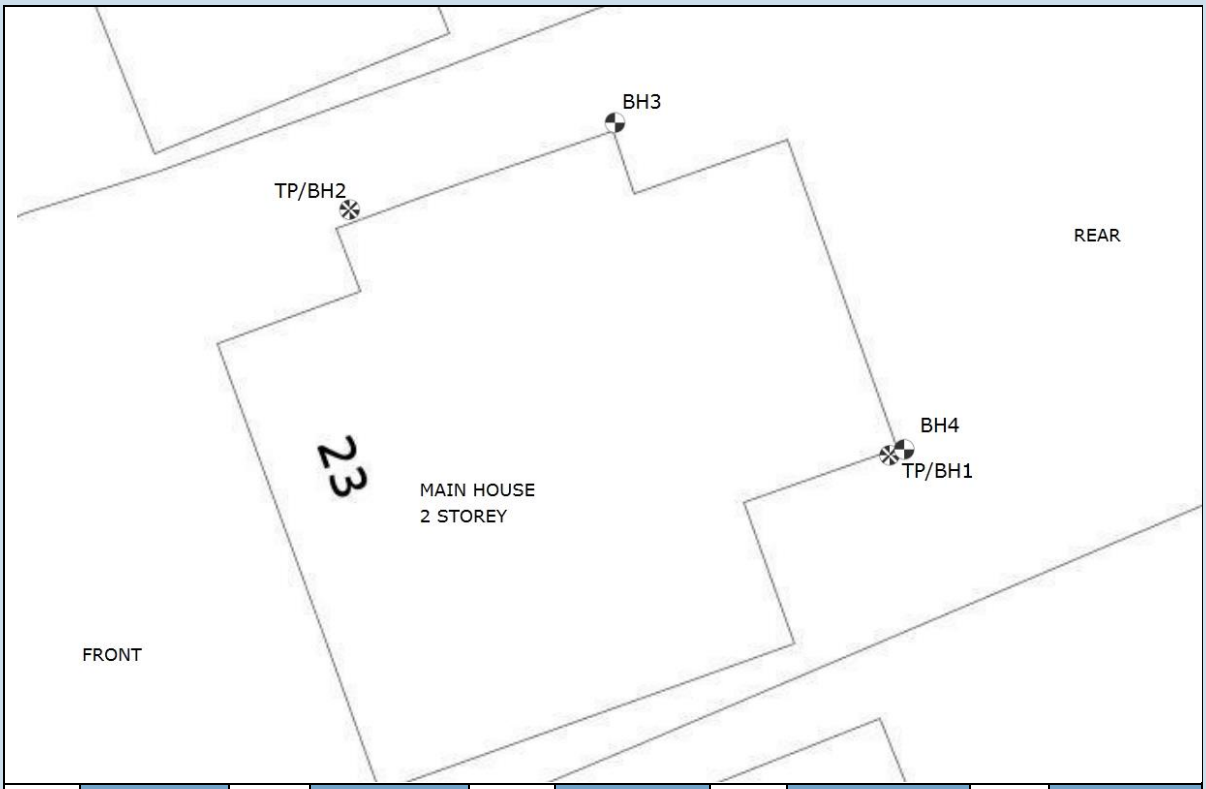
GEOTECHNICAL
for Subsidence Management Services

