[redacted]

Site Investigation Report

[redacted]

Job Information	
Client	[redacted]
Client ref	
Visit date	31/10/2022
Report date	03/11/2022

Job Summary

- CCTV survey undertaken. Read more.
- Further Investigations required. Read more.
- 3 trial holes undertaken. Read more.
- No drainage defects found. Read more.

[redacted]

Job Information

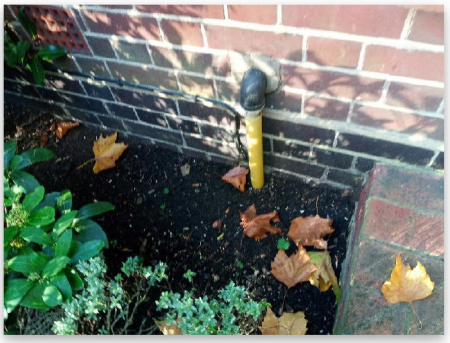
Overview	
Brief	Auger were commissioned by Questgates to undertake a site investigation and CCTV inspection of the underground drainage within the area of concern (AOC) at the property.

Findings	
Trial Hole Findings	TH1 was completed in the proposed location and reached the required depth, soil and root samples were taken. The footing was determined by probing to a depth below 1m, if deemed necessary we can return with two men to dig a larger hole and fully expose the footing. TH2 was completed in the proposed location and revealed the footing. Soil and root samples were taken. Within TH2 we also took readings from the garage wall, these measurements can be shown in trial hole log 2b below TH3 was completed in the proposed location and revealed the footing. Soil and root samples were taken.
Drain Survey	We carried out a CCTV survey of the below ground drainage system, our findings of which are as follows: **Line 1 - From IC1 downstream to MH** Our survey of line 1 revealed no significant defects to the pipework on this line which could be allowing an escape of water. **Line 2 - From IC1 upstream to RWG1** Our survey of line 2 revealed no significant defects to the pipework on this line which could be allowing an escape of water. **Line 3 - From IC1 upstream to WP1** Our survey of line 3 revealed no significant defects to the pipework on this line which could be allowing an escape of water. **Line 4 - From SWG1 downstream to D/S** We were unable to survey line 4 properly due to severe root ingress within the pipework. **Line 5 - From MH1 downstream to Main** Our survey of line 5 revealed no significant defects to the pipework on this line which could be allowing an escape of water. **Line 4 - From SWG1 downstream to D/S** We were unable to complete a full CCTV survey of line 4 due to an unknown blockage in the pipework.

Recommendations	
Refer Back to Client	It is recommended that the following further investigation works are carried out to confirm the condition of all pipework at the property: **Line 4** Excavate at a depth no greater than 1.0m through concrete directly downstream of RWG to break into and access the pipework on this line. We need to perform high pressure jetting of the drains for approximately 2 hours to clear the roots. We will then need to conduct a further CCTV investigation downstream on this line. **Please note** The further CCTV investigation may reveal additional defects to the drainage system. This will be reported whilst on-site and could potentially cause an increase in repair costs and provide further inconvenience to the customer/occupants. We will now refer the claim back to the client in order to progress the claim.
Repair Caveats	*Once repairs have been undertaken the customer should ensure the drainage system is periodically inspected in the future for any deterioration and kept free flowing / free of blockages. Any damage noted during future inspections should be repaired immediately in accordance with current Building Regulations.* *With any repair process, complications and unforeseen circumstances can arise. These scenarios will be reported whilst on-site and could potentially cause an increase in repair costs and inconvenience.* *If any of the above lining recommendations fail then excavation and replacement of the pipework would be required. This would severely increase the cost of repairs and would provide greater inconvenience to the residents.* *Recommendations have been made to reline or patch reline sections of the drainage system at the property. This process combines a number of chemicals in a resin, which then harden in a fibreglass matting to create a new section of drain within the original. The reaction creates* ***a strong smell which can linger for up to 72 hours*** *once works are completed - this is not harmful. It is recommended that any areas where smells are experienced are kept well ventilated until the odour subsides.*

Photographs

Trial Hole 1

Fig 1.1: Trial Hole 1 Location	Fig 1.2: Trial Hole 1 Footing
	

Trial Hole 2

Fig 2.1: Trial Hole 2 Location

Fig 2.2: Trial Hole 2 Footing

Trial Hole 3

Fig 3.1: Trial Hole 3 Location

Fig 3.2: Trial Hole 3 Footing

CCTV Survey – Inspection Listings *(WRc Guidelines Applied)*

L1			
Direction	Downstream	**From**	IC1
Pipe Size (mm)	100	**Depth (m)**	0.80
Pipe Material	PVC	**To**	MAIN

