


SITE INVESTIGATION FACTUAL REPORT

Report No: SI-728253
Client: AA
Site: Long Acre, Main Street, Polebrook
Northamptonshire
Client Ref: SHAA01022064
Date of Visit: 31/10/2023



Home Emergency Response - Subsidence Investigation - Drainage Services – Crack & Level Monitoring – Property Video Surveys

Unit E2 First Floor Suite, Boundary Court
Willow Farm Business Park, Castle Donington
Leicestershire, DE74 2NN


www.cet-uk.com

CET is the trading name of CET Structures Ltd
Registered in England No. 02527130

Investigation Layout Plan

Sheet: 1 of 1

Job No: 728253

Date: 31/10/2023

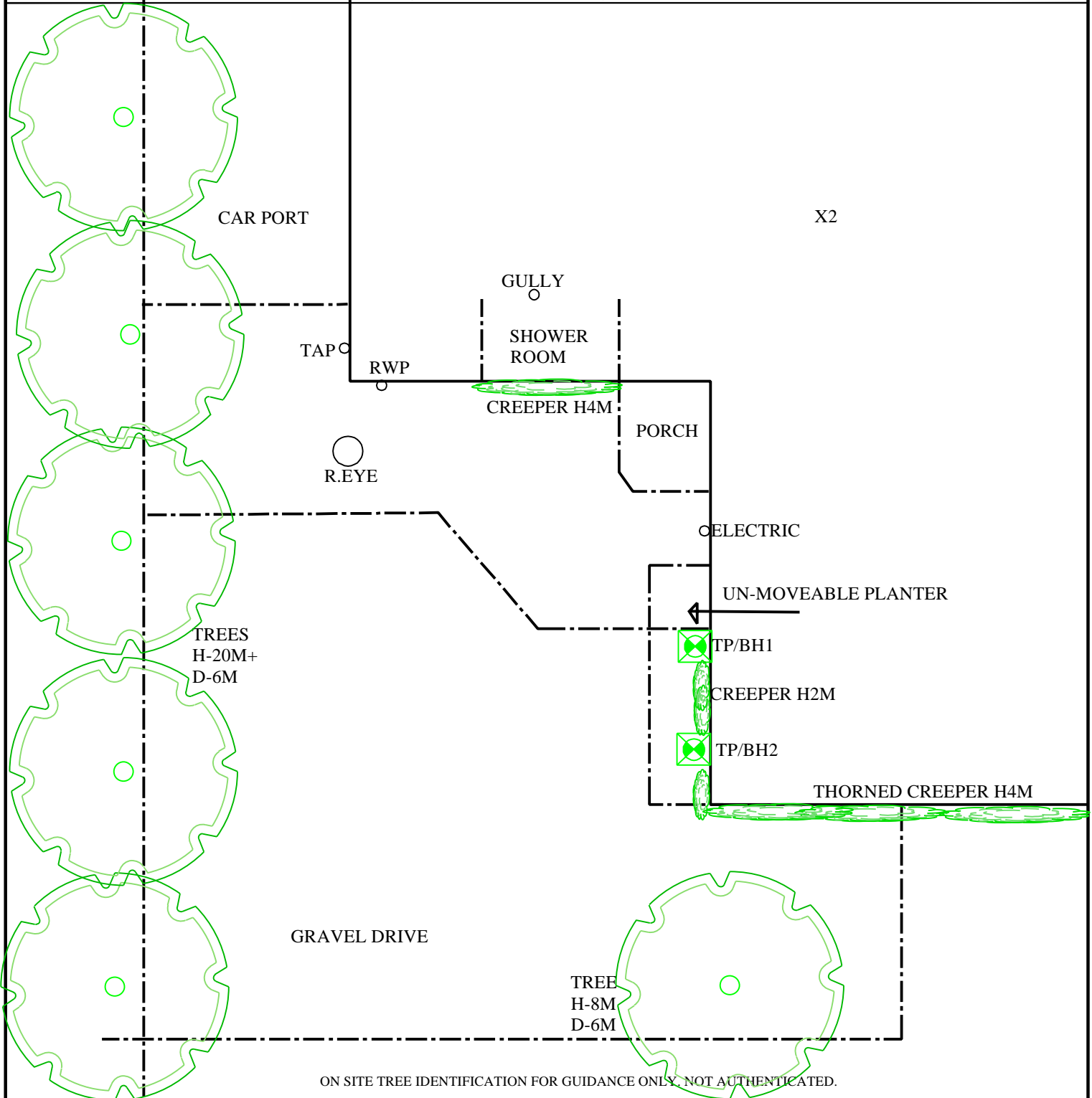
Site: Long Acre

Work carried out for: AA

AG (SI) (Checked)

CL (Drawn)

Weather: Wet



ON SITE TREE IDENTIFICATION FOR GUIDANCE ONLY. NOT AUTHENTICATED.