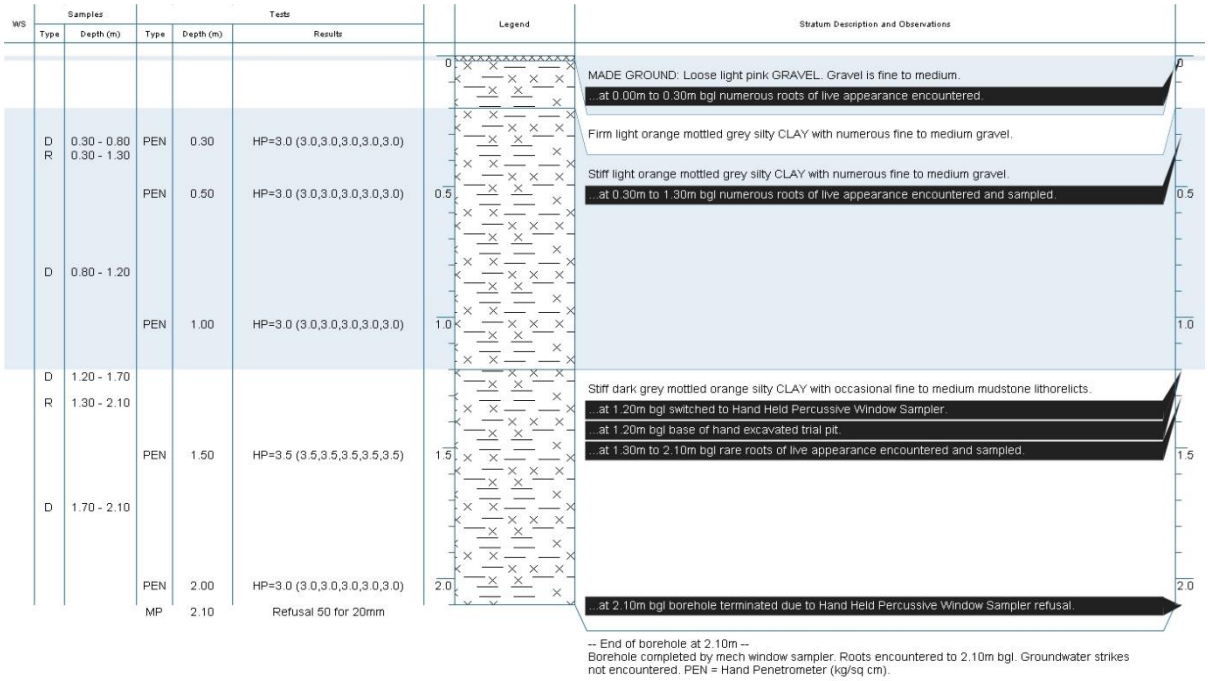
23 Oakfield Walk, Barnsley, S75 2LW

Client:	Subsidence Management Services
Client Contact:	John Buckley
Client Ref:	IFS-LBG-SUB-18-0078492
Policy Holder:	Mr Rob Bramley
Report Date:	29 April 2022
Our Ref:	C43839G28951

Site Plan



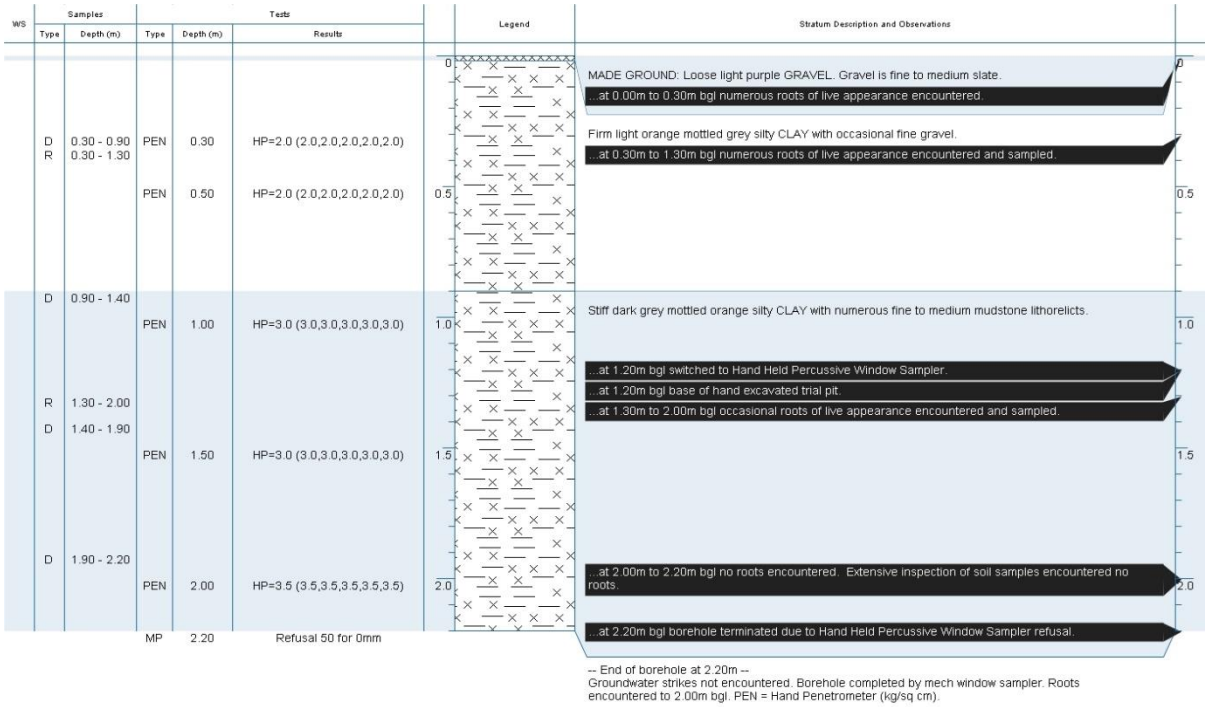
BH3 Borehole Log



WS	Samples Type	Samples Depth (m)	Tests Type	Tests Depth (m)	Tests Results	Legend	Stratum Description and Observations
						0	MADE GROUND: Loose light pink GRAVEL. Gravel is fine to medium.
							...at 0.00m to 0.30m bgl numerous roots of live appearance encountered.
	D	0.30 - 0.80	PEN	0.30	HP=3.0 (3.0,3.0,3.0,3.0,3.0)		Firm light orange mottled grey silty CLAY with numerous fine to medium gravel.
	R	0.30 - 1.30					Stiff light orange mottled grey silty CLAY with numerous fine to medium gravel.
			PEN	0.50	HP=3.0 (3.0,3.0,3.0,3.0,3.0)	0.5	...at 0.30m to 1.30m bgl numerous roots of live appearance encountered and sampled.
	D	0.80 - 1.20					
			PEN	1.00	HP=3.0 (3.0,3.0,3.0,3.0,3.0)	1.0	
	D	1.20 - 1.70					Stiff dark grey mottled orange silty CLAY with occasional fine to medium mudstone lithorelicts.
	R	1.30 - 2.10					...at 1.20m bgl switched to Hand Held Percussive Window Sampler.
							...at 1.20m bgl base of hand excavated trial pit.
			PEN	1.50	HP=3.5 (3.5,3.5,3.5,3.5,3.5)	1.5	...at 1.30m to 2.10m bgl rare roots of live appearance encountered and sampled.
	D	1.70 - 2.10					
			PEN	2.00	HP=3.0 (3.0,3.0,3.0,3.0,3.0)	2.0	
			MP	2.10	Refusal 50 for 20mm		...at 2.10m bgl borehole terminated due to Hand Held Percussive Window Sampler refusal.