0.0m	Start of Survey Length
0.1m	Material Change (TO VC)
3.3m	Finish of Survey Length (ENTER LARGE MH1)

L2			
Direction	Upstream	**From**	IC1
Pipe Size (mm)	100	**Depth (m)**	0.80
Pipe Material	PVC	**To**	RWG1

0.0m	Start of Survey Length
3.2m	Junction (TO ACO)
9.5m	Manhole (TO BIC2)
9.9m	Junction (TO RWG2)
12.3m	Line of Sewer Deviates Left

17.4m	Finish of Survey Length (AT RWG1)

L3

Direction	Upstream	**From**	IC1
Pipe Size (mm)	100	**Depth (m)**	0.80
Pipe Material	PVC	**To**	WP1

0.0m	Start of Survey Length
0.2m	Material Change (TO VC)
3.2m	Material Change (TO PVC)
3.5m	Line of Sewer Deviates Left
4.5m	Junction
5.2m	Line of Sewer Deviates Right
6.3m	Finish of Survey Length

L4

Direction	Downstream	**From**	SWG1
Pipe Size (mm)	100	**Depth (m)**	0.0
Pipe Material	PVC	**To**	DS

0.0m	Start of Survey Length
0.0m	Survey Abandoned (Mass Roots)

L5

Direction	Downstream	**From**	MH1
Pipe Size (mm)	100	**Depth (m)**	1.25
Pipe Material	VC	**To**	MAIN

0.0m	Start of Survey Length
3.8m	Line of Sewer Deviates Left
5.7m	Line of Sewer Deviates Left
6.6m	Junction (TO CWG/SWG)
20.6m	Finish of Survey Length

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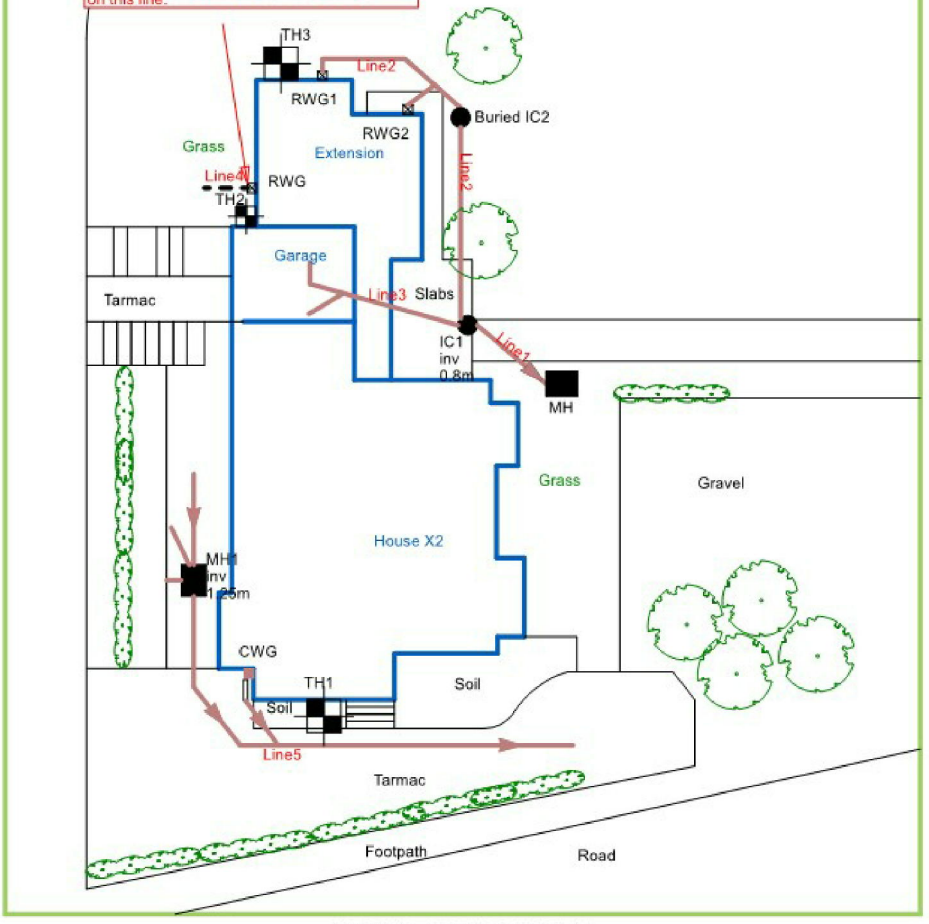
Further Investigations Layout

Date: 03/11/2022

Jetting CCTV

Excavate at a depth no greater than 1.0m through concrete directly downstream of RWG to break into and access the pipework on this line. We need to perform high pressure jetting of the drains for approximately 2 hours to clear the roots. We will then need to conduct a further CCTV investigation d/s on this line.