Remarks:

Key:

- Combined Gully RWWG
- Manhole MH
- Rain Water Pipe RWP
- Rain Water Gully RWG
- Soil Vent Pipe SVP
- Waste Gully WG
- Waste Pipe WP

Surface Water Drain

Foul Water Drain

Tree / Bush

(approx. ht in m)

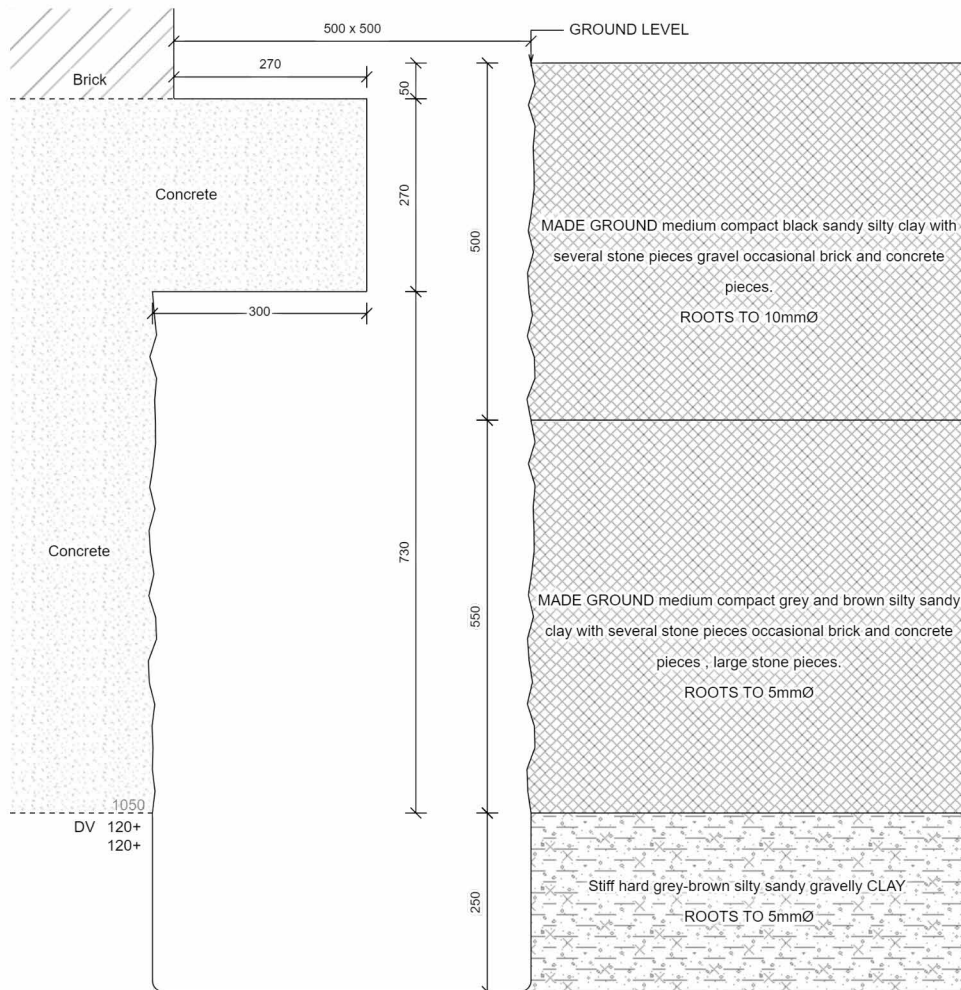
Trial Pit

Borehole

O/D - Open Discharge

Scale: N.T.S.

TEST REPORT: Trial Pit
REPORT NUMBER: C1083033 / 276001.1.1.1
TRIAL PIT REF: 1of1 TP1 **DATE:** 31/10/2023
CLIENT: AA **SITE:** LONG ACRE
JOB NO: 728253 **WEATHER:** Dry
EXCAVATION METHOD: Hand tools



For Strata below 1300mm see Bore Hole log

Curved steel pin driven 300mm under concrete foundation at 1050mm below ground level. Due to the foundation cutting back 300mm unable to physical see foundation so assumed underside only
Key:
 D Small disturbed sample J Jar sample
 B Bulk disturbed sample V Pilcon vane (kPa)
 W Water sample M Mackintosh probe
 TDTD Too dense to drive

Remarks:
 Test results reported relate only to the items tested.
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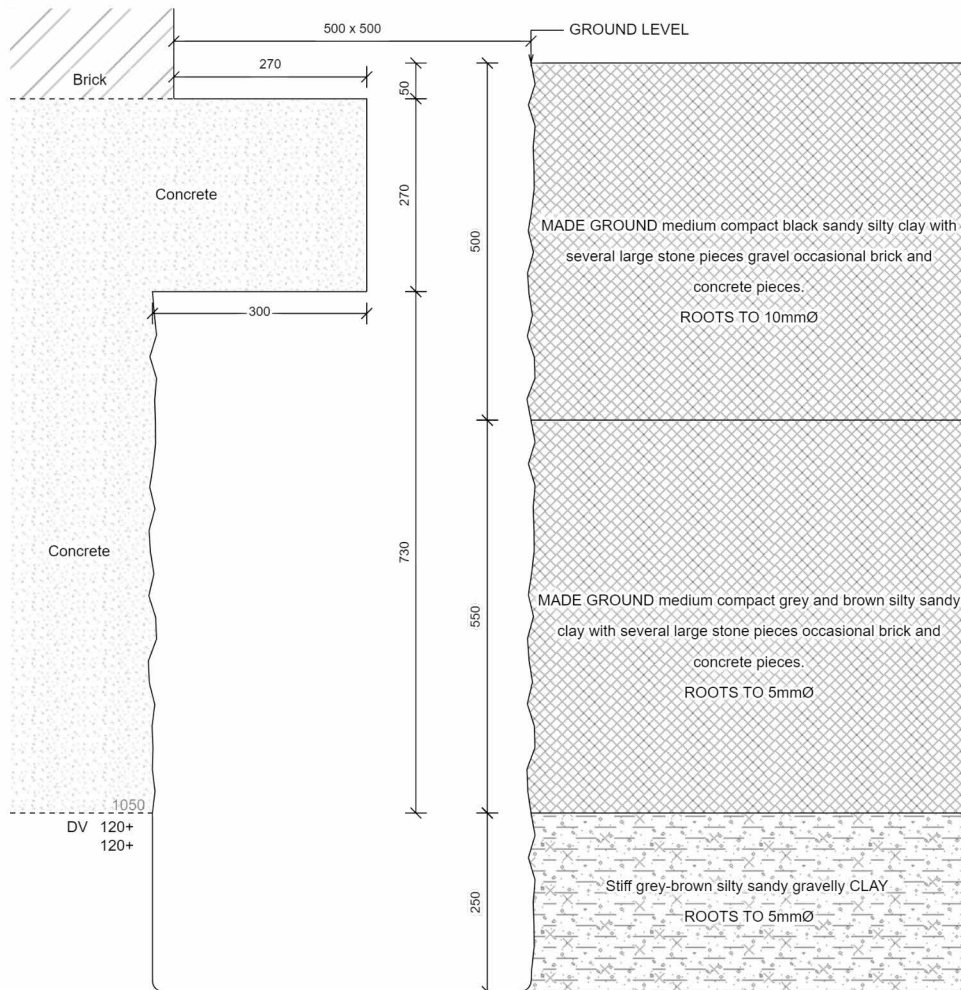
For and on behalf of CTS
 Cara Kosma - Project Delivery Supervisor