-- End of borehole at 2.10m --
Borehole completed by mech window sampler. Roots encountered to 2.10m bgl. Groundwater strikes not encountered. PEN = Hand Penetrometer (kg/sq cm).

BH4 Borehole Log



WS	Samples Type	Samples Depth (m)	Tests Type	Tests Depth (m)	Tests Results	Legend	Stratum Description and Observations
						0	MADE GROUND: Loose light purple GRAVEL. Gravel is fine to medium slate.
							...at 0.00m to 0.30m bgl numerous roots of live appearance encountered.
	D	0.30 - 0.90	PEN	0.30	HP=2.0 (2.0,2.0,2.0,2.0,2.0)		Firm light orange mottled grey silty CLAY with occasional fine gravel.
	R	0.30 - 1.30					...at 0.30m to 1.30m bgl numerous roots of live appearance encountered and sampled.
			PEN	0.50	HP=2.0 (2.0,2.0,2.0,2.0,2.0)	0.5	0.5
	D	0.90 - 1.40					Stiff dark grey mottled orange silty CLAY with numerous fine to medium mudstone lithorelicts.
			PEN	1.00	HP=3.0 (3.0,3.0,3.0,3.0,3.0)	1.0	1.0
							...at 1.20m bgl switched to Hand Held Percussive Window Sampler.
							...at 1.20m bgl base of hand excavated trial pit.
	R	1.30 - 2.00					...at 1.30m to 2.00m bgl occasional roots of live appearance encountered and sampled.
	D	1.40 - 1.90					
			PEN	1.50	HP=3.0 (3.0,3.0,3.0,3.0,3.0)	1.5	1.5
	D	1.90 - 2.20					
			PEN	2.00	HP=3.5 (3.5,3.5,3.5,3.5,3.5)	2.0	...at 2.00m to 2.20m bgl no roots encountered. Extensive inspection of soil samples encountered no roots. 2.0
			MP	2.20	Refusal 50 for 0mm		...at 2.20m bgl borehole terminated due to Hand Held Percussive Window Sampler refusal.

-- End of borehole at 2.20m --
Groundwater strikes not encountered. Borehole completed by mech window sampler. Roots encountered to 2.00m bgl. PEN = Hand Penetrometer (kg/sq cm).

Site Observations

GENERAL:
Site Investigation works (BH 3 and BH 4) undertaken on 19 April 2022 during dry weather (i.e. no rain).

HEALTH AND SAFETY:
Negative signal obtained in Radio and Genny mode on the Cable Avoidance Tool (CAT) (BH3).
Negative signal obtained in Power, Radio and Genny mode on the Cable Avoidance Tool (CAT) (BH4).

BOREHOLE:
At 1.20m bgl switched to Hand Held Percussive Window Sampler in BH3.
At 1.20m bgl base of hand excavated trial pit in BH3.
At 2.10m bgl borehole terminated due to Hand Held Percussive Window Sampler refusal in BH3.
Hand Held Percussive Window Sampler and Mackintosh Probe refusal at 2.10m bgl due to cobbles within the clay (BH 3). Borehole terminated. No further works undertaken.
At 1.20m bgl switched to Hand Held Percussive Window Sampler in BH4.
At 1.20m bgl base of hand excavated trial pit in BH4.
At 2.20m bgl borehole terminated due to Hand Held Percussive Window Sampler refusal in BH4.
Hand Held Percussive Window Sampler and Mackintosh Probe refusal at 2.20m bgl due to cobbles within the clay (BH 4). Borehole terminated. No further works undertaken.

ROOTS:
At 0.00m to 0.30m bgl numerous roots of live appearance encountered in BH3.
At 0.30m to 1.30m bgl numerous roots of live appearance encountered and sampled in BH3.
At 1.30m to 2.10m bgl rare roots of live appearance encountered and sampled in BH3.
At 0.00m to 0.30m bgl numerous roots of live appearance encountered in BH4.
At 0.30m to 1.30m bgl numerous roots of live appearance encountered and sampled in BH4.
At 1.30m to 2.00m bgl occasional roots of live appearance encountered and sampled in BH4.
At 2.00m to 2.20m bgl no roots encountered. Extensive inspection of soil samples encountered no roots in BH4.

IN SITU TESTING:
Hand Penetrometer (PEN) undertaken at 0.30m bgl (BH 3) within the hand excavated trial pit and thereafter in the window sampler at maximum 0.50m intervals.
Mackintosh Probe (MP) test undertaken at 2.10m bgl (BH 3) within the window sample borehole only with no further Mackintosh Probe (MP) testing undertaken.
Hand Penetrometer (PEN) undertaken at 30m bgl (BH 4) within the hand excavated trial pit and thereafter in the window sampler at maximum 0.50m intervals.
Mackintosh Probe (MP) test undertaken at 2.20m bgl (BH 4) within the window sample borehole only with no further Mackintosh Probe (MP) testing undertaken.