Subsidence



FRONT OF PROPERTY

LEGEND

- = Manhole (MH)
- = Inspection Chamber (IC)
- = Inspection Point (IP)
- = Blockage / Collapse
- = Soil Vent Pipe (SVP) / WC
- = Combined Waste Gully (CWG) / Foul Waste Gully (FWG)
- = Rainwater Gully (RWG)
- = Rainwater Pipe (RWP)
- = Lines not to be repaired
- = Lines to be repaired
- = Assumed water mains feed
- = Walls
- = Fences
- = Building Outline
- = Trial hole
- = Borehole
- = Direction of flow
- = Gate / Door
- = Shrubs / Bush
- = Hedge
- = Tree
- = Steps

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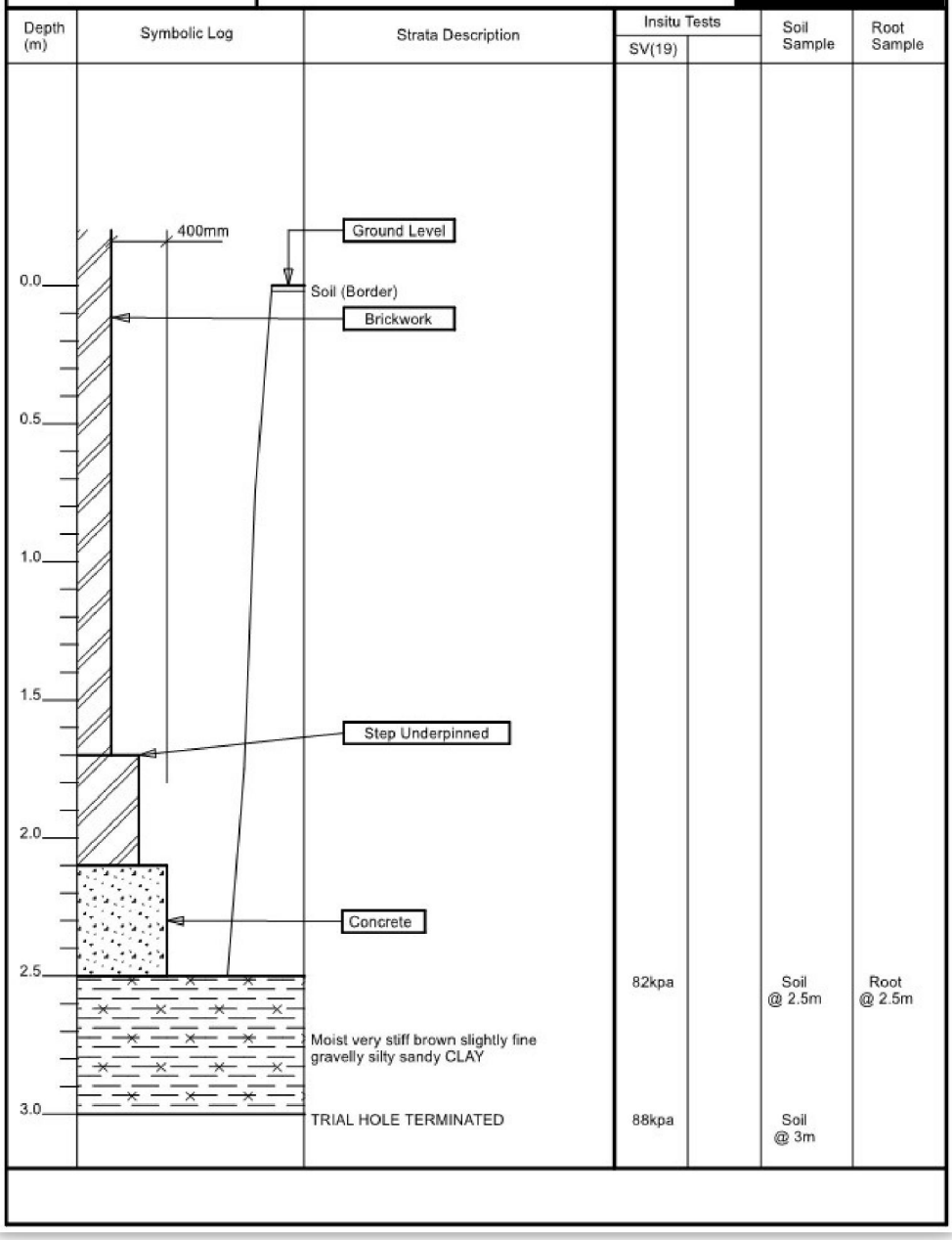
Trial Hole Log No.1