Approved Signatory
 Report date 01-Nov-23

Borehole		1	Sheet: 1 of 2		Site: LONG ACRE					
			Job No: 728253							
			Date: 31/10/2023							
Boring Method:	Rotary Auger		Ground Level:		Client: AA					
Diameter (mm):	100	Weather:	dry							
Depth (m)	Soil Description				Thickness	Legend	Samples and Tests			
0.00	See Trial Pit				1.30					
1.30	Stiff grey silty sandy CLAY				3.20					
					1.50		D			
					2.00		DV	120+		
								120+		
					2.50		D			
					3.00		DV	120+		
								120+		
					3.50		D			
					4.00		DV	120+		
								120+		
4.50	Stiff fragmented grey silty sandy CLAY				0.50		4.50	D		
Remarks:					Key: D - Disturbed Sample B - Bulk Sample W - Water Sample Roots J - Jar Sample Roots V - Pilcon Shear Vane (kPa) Roots M - Mackintosh Probe Depth to Water (m) TDTD - Too Dense To Drive					
					To		Max			
					Depth		Dia			
					(m)		(mm)			
					2.10		3			
Logged:					Checked:					
Approved:					Version V1.0 28/01/16					
					N.T.S.					

Borehole		1	Sheet: 2 of 2		Site: LONG ACRE				
			Job No: 728253						
			Date: 31/10/2023						
Boring Method:	Rotary Auger		Ground Level:		Client: AA				
Diameter (mm):	75	Weather:	dry						
Depth (m)	Soil Description				Thickness	Legend	Samples and Tests		
5.00	Stiff fragmented grey silty sandy CLAY				0.30	X + - x	5.00	DV	120+
5.30	End of BH								
Remarks: BH ends at 5.3m obstruction thought too be sandstone too hard too drill, BH dry and open on completion.					Key: D - Disturbed Sample B - Bulk Sample W - Water Sample Roots J - Jar Sample Roots V - Pilcon Shear Vane (kPa) Roots M - Mackintosh Probe Depth to Water (m) TDTD - Too Dense To Drive			To Depth (m)	Max Dia (mm)
Logged: AG		CK	Checked:	Approved:	Version V1.0 28/01/16		N.T.S.		

TEST REPORT: Trial Pit
REPORT NUMBER: C1083033 / 276001.1.1.2
TRIAL PIT REF: TP2 **DATE:** 31/10/2023
CLIENT: AA **SITE:** LONG ACRE
JOB NO: 728253 **WEATHER:** Dry
EXCAVATION METHOD: Hand tools



For Strata below 1300mm see Bore Hole log

Curved steel pin driven 300mm under concrete foundation at 1050mm below ground level. Unable to physical see foundation due to 300mm cut back so assumed only.

Key:
 D Small disturbed sample J Jar sample
 B Bulk disturbed sample V Pilcon vane (kPa)
 W Water sample M Mackintosh probe
 TDTD Too dense to drive

Remarks:
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For and on behalf of CTS
 Cara Kosma - Project Delivery Supervisor

Approved Signatory
 Report date 01-Nov-23

Borehole		2	Sheet:		1 of 2		Site: LONG ACRE							
			Job No:		728253									
			Date:		31/10/2023									
Boring Method:		Rotary Auger		Ground Level:		Client: AA								
Diameter (mm):		100		Weather:				dry						
Depth	Soil Description						Thickness	Legend	Samples and Tests					
(m)									Depth	Type	Result			
0.00	See Trial Pit						1.30							
1.30	Stiff grey silty sandy CLAY						3.70		1.50	D				
									2.00	DV	120+			
											120+			
									2.50	D				
									3.00	DV	120+			
											120+			
									3.50	D				
									4.00	DV	120+			
											120+			
									4.50	D				
Remarks: see page 2of2						Key: D - Disturbed Sample B - Bulk Sample W - Water Sample Roots J - Jar Sample Roots V - Pilcon Shear Vane (kPa) Roots M - Mackintosh Probe Depth to Water (m) TDTD - Too Dense To Drive						To	Max	
												Depth	Dia	
												(m)	(mm)	
												2.20	3	
Logged: AG		CK		Checked:		Approved:		Version		V1.0 28/01/16		N.T.S.		