WATER STRIKES:
No water strikes (NWS) encountered (BH 3 and BH 4).

The groundwater observations do not necessarily indicate equilibrium conditions. It should be appreciated that groundwater levels are subject to both seasonal and weather induced variations. Other effects such as construction activities may also change groundwater levels.

Environmental Services

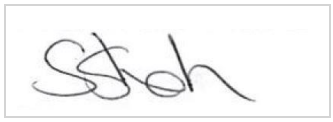
SOIL ANALYSIS

for Subsidence Management Services

23 Oakfield Walk, Barnsley, S75 2LW

Client:	Subsidence Management Services
Claim Number:	500061895
Policy Holder:	Mr Rob Bramley
Report Date:	11/05/2022
Our Ref:	L22812

Compiled By:

Name	Position	Signature
Saira Dougan	Laboratory Technician	

Checked By:

Name	Position	Signature
Bob Walker	Laboratory Manager	

Date samples received:	27-Apr-22
Water Content Test Date:	27-Apr-22
Atterberg Limits Test Date:	03-May-22
Oedometer Test Date:	08-May-22

UKAS TESTING

9265

Environmental Services

Notes relating to soils testing

Unless otherwise stated, all soil testing was undertaken by Environmental Services at unit 10H Maybrook Business Park, B76 1AL for SubsNetUK of Unit 4 Linnet Court, Cawledge Business Park, Alnwick, NE66 2GD

Soil samples have been prepared in accordance with BS1377:Part 1: 2016 Section 7

Descriptions of soil samples within the laboratory have been undertaken generally in accordance with BS5930:2015. Descriptions of soil samples fall outside of the scope of UKAS accreditation and may have been shortened to remove tertiary components for ease of reference.

The graphical representation of 40% of the LL and the numerical representation of the modified plasticity index (mod. PI) fall outside of the scope of UKAS accreditation.

Following the issue of this soil analysis report, samples will be retained for at least 28 days should additional testing, or referencing, be required. It should be noted that any tests undertaken on soils retained subsequent to the issue of this report may not give an accurate indication of the in-situ conditions of the sample.

The results contained herein relate only to items tested and no others. Additionally as the laboratory is not responsible for the sampling process it takes no responsibility for the condition of the samples and all samples are tested "as received".

Where samples of the same test type are not tested on the same day, or the testing spans multiple days, the test date states the day of the final test or the test date of the final sample.

All information above the laboratory reference on the cover page of this report are as provided by the customer and the laboratory is not responsible for any errors or omissions therein.

Water Content Tests are undertaken in accordance with ISO 17892:Part 1:2014

The Liquid Limit test is undertaken in accordance with BS1377:Part 2:1990 Section 4.4 using an 80g cone with a 30° tip. Sieve percentages reported in blue denote that the sample has been sieved otherwise it has been prepared from its natural state. Sieve percentage reported in BOLD denote that the sample has been oven-dried prior to testing.
Unless otherwise specified herein, the one-point cone penetrometer method has been used with increasing water content. Atterberg results depicted in green have not been tested and are duplicates of the preceding sample, included for reference only.

The Plastic Limit test and the determination of the Plasticity Index is undertaken in accordance with BS1377:Part 2:1990. Where a plastic limit has been denoted with an asterisk (*) then it has been derived from the liquid limit and has not been tested.

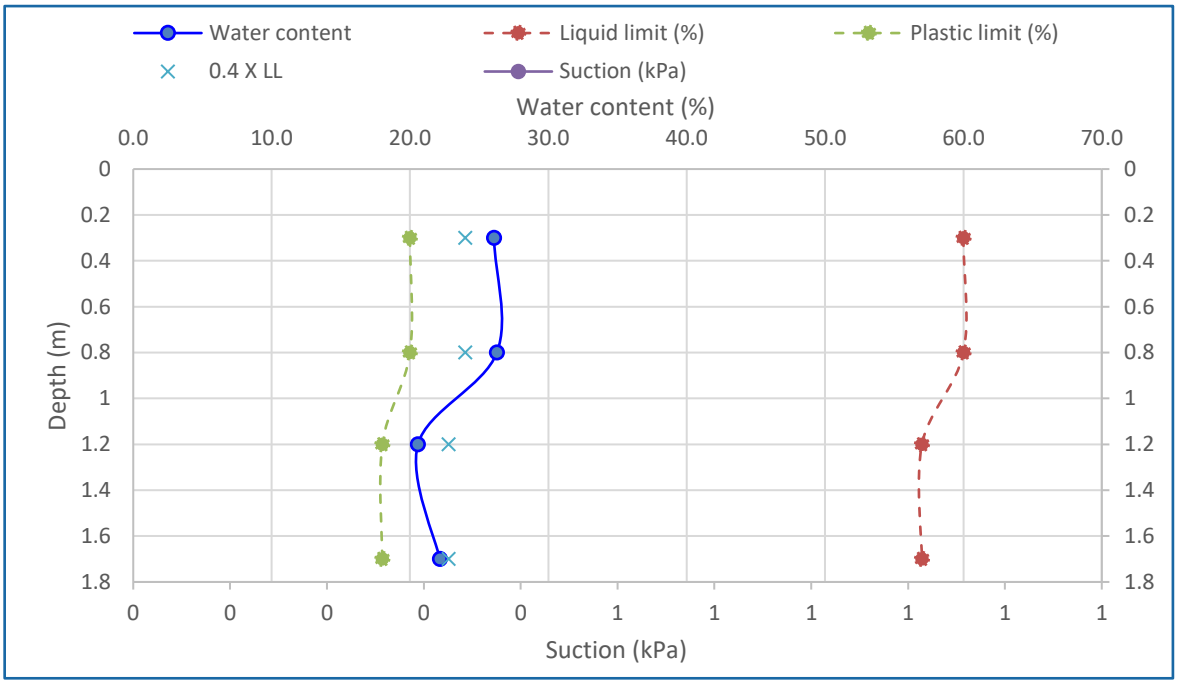
The Oedometer swell/strain test method is based upon BS1377:Part 5:1990 Section 4.4 ‘Determination of swelling and collapse characteristics’ and unless otherwise stated is undertaken on a remoulded, disturbed, sample.