Location: Front left of front entrance

[redacted]



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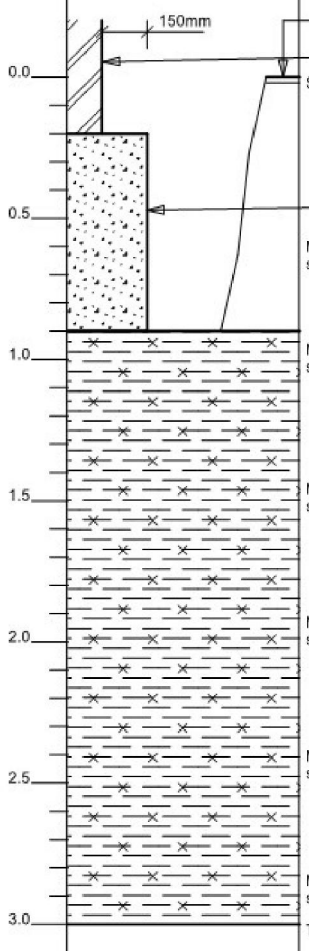
Trial Hole Log No.2

Location: JN between extension and garage (A) extension

[redacted]



Depth (m)	Strata Description	Insitu Tests SV(19)	Soil Sample	Root Sample
0.0				
0.5	Moist stiff brown fine gravelly silty sandy CLAY		Soil @ 0.6m	
1.0	Moist stiff brown fine gravelly silty sandy CLAY	62kpa	Soil @ 0.9m	Root @ 0.9m
1.5	Moist stiff brown fine gravelly silty sandy CLAY	76kpa	Soil @ 1.4m	
2.0	Moist stiff brown fine gravelly silty sandy CLAY	74kpa	Soil @ 1.9m	
2.5	Moist stiff brown fine gravelly silty sandy CLAY	64kpa	Soil @ 2.4m	
	Moist stiff brown slightly fine gravelly silty sandy CLAY	60kpa	Soil @ 2.9m	
3.0	TRIAL HOLE TERMINATED	60kpa		

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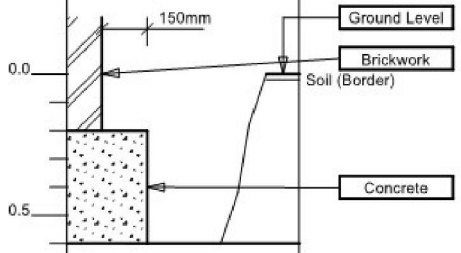
Trial Hole Log No.2b

Location: Garage wall

[redacted]

Depth (m)	Symbolic Log	Strata Description	Insitu Tests SV(19)		Soil Sample	Root Sample
0.0		150mm Ground Level Brickwork Soil (Border) Concrete				
0.5						
1.0						
1.5						
2.0						
2.5						
3.0		TRIAL HOLE TERMINATED				

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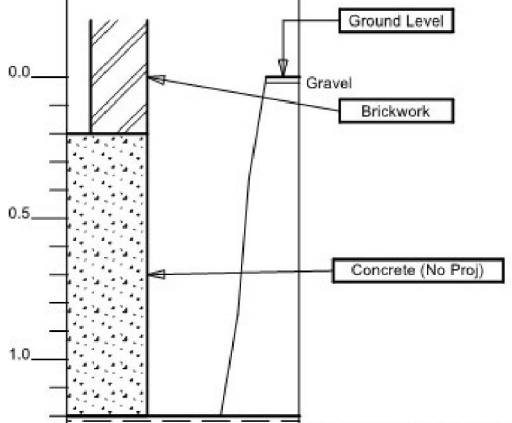
Trial Hole Log No.3

Location: Rear of extension

[redacted]



Depth (m)	Symbolic Log	Strata Description	Insitu Tests SV(19)		Soil Sample	Root Sample
0.0						
0.5						
1.0						
		Moist very stiff brown silty sandy CLAY	82kpa		Soil @ 1.2m	Root @ 1.2m
1.5						
		Moist very stiff brown fine gravelly silty sandy CLAY	84kpa		Soil @ 1.7m	
2.0						
		Moist very stiff brown fine gravelly silty sandy CLAY	86kpa		Soil @ 2.2m	
2.5						
		Moist very stiff brown slightly fine gravelly silty sandy CLAY	78kpa		Soil @ 2.7m	
3.0		TRIAL HOLE TERMINATED	80kpa			