Borehole		2	Sheet: 2 of 2		Site: LONG ACRE				
			Job No: 728253						
			Date: 31/10/2023						
Boring Method:	Rotary Auger		Ground Level:		Client: AA				
Diameter (mm):	100	Weather:	dry						
Depth (m)	Soil Description				Thickness	Legend	Samples and Tests		
5.00	Stiff grey silty sandy CLAY				0.40	X + - x	5.00	DV	120+
5.40	End of BH								
Remarks: BH ends at 5.4m obstruction thought too be sandstone too hard too drill, BH dry and open on completion.					Key:			To	Max
					D - Disturbed Sample			Depth	Dia
B - Bulk Sample			(m)	(mm)	2.20	3			
W - Water Sample			Roots						
J - Jar Sample			Roots						
V - Pilcon Shear Vane (kPa)			Roots						
M - Mackintosh Probe			Depth to Water (m)						
TDTD - Too Dense To Drive									
Logged: AG	CK	Checked:	Approved:	Version	V1.0 28/01/16	N.T.S.			

SITE INVESTIGATION LABORATORY TEST REPORT

SI REPORT NUMBER: 728253

CLIENT : CET Property Assurance (AA)

SITE:
Long Acre, Main Street
Polebrook
Peterborough
PE8 5LN

DATE OF SITE VISIT:
31/10/2023

DATE RECEIVED BY LABORATORY:
31/10/2023

Approved by : 
C Kosma - Project Delivery Supervisor

DATE REPORTED: 17-Nov-2023

The testing on this report has been subcontracted, see Summary for testing
Laboratory details

Our Ref : 728253

Laboratory Summary Results

Date Sampled: 31/10/2023

Location : Long Acre, Main Street

Date Received : 31/10/2023

Client: CET Property Assurance (AA)

Date Tested : 15/11/2023

Address: CET, Unit 4, Boundary Court, Willow Farm Business Park, Castle Donington, DE74 2NN

Date of Report : 17/11/2023

Sample Ref		Type	# Moisture Content (%) [11]	# Soil Fraction > 0.425mm (%) [2]	# Liquid Limit (%) [3]	# Plastic Limit (%) [4]	~ Plasticity Index (%) [5]	~ Liquidity Index [5]	~ Modified Plasticity Index (%) [6]	~ Soil Class [7]	# Filter Paper Contact Time (d)	# Soil Sample Suction (kPa) [8]	# Oedometer Strain [9]	~ Estimated * Heave Potential (Dd) (mm)[10]	In situ * Shear Vane Strength (kPa) [11]	Organic * Content (%) [12]	pH Value [13]	Sulphate Content		* Class [16]
TP/BH No	Depth (m)																	SO ₃ (g/l)* [14]	SO ₄ (mg/l) [15]	
1	U/S 1.05	D	21	10	45	22	23	-0.04	21	CI	7	333			> 120					
	1.5	D	17	<5																
	2.0	D	27	<5	80	32	48	-0.11	48	CV	7	967			> 120					
	2.5	D	29	<5																
	3.0	D	27	<5	80	33	47	-0.13	47	CV	7	1170			> 120					
	3.5	D	23	<5																
	4.0	D	25	<5	69	27	42	-0.05	42	CH	7	624			> 120					
	4.5	D	24	<5																
	5.0	D	26	<5	78	32	46	-0.14	46	CV	7	1070			> 120					

Test Methods / Notes

[1] BS 1377 : Part 2 : 1990, Test No 3.2

[2] Estimated if <5%, otherwise measured

[3] BS 1377 : Part 2 : 1990, Test No 4.4

[4] BS 1377 : Part 2 : 1990, Test No 5.3

[5] BS 1377 : Part 2 : 1990, Test No 5.4

[6] BRE Digest 240 : 1993

[7] BS 5930 : 2018 : Figure 8 - Plasticity Chart for the classification of fines soils

[8] Building Research Establishment Information Paper 4/93

[9] In Accordance with BS 1377-5 : 1990 : Clause 3

[10] Estimated Heave Potential (Dd)

[11] Values of shear strength were determined in situ by CTS using

a Pilon hand vane or Geonor vane (GV).

[12] BS 1377 : Part 3 : 2018 + A1 2021 Clause 4 - Tested By CTS Leicester

[13] BS 1377 : Part 3 : 2018 + A1 2021 Clause 12 - Tested By CTS Leicester

[14] Sulphate content as SO₃ as required by BS 1377: Part 3: 1990 has been provided for information purposes - Tested By CTS Leicester

[15] BS 1377 : Part 3 : 2018 + A1 2021 Clause 7.6 - Tested By CTS Leicester

[16] BRE Special Digest One (Concrete in Aggressive Ground) August 2005

Note that if the SO₄ content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4M or DS-5M class respectively unless water soluble magnesium testing is undertaken to prove otherwise.

PSD Chart - BS 1377: Part 2 : 1990, Test No 9.2

- Calculations performed using subcontracted data.

* These tests are not UKAS accredited

These tests have been subcontracted and carried out by PSL (Part of the Phenna Group)

Full reports can be provided upon request.

Key

- D Disturbed sample (small)
- B Disturbed sample (bulk)
- U Undisturbed sample
- W Groundwater sample
- ENP Essentially Non-Plastic by inspection
- U/S Underside of Foundation

Test results reported relate only to the items tested.