The Oedometer Swell/Strain Test is undertaken in a controlled environment within a temperature range of 16°C and 24°C

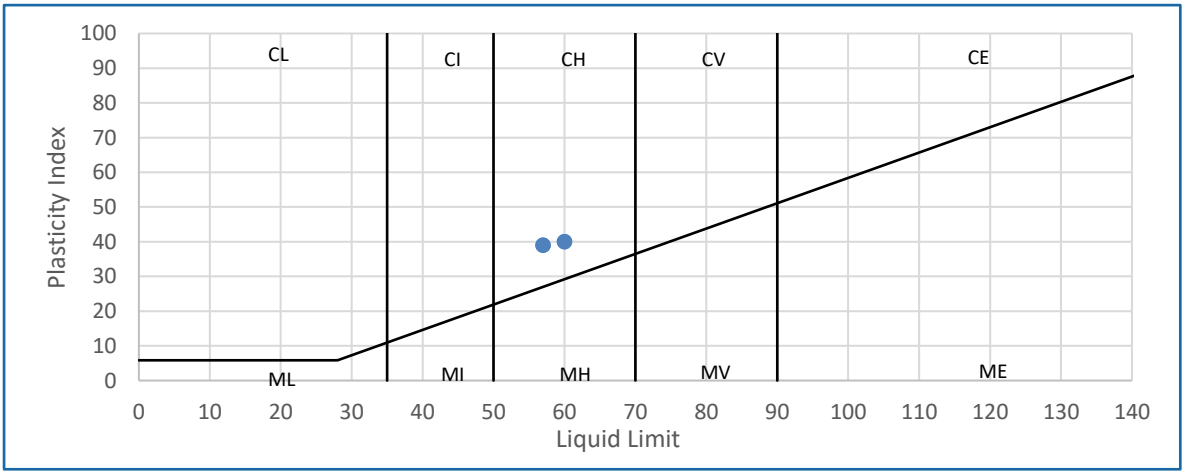
Environmental Services

Samples from BH3

Lab Ref	Depth (m)	WC (%)	LL (%)	PL (%)	PI (%)	.425 mm(%)	mod. PI (%)	Av. Suc. (kPa)	Description
1	0.3	26.1	60	20	40	100	40		Stiff orange-brown/light grey mottled silty CLAY with rare gravel. Gravel is fine and medium.
2	0.8	26.3	60	20	40	100	40		Firm to stiff orange-brown/light grey mottled silty CLAY with rare gravel. Gravel is fine
3	1.2	20.6	57	18	39	100	39		Stiff dark grey silty CLAY with rare gravel. Gravel is fine
4	1.7	22.2	57	18	39	100	39		Stiff dark grey silty CLAY with rare gravel. Gravel is fine