Richardson's Botanical Identifications

Root identification
Vegetation surveys
Tree/Building investigations
Plant taxonomy

Dr Ian B K Richardson
BSc, MSc, PhD, MRSB, FLS
James Richardson
BSc (Hons. Biology)

Auger Solutions

[redacted]

[redacted]

15/11/2022

Dear Sirs

Root ID

The samples you sent in relation to the above on 31/10/2022 have been examined. Their structures were referable as follows:

TH1, 2.50m		
2 no.	Examined root: similar in many ways to PLATANUS (Plane). Less than 0.9mm in diameter.	Alive, recently*.
4 no.	All pieces of BARK only - not enough material for identification.	
TH2, 0.90m		
3 no.	Examined root: also under 0.9mm in diameter. Referable to the family Rosaceae, subfamily POMOIDEAE (a group of closely related trees: Malus (Apple), Pyrus (Pear), Crataegus (Hawthorn), Sorbus (Rowan, Whitebeam, Service tree), Mespilus (Medlar), and some shrubs (Pyracantha (Firethorn), Chaenomeles (Japonica), Cydonia (Quince), Amelanchier, Cotoneaster)).	Alive, recently*.
TH3, 1.20m		
2 no.	Examined root: the family LEGUMINOSAE (a group of closely related trees: Robinia (False Acacia), Laburnum, Sophora (Pagoda tree), Gleditsia (Honey Locust), Cercis (Judas tree/Redbud), Albizia (Silk tree), Acacia (Mimosa), as well as such shrubs as Wisteria, Lupins, Gorse and Brooms). Again, not more than 0.9mm in diameter.	Alive, recently*.

Click here for more information: LEGUMINOSAE PLATANUS POMOIDEAE

I trust this is of help. Please call us if you have any queries; our Invoice is enclosed.

Yours faithfully

[redacted]

Dr Ian B K Richardson

* Based mainly on the Iodine test for starch. Starch is present in some cells of a living woody root, but is more or less rapidly broken down by soil micro-organisms on death of the root, sometimes before decay is evident. This result need not reflect the state of the parent tree.

Identified with no information on vegetation, on or off site.

Report commissioned by auger

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	**Geotechnical Testing Analysis Report**	auger environmental + claims mgmt + subsidence + drainage +
[redacted]	***The testing results contained within this report have been performed by GSTL a UKAS accredited laborotory on behalf of Auger.**	[redacted]

Summary Of Claim Details

Policy Holder	Unknown
Risk Address	Unknown
SI Date	31/10/2022
Issue Date	31/10/2022
Report Date	21/11/2022
Auger Reference	[redacted]
Insurance Company	
LA Claim Reference	[redacted]
LA Co. Reference	

Checked and approved	21/11/2022	Wayne Honey	[redacted]

UKAS TESTING 2788

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)
DESCRIPTIONS

auger
environmental + claims mgmt + subsidence + drainage +

GSTL Contract Number	[redacted]	
Risk Address	**Unknown**	
Auger Reference	[redacted]	

TH Trial Hole	Sample Type	Depth (m)	Sample Description
TH1	D	2.50	Brown slightly fine gravelly silty sandy CLAY
TH1	D	3.00	Brown slightly fine gravelly silty sandy CLAY
TH2	D	0.60	Brown fine gravelly silty sandy CLAY
TH2	D	0.90	Brown fine gravelly silty sandy CLAY
TH2	D	1.40	Brown fine gravelly silty sandy CLAY
TH2	D	1.90	Brown fine gravelly silty sandy CLAY
TH2	D	2.40	Brown fine gravelly silty sandy CLAY
TH2	D	2.90	Brown slightly fine gravelly silty sandy CLAY
TH3	D	1.20	Brown silty sandy CLAY
TH3	D	1.70	Brown fine gravelly silty sandy CLAY
TH3	D	2.20	Brown fine gravelly silty sandy CLAY
TH3	D	2.70	Brown slightly fine gravelly silty sandy CLAY