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

Our Ref : 728253

Laboratory Summary Results

Date Sampled : 31/10/2023

Location : Long Acre, Main Street

Date Received : 31/10/2023

Client: CET Property Assurance (AA)

Date Tested : 15/11/2023

Address: CET, Unit 4, Boundary Court, Willow Farm Business Park, Castle Donington, DE74 2NN

Date of Report : 17/11/2023

Sample Ref.		Type	# Moisture Content (%) [1]	# Soil Fraction > 0.425mm (%) [2]	# Liquid Limit (%) [3]	# Plastic Limit (%) [4]	~ Plasticity Index (%) [5]	~ Liquidity Index [5]	~ Modified Plasticity Index (%) [6]	~ Soil Class [7]	# Filter Paper Contact Time (d)	# Soil Sample Suction (kPa) [8]	# Oedometer Strain [9]	~ Estimated Heave Potential (Dd) (mm)[10]	In situ Shear Vane Strength (kPa) [11]	Organic Content (%) [12]	pH Value [13]	Sulphate Content		* Class [16]
TP/BH No.	Depth (m)																	SO ₃ (g/l)* [14]	SO ₄ (mg/l) [15]	
2	U/S 1.05	D	17	11	48	24	24	-0.28	21	CI	7	1390			> 120					
	1.5	D	16	<5											> 120					
	2.0	D	26	<5	70	29	41	-0.07	41	CV	7	657			> 120					
	2.5	D	26	<5											> 120					
	3.0	D	21	<5	49	24	25	-0.12	25	CI	7	437			> 120					
	3.5	D	30	<5											> 120					
	4.0	D	24	8	46	22	24	0.10	22	CI	7	457			> 120					
	4.5	D	26	<5											> 120					
	5.0	D	23	7	46	22	24	0.03	22	CI	7	199			> 120					

Test Methods / Notes

[1] BS 1377 : Part 2 : 1990, Test No 3.2

[2] Estimated if <5%, otherwise measured

[3] BS 1377 : Part 2 : 1990, Test No 4.4

[4] BS 1377 : Part 2 : 1990, Test No 5.3

[5] BS 1377 : Part 2 : 1990, Test No 5.4

[6] BRE Digest 240 : 1993

[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils.

[8] Building Research Establishment Information Paper 4/93

[9] In Accordance with BS 1377-5 : 1990 : Clause 3

[10] Estimated Heave Potential (Dd)

[11] Values of shear strength were determined in situ by CTS using

a Pilon hand vane or Geonor vane (GV).

[12] BS 1377 : Part 3 : 2018 + A1 2021 Clause 4 - Tested By CTS Leicester

[13] BS 1377 : Part 3 : 2018 + A1 2021 Clause 12 - Tested By CTS Leicester

[14] Sulphate content as SO₃ as required by BS 1377: Part 3: 1990 has been provided for information purposes - Tested By CTS Leicester

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PSD Chart - BS 1377: Part 2 : 1990, Test No 9.2

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Key

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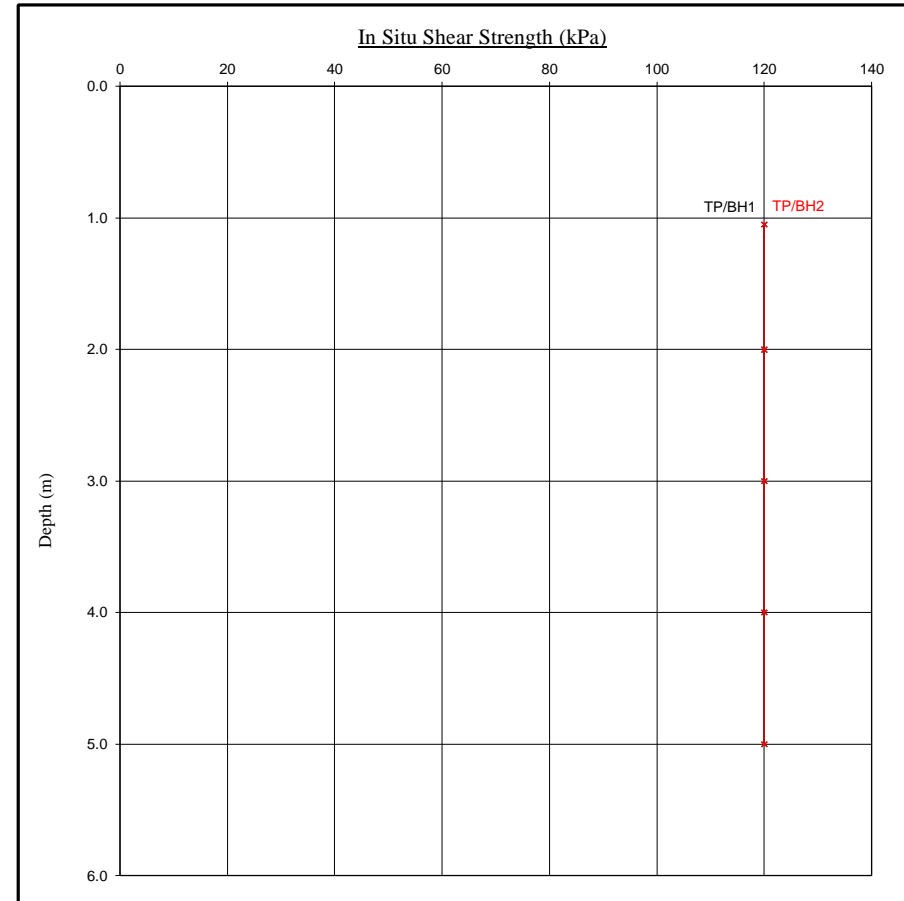
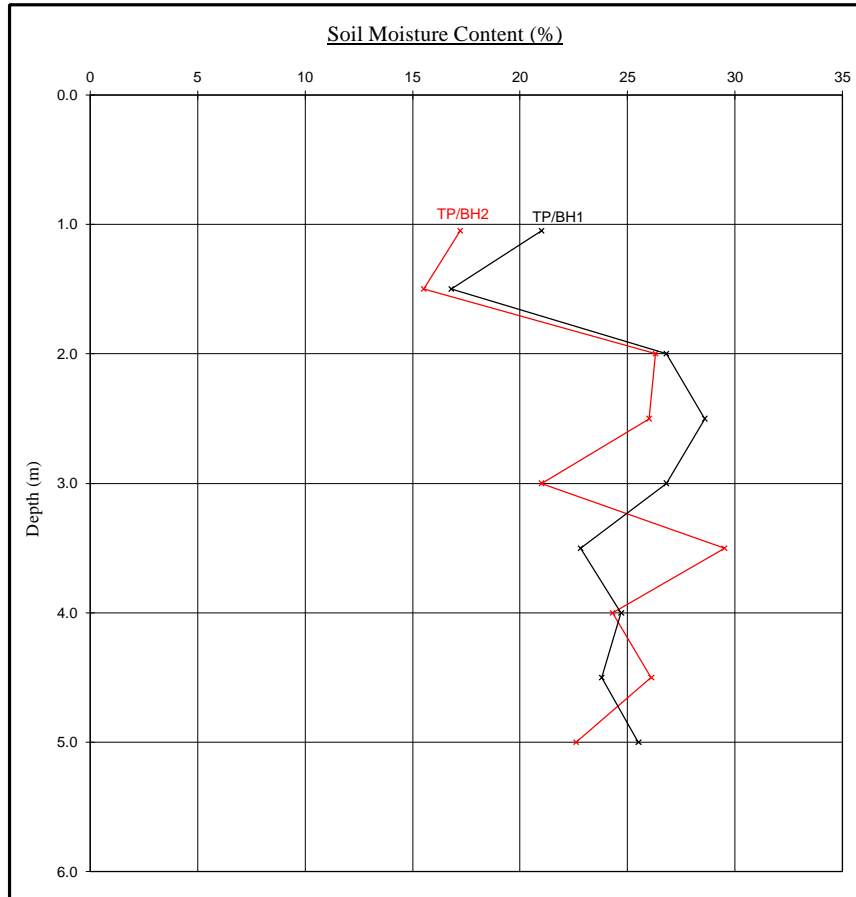
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Moisture Content Profiles