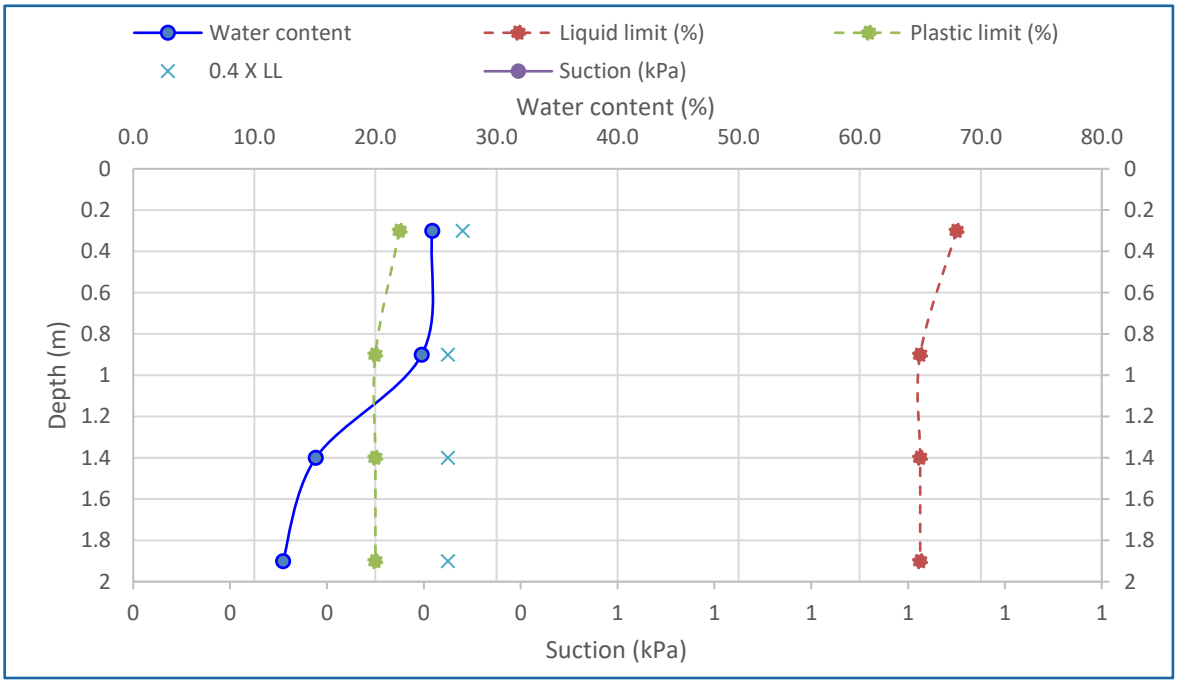
Plasticity Chart for Casagrande Classification



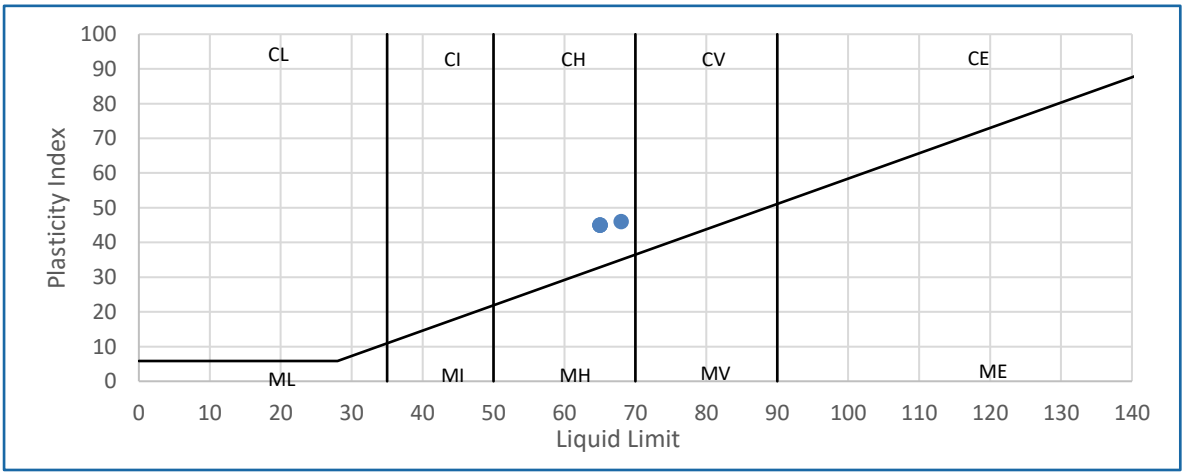
Environmental Services

Samples from BH4

Lab Ref	Depth (m)	WC (%)	LL (%)	PL (%)	PI (%)	.425 mm(%)	mod. PI (%)	Av. Suc. (kPa)	Description
5	0.3	24.7	68	22	46	100	46		Firm to stiff orange-brown/light grey mottled slightly silty CLAY with rare gravel. Gravel is fine
6	0.9	23.8	65	20	45	90	41		Firm to stiff dark grey slightly gravelly silty CLAY. Gravel is fine.
7	1.4	15.1	65	20	45	90	41		Firm to stiff dark grey slightly gravelly silty CLAY. Gravel is fine and medium.
8	1.9	12.4	65	20	45	90	41		Firm to stiff dark grey slightly gravelly silty CLAY. Gravel is fine and medium.