Test Operator
Jason Smith

GSTL
GEOTECHNICAL SITE & TESTING LABORATORIES

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.4 & 5.3)

auger
environmental + claims mgmt + subsidence + drainage +

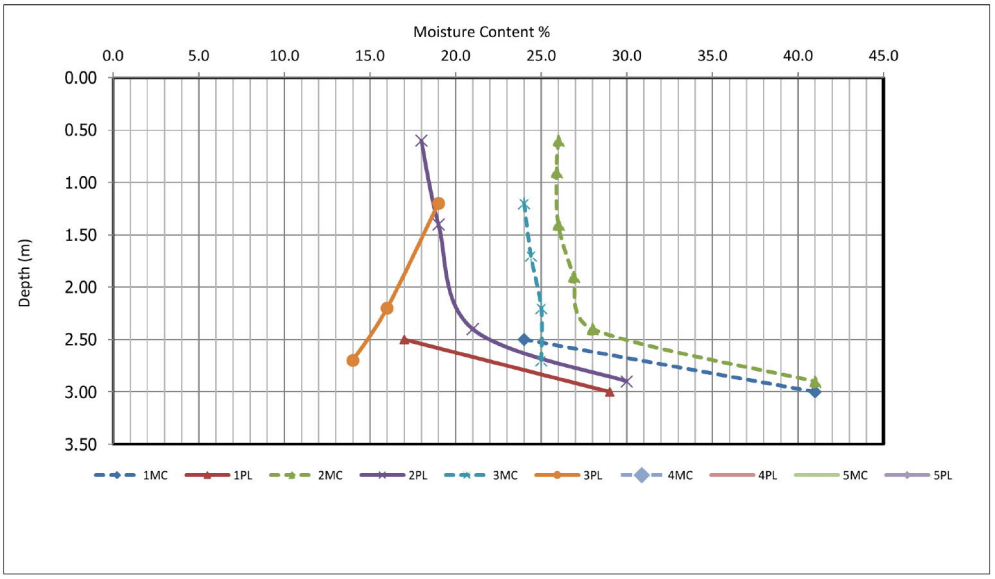
GSTL Contract Number	[redacted]	
Risk Address	**Unknown**	
Auger Reference	[redacted]	
Remarks	NP - (Non-Plastic), # - (Liquid Limit and Plastic Limit Wet Sieved)	

TH Trial Hole	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing .425mm %	NHBC Chapter 4.2	Remarks
TH1	D	2.50	24	59	17	42	94	HIGH VCP	CH High Plasticity
TH1	D	3.00	41	66	29	37	95	MEDIUM VCP	CH High Plasticity
TH2	D	0.60	26	57	18	39	94	MEDIUM VCP	CH High Plasticity
TH2	D	0.90	26						
TH2	D	1.40	26	55	19	36	96	MEDIUM VCP	CH High Plasticity
TH2	D	1.90	27						
TH2	D	2.40	28	52	21	31	94	MEDIUM VCP	CH High Plasticity
TH2	D	2.90	41	59	30	29	96	MEDIUM VCP	CH High Plasticity
TH3	D	1.20	24	51	19	32	98	MEDIUM VCP	CH High Plasticity
TH3	D	1.70	24						
TH3	D	2.20	25	54	16	38	95	MEDIUM VCP	CH High Plasticity
TH3	D	2.70	25	44	14	30	97	MEDIUM VCP	CI Intermediate Plasticity

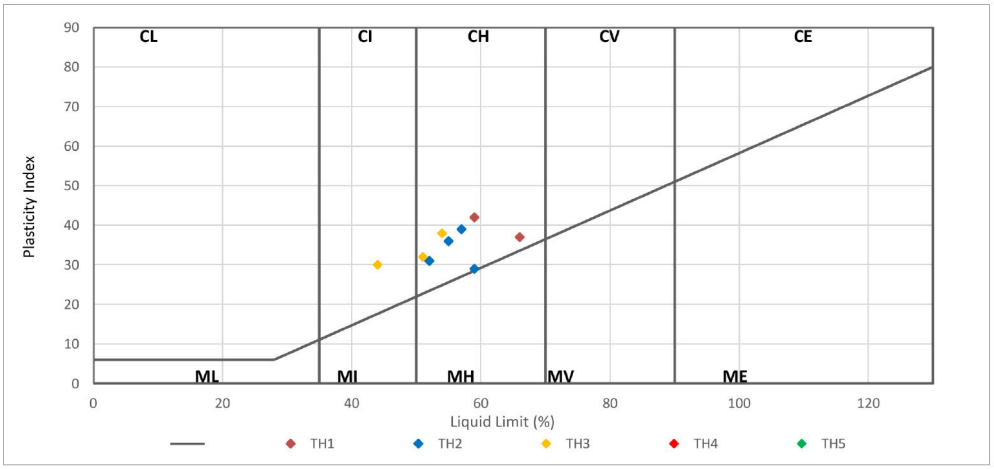
Modified Plasticity Index (PI) <10	: Non Classified
Modified PI = 10 to <20	: Low volume change potential (LOW VCP)
Modified PI = 20 to <40	: Medium volume change potential (Med VCP)
Modified PI = 40 or greater	: High volume change potential (HIGH VCP)