Our Ref : 728253
 Location : Long Acre, Main Street
 Work carried out for: CET Property Assurance (AA)

Date Sampled : 31/10/2023
 Date Received : 31/10/2023
 Date Tested : 15/11/2023
 Date of Report : 17/11/2023



Notes

1. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clay) at shallow depths.
2. Unless specifically noted the profiles have not been related to a site datum.

Note

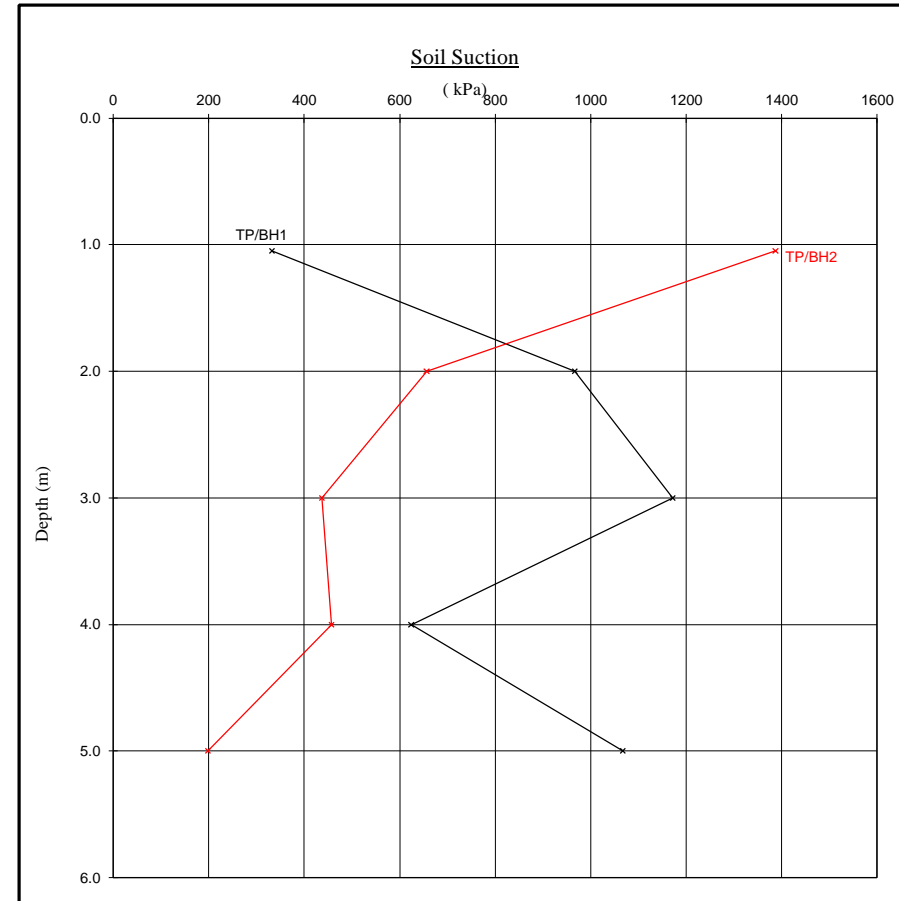
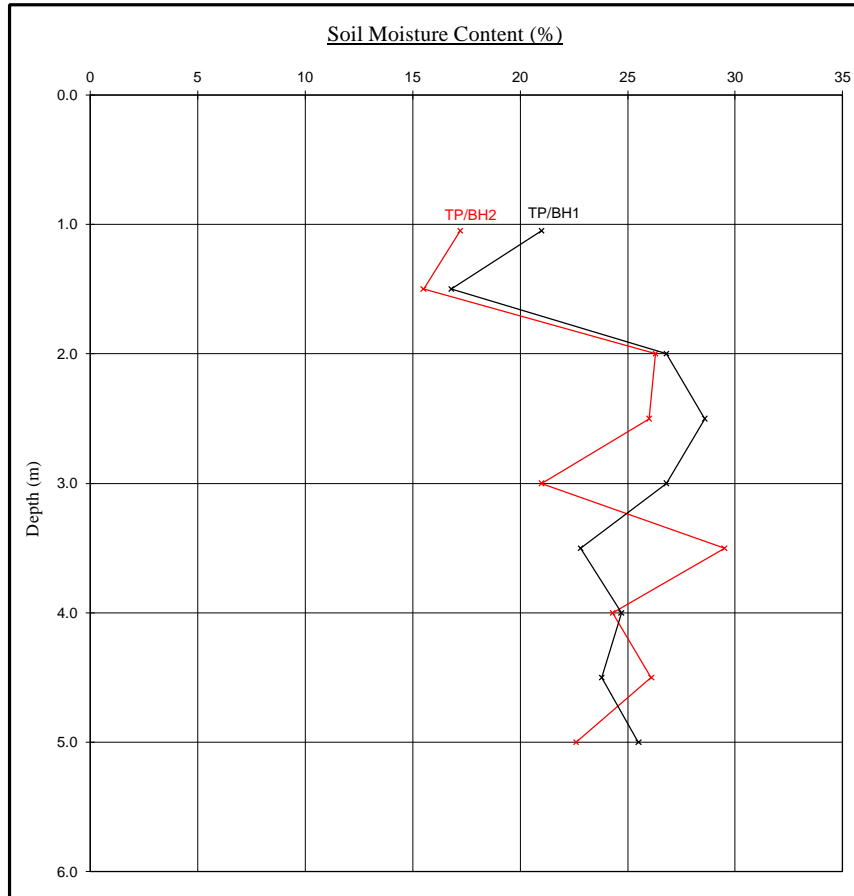
1. Unless otherwise stated, values of Shear Strength were determined in situ by CTS using a Picon Hand Vane the calibration of which is limited to a maximum reading of 130 kPa.
2. Unless specifically noted the profiles have not been related to a site datum.