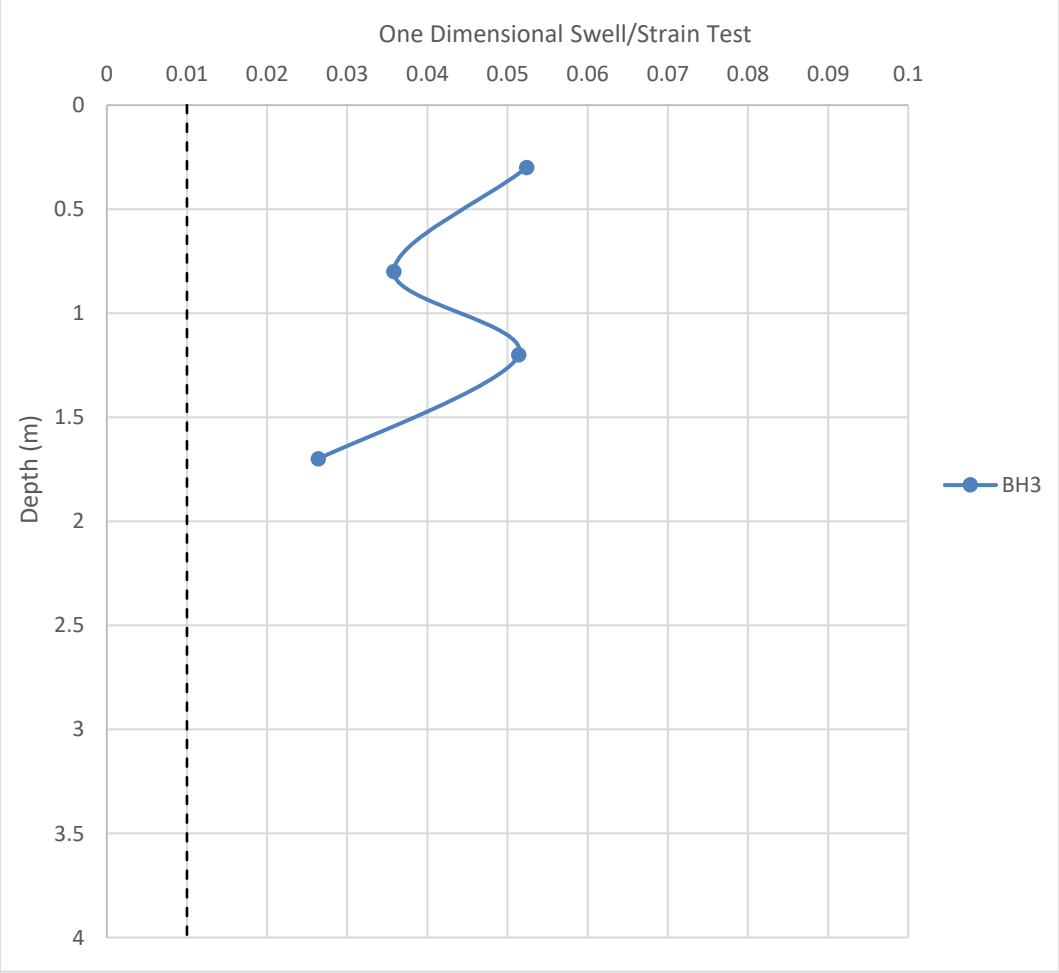
Plasticity Chart for Casagrande Classification



Summary of Oedometer Testing for BH3

Lab Ref	Depth (m)	Strain	Heave (mm)	Remarks
1	0.3	0.0524	7.9	
2	0.8	0.0358	8.9	
3	1.2	0.0514	10.3	
4	1.7	0.0264	6.6	