The Atterberg Limits May also be used to classify the volume change potential of fine soils using the National House building system, as given in the NHBC's Standards Chapter 4.2 (2003) "Building Near Trees"

Test Operator
Jason Smith



PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:1999+A2:2010



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Modified PI = 10 to <20	: Low volume change potential (LOW VCP)
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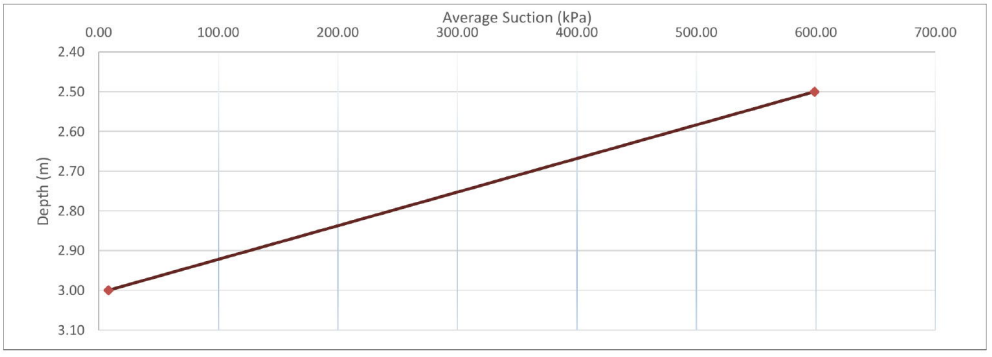
Test Operator
Jason Smith

GSTL GEOTECHNICAL SITE & TESTING LABORATORIES	SUMMARY OF SOIL CLASSIFICATION TESTS, BRE Information Paper IP 4/93 February 1993 (Cl/SfB p1), BRE Information Paper Digest 412 ci/sFb (A3s) February 1996	auger environmental + claims mgmt + subsidence + drainage +
GSTL Contract Number	[redacted]	
Risk Address	**Unknown**	
Auger Reference	[redacted]	
Remarks	D - Disturbed (Recompacted 2.5kg Rammer), U - Undisturbed Sample	

TH Trial Hole	Depth (m)	Filter Paper Location	Filter Paper	Sample Prep Method	Test Duration (Days)	Water Content (%)	Soil Suction Pk (kPa)	Average Soil Suction Pk (kPa)	Cumalative Heave Potential (mm) from bottom of the hole
TH1	2.50	Top	I	D	5	33.2	594	599	49
TH1		Middle	II	D	5	33.1	604		
TH1		Bottom	III	D	5	33.2	598		
TH1	3.00	Top	I	D	5	117.0	8	8	0
TH1		Middle	II	D	5	118.0	8		
TH1		Bottom	III	D	5	118.0	8		

Heave potential is calculated from the bottom of the hole and heaves above the bottom of the hole are reported as a cumalative value.
The values reported for heave above only apply to the strata the suction and plasticity have been performed on. The shallowest depth reported is assumed to be a strata thickness to GL and Heave is calculated based on that layer thickness, if the next sample is in 0.5m increments the heave is calculated based on the layer thickness of 0.5m and depths 1m from the sample above will include heave over 1m.
Consideration should be made for other stratas where values are not reported and when working out the heave potential over the entire trial hole.



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TH Trial Hole	Depth (m)	Filter Paper Location	Filter Paper	Sample Prep Method	Test Duration (Days)	Water Content (%)	Soil Suction Pk (kPa)	Average Soil Suction Pk (kPa)	Cumalative Heave Potential (mm) from bottom of the hole
TH2	0.60	Top	I	D	5	45.3	105	124	5
TH2	0.60	Middle	II	D	5	45.5	102		
TH2	0.60	Bottom	III	D	5	42.1	166		
TH2	0.90								
TH2	0.90								
TH2	0.90								
TH2	1.40	Top	I	D	5	48.1	76	75.1	0
TH2	1.40	Middle	II	D	5	48.2	75		
TH2	1.40	Bottom	III	D	5	48.4	74		
TH2	1.90								
TH2	1.90								
TH2	1.90								
TH2	2.40	Top	I	D	5	59.6	44	43.8	0
TH2	2.40	Middle	II	D	5	59.9	44		
TH2	2.40	Bottom	III	D	5	60.3	43		
TH2	2.90	Top	I	D	5	127.0	7	12.3	0
TH2	2.90	Middle	II	D	5	92.1	15		
TH2	2.90	Bottom	III	D	5	92.5	15		