Moisture Content Profiles

Our Ref : 728253
 Location : Long Acre, Main Street
 Work carried out for: CET Property Assurance (AA)

Soil Suction Profiles

Date Sampled : 31/10/2023
 Date Received : 31/10/2023
 Date Tested : 15/11/2023
 Date of Report : 17/11/2023



Notes

1. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly overconsolidated clay) at shallow depths.
2. Unless specifically noted the profiles have not been related to a site datum.

Note

When shown, the theoretical equilibrium suction profiles are based on conventional assumptions associated with London Clay (and similarly overconsolidated clays) at shallow depths. Note that the sample disturbance component is dependant on the method of sampling and any subsequent recompaction. The above plots show this to be 100kPa which is the value suggested by the BRE on the basis of their limited number of tests on recompacted samples. This may or may not be appropriate in this instance and judgement should be exercised.

Construction Testing Solutions
4 Oak Spinney Park
Ratby Lane
Leicester Forest East
Leicestershire
LE3 3AW

Intec
Parc Menai, Bangor,
Gwynedd, North Wales
LL57 4FG

T [REDACTED]
F [REDACTED]

ROOT IDENTIFICATION

Long Acre,

Client Reference: 728253
Report Date: 7 November 2023
Our Ref: R55731

Sub Sample	Species Identified		Root Diameter	Starch
TP1:				
USF	<i>Pinus</i> spp.		3 mm	Abundant
BH1:				
1.3-2.1m	<i>Pinus</i> spp.		3 mm	Abundant
1.3-2.1m	Pomoideae gp.		2 mm	Abundant
1.3-2.1m	<i>Quercus</i> spp.		1 mm	Abundant
TP2:				
USF	<i>Pinus</i> spp.	1	6 mm	Abundant
BH2:				
1.3-2.2m	<i>Pinus</i> spp.	2	3 mm	Abundant

Comments:

- 1 - Plus 1 other also identified as *Pinus* spp.
- 2 - Plus 2 others also identified as *Pinus* spp.

Pinus spp. are pines.

Pomoideae gp include apple, cotoneaster, hawthorn, pear, pyracantha, quince, rowan, snowy mespil and whitebeam.

Quercus spp. are oaks (both deciduous and evergreen).

Signed: M D Mitchell

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



Water Mains Test	Sheet:	1 of 1	Site:	LONG ACRE
	Job No:	728253	Client:	AA
	Date:	31/10/23		

Test	Start Time	Gauge Pressure (bar)		
		0 mins	5 mins	10 mins

If pressure drops before 5 minute test complete, advise time:

Test	Start Time	Gauge Pressure (bar)		
		0 mins	5 mins	10 mins

If pressure drops before 5 minute test complete, advise time:

Test	Start Time	Gauge Pressure (bar)		
		0 mins	5 mins	10 mins

If pressure drops before 5 minute test complete, advise time:

Listening Stick Water Mains Test

Period listening test carried out with all available water services within property switched off:

Any indication of leak detected by way of sound with stick placed on stop cock:

When taps are used, toilets flushed or any other water demand appliance used is there a noticeable flushing noise heard from the listening stick:

Photos Taken of Property

Front

Side

Rear

Internal Floor Coverings and Location of Stopcock

Reason for No External Photos:

Reason for No Internal Photos:

Information Notes

A site plan with external and internal stopcocks is required - also ground surfaces and assumed route of water main.