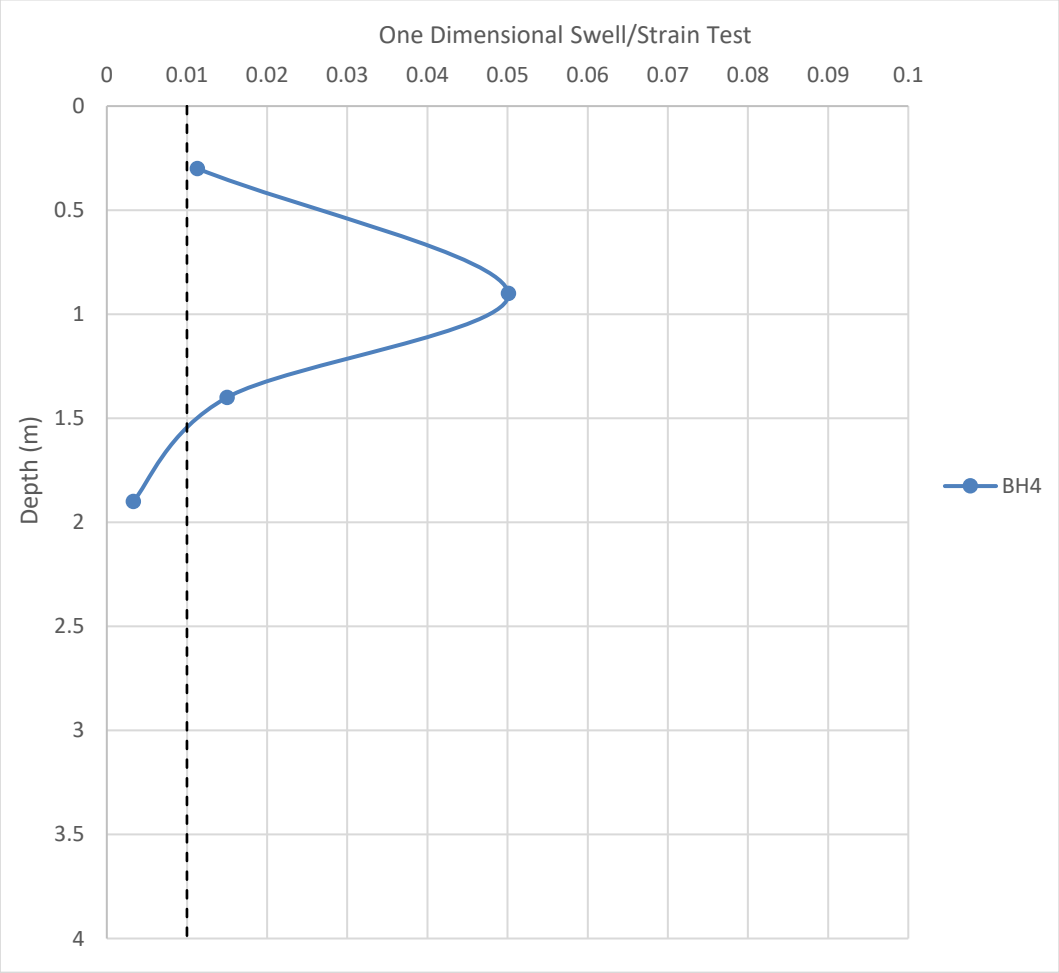
BH 3 estimate of heave	34mm



Summary of Oedometer Testing for BH4

Lab Ref	Depth (m)	Strain	Heave (mm)	Remarks
5	0.3	0.0113	1.7	
6	0.9	0.0501	15	
7	1.4	0.015	3.7	
8	1.9	0.0033	0	

BH 4 estimate of heave	20mm



Deviating Samples

The table below details any samples deviating from laboratory procedure or deviating in condition to an extent whereby the validity of results may be affected. A test denoted "I" is likely to have had testing abandoned but where a test result has been provided a non-standard procedure may have been used, details of which will be provided upon request.

LAB REF	CONDITION	WC	ATT	SUC	OED
1					
2					
3					
4					
5					
6					
7					
8					

Key

D	Delay in sample receipt
C	Contaminated sample
B	Sample not bagged correctly
S	Sample too sandy (unsuitable for testing)
G	Sample too gravelly (unsuitable for testing)
V	Sample too soft (unsuitable for preparation)
L	Sample too silty
I	Insufficient sample
O	Too much organic content (unsuitable for testing)
N	Non-standard procedure used
H	Sample depth too shallow
X	Testing result too similar to above sample

References

The following provides a brief interpretation of the test results by comparison of the results to published classifications. The Atterberg Limit test may be used to classify the plasticity of soils; the plasticity classes defined in BS5930:2015 "Code of Practice for Site Investigations" are as follows.

CL (ML)	CLAY and CLAY/SILT of Low plasticity
CI (MI)	CLAY and CLAY/SILT of Intermediate plasticity
CH (MH)	CLAY and CLAY/SILT of High plasticity
CV (MV)	CLAY and CLAY/SILT of Very High plasticity
CE (ME)	CLAY and CLAY/SILT of Extremely High plasticity
O	The letter O is added to prefixes to symbolise a significant proportion of organic matter.
NP	Non-plastic

The Plasticity Index (PI) Result obtained from the Atterberg Limit tests may also be used to classify the potential for volume change of fine soils, in accordance with the National House Building Council's standards - Chapter 4.2 (2003) "Building Near Trees", as summarised below.

Modified PI < 10	Non Classified.
Modified PI = 10 to <20	Low volume change potential.
Modified PI = 20 to <40	Medium volume change potential.
Modified PI = 40 or greater	High volume change potential.

The 2003 edition of Chapter 4.2 also permits use of the Plasticity Index without modification. The classifications for this are grouped by soil type (soils with similar visual soils description and using unmodified Plasticity Indices.

ROOT IDENTIFICATION

for Subsidence Management Services

23 Oakfield Walk, Barnsley, S75 2LW

Client:	Subsidence Management Services
Client Contact:	John Buckley
Claim Number:	500061895
Client Reference:	IFS-LBG-SUB-18-0078492
Policy Holder:	Mr Rob Bramley
Report Date:	25 April 2022
Our Ref:	R44981

Intec
Parc Menai, Bangor,
Gwynedd, North Wales
LL57 4FG
Tel: 01248 672652

Sub Sample	Species Identified		Root Diameter	Starch
BH3:				
0.3-1.3m	probably *Quercus* spp.		1 mm	Low
0.3-1.3m	*Populus* or *Salix* spp.	1	<1 mm	Low
1.3-2.1m	*Quercus* spp.	2	3 mm	Moderate
1.3-2.1m	broadleaved species, too decayed for positive identification		3 mm	Absent
BH4:				
0.3-1.3m	either *Quercus* spp. or *Castanea* spp.	3	<1 mm	Absent
1.3-2m	probably either *Quercus* spp. or *Castanea* spp.	4	<1 mm	Absent
1.3-2m	too small and decayed for identification	5	<1 mm	Absent

Comments:

1 - Plus 2 others the same. All small and juvenile.
2 - Plus 2 others also identified as *Quercus* spp.
3 - Plus 3 others the same. All juvenile and in a state of decay.
4 - Very small and decayed.
5 - Plus 2 others the same.

Quercus spp. are oaks. *Castanea* spp. include sweet chestnut.
Populus spp. are poplars and aspen; *Salix* spp. are willows.

Signed: R J Shaw

Unless we are otherwise instructed in writing, the above sample material will normally be disposed of 6 years after the date of this report.