Heave potential is calculated from the bottom of the hole and heaves above the bottom of the hole are reported as a cumalative value.
The values reported for heave above only apply to the strata the suction and plasticity have been performed on. The shallowest depth reported is assumed to be a strata thickness to GL and Heave is calculated based on that layer thickness, if the next sample is in 0.5m increments the heave is calculated based on the layer thickness of 0.5m and depths 1m from the sample above will include heave over 1m.
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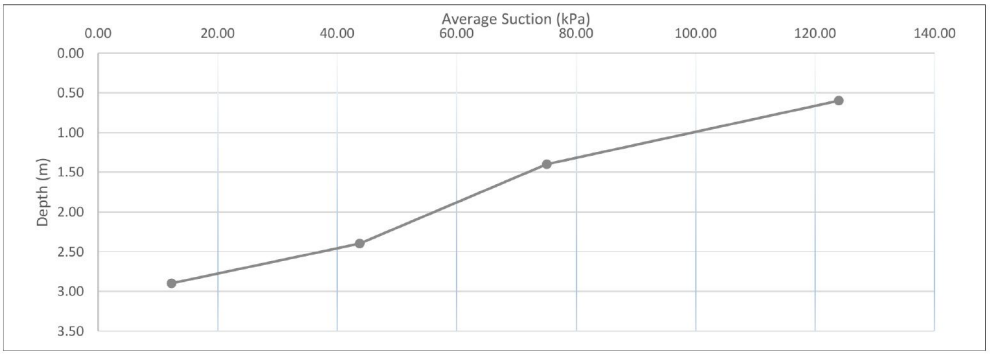

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TH Trial Hole	Depth (m)	Filter Paper Location	Filter Paper	Sample Prep Method	Test Duration (Days)	Water Content (%)	Soil Suction Pk (kPa)	Average Soil Suction Pk (kPa)	Cumalative Heave Potential (mm) from bottom of the hole
TH3	1.20	Top	I	D	5	37.3	329	357	20
TH3	1.20	Middle	II	D	5	37.5	322		
TH3	1.20	Bottom	III	D	5	35.6	421		
TH3	1.70								
TH3	1.70								
TH3	1.70								
TH3	2.20	Top	I	D	5	43.3	140	137	6
TH3	2.20	Middle	II	D	5	43.4	139		
TH3	2.20	Bottom	III	D	5	43.6	134		
TH3	2.70	Top	I	D	5	39.7	234	228	4
TH3	2.70	Middle	II	D	5	39.9	229		
TH3	2.70	Bottom	III	D	5	40.1	221		

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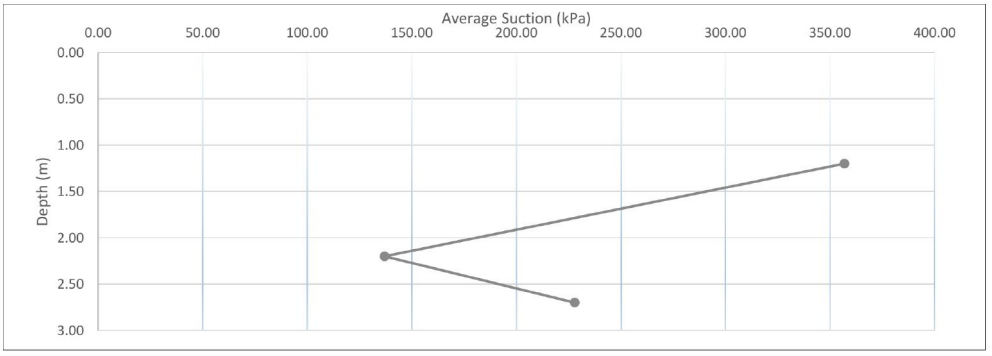
The values reported for heave above only apply to the strata the suction and plasticity have been performed on. The shallowest depth reported is assumed to be a strata thickness to GL and Heave is calculated based on that layer thickness, if the next sample is in 0.5m increments the heave is calculated based on the layer thickness of 0.5m and depths 1m from the sample above will include heave over 1m.
Consideration should be made for other stratas where values are not reported and when working out the heave potential over the entire trial hole.



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