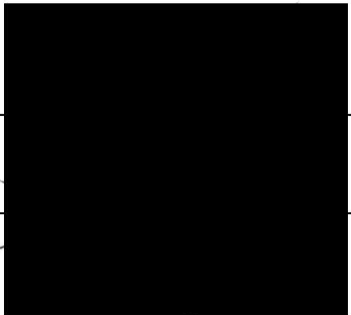
Water main stop cocks that appear to be seized or in an un-serviceable condition, are not to be forced to complete test, - a listening stick is to be used.

Remarks:
outside tap.

Logged:	AG	Checked:	CK	Approved:	CK	
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Author	Marc Roberts, Senior Environmental Scientist <i>BSc (Hons) FGS CGeol</i>				
Checked	Sean McKenna, Principal Engineer <i>MEng (Hons) BEng Tech CEng MICE</i>				
Approved	Joseph Slattery, Technical Director <i>MEng (Hons) BEng CEng MICE MIEI FGS RoGEP (Adviser)</i>				
Reference	CGK/00136/22	Revision	0	Issue Date	December 2023

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2.2 Results	Error! Bookmark not defined.

DISTRIBUTION SHEET

Our ref: CGK/00136/22

REPORT ON HEAVE POTENTIAL

At

Long Acre, Main Street, Polebrook, Peterborough, PE8 5LN

For

Construction Testing Solutions (CTS) on behalf of CET Property Assurance (AA)

DISTRIBUTION			
Date:	Issued to:	Name:	No:
Dec 2023	CTS Billericay	Cara Marie Kosma / Mark Duffield	1

1. INTRODUCTION




This report has been prepared on the instruction of Construction Testing Solutions to support the ground investigation undertaken on 31/10/2023. This report has been requested to provide an estimate of heave potential based on the results of the investigation.

1.1 Site Location

The site was located at Long Acre, Main Street, Polebrook, Peterborough, PE8 5LN.

1.2 Provided Information

CGL has been provided with the results from the ground investigation comprising:-

-  Two trial pit drawings (TP01 and TP02);
-  Two rotary auger borehole logs (BH01 and BH02);
-  Laboratory testing comprising Moisture content, Atterberg limits, root identification and soil suctions.

Attention is drawn to the fact that limited data has been provided for this assessment and CGL has no way of verifying the accuracy of the data supplied. The possibility exists of variations in ground and groundwater conditions between and beyond the sample results and descriptions provided. No liability can be accepted for any such variations in these conditions. Furthermore, any analysis is specific to the purpose described above and no liability will be accepted should the information contained herein be used for the design of alternative schemes without prior consultation with Card Geotechnics Limited (CGL).

2. HEAVE POTENTIAL

2.1 Methodology

The heave potential has been assessed in general accordance with BRE Digest 412;1996 Desiccation in Clay Soils.

The field descriptions of the soils and the shear strength and water content (wc) profiles are consistent in both boreholes; however soil index (Atterberg) testing indicate an inconsistency with Liquid Limits suggesting that soils will respond differently with changes in water content at each borehole location. As such, a control point has not been established for this assesment and the equilibrium water content and soil suction profiles have been estimated by empirical methods.

The presence of roots between 5mm and 10mm have been identified in both trial pits TP1 and TP2 within the Made Ground and superficial deposits to a maximum depth of 1.3m.

The presence of roots has been recorded in BH02 to 2.3mbgl and BH01 to 2.1mbgl. All roots were recorded to a maximum diameter of 3mm. Tree species were identified as 'Pinus' (Medium Water Demanding) within BH02, and 'Pinus', 'Pomoideaep and 'Quercus' (Medium to High Water Demanding) within BH01. All roots had abundant starch indicating the roots to be alive and active.

The method of analysis has limitations due to the assumptions necessary in deriving the heave potential and so the potential heave values calculated by these methods are an estimate only. The following assumptions have been made in order to complete the assessment following guidance outlined in BRE D412:

coefficient of earth pressure at rest, $K_0 = 2.0$ (for stiff over consolidated clay)

bulk unit weight of soil, $\gamma_b = 20\text{kN/m}^3$ (for a wide range of clay soils)

change in suction caused by sampling, $\lambda = 100\text{ kPa}$ (BRE 412 page 4)

Specify gravity, $G_s = 2.75$

The soil is desiccated when $w_c < 40\%$ of the Liquid Limit (BRE 412 page 2)

2.2 Results

In summary, the results show consistence differences between BH01 and BH02. The Potential Heave is greater in BH01 with values up to -80mm compared to -40mm at BH02.

RESULT OF HEAVE POTENTIAL ANALYSIS					
Depth (m bgl)	Water Content profile method (mm)		Soil Suction profile method (mm)		Comments
	BH01	BH02	BH01	BH02	
1.0					The heave potential at BH1 and BH2 is based on a comparison of measured insitu values of water content and soil suction with postulated equilibrium values.
1.5	55	29	82	35	
2.0					
2.5	51	38	64	16	
3.0					
3.5	31	39	37	5	
4.0					
4.5	16	23	17	1	
5.0					