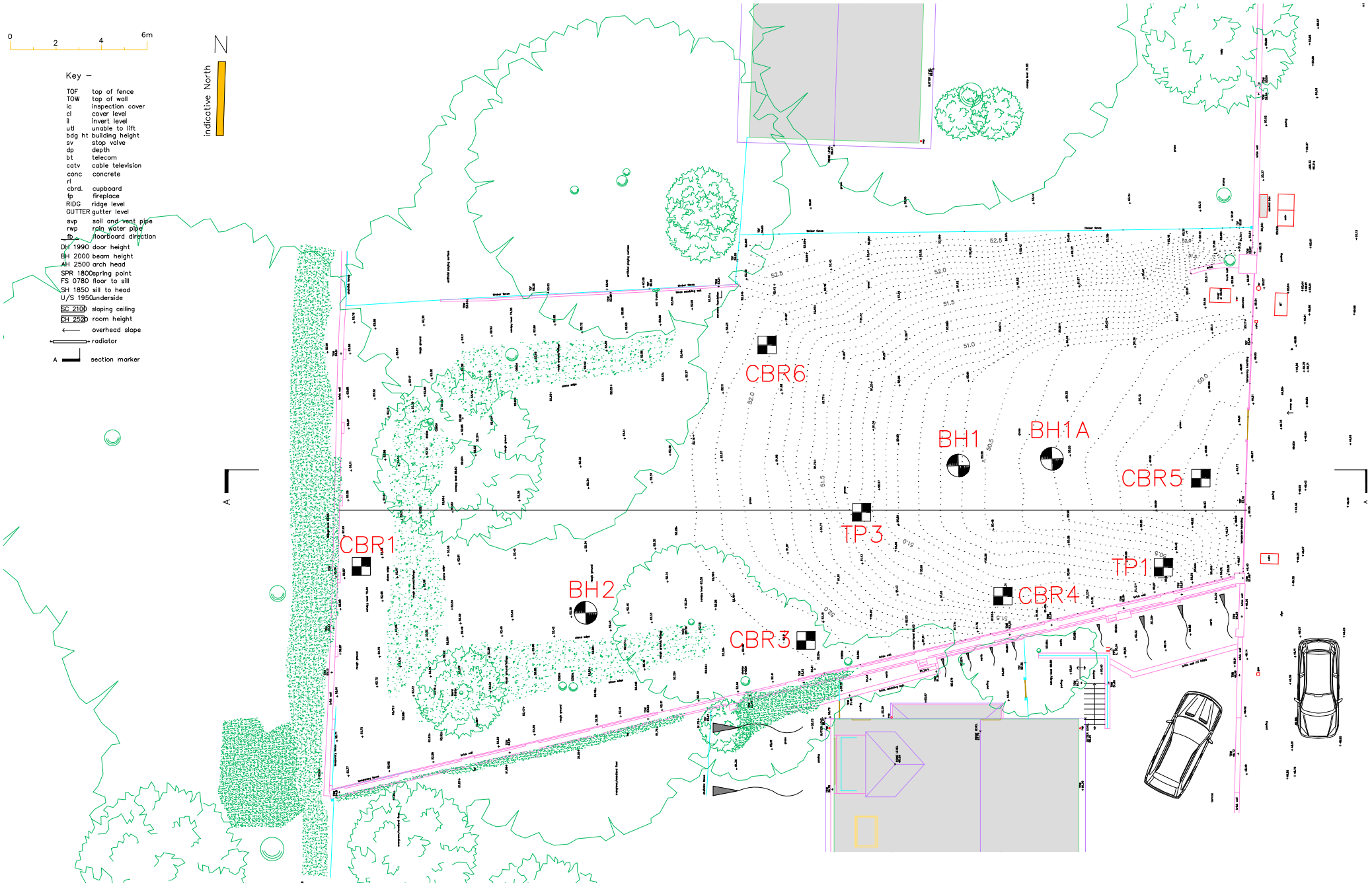
APPENDIX B –

EXPLORATORY HOLE LOCATION PLAN


0
2
4
6m
N
indicative North
Key –
TOF top of fence
TOW top of wall
ic inspection cover
cl cover level
il invert level
utl unable to lift
bdg ht building height
sv stop valve
dp depth
bt telecom
catv cable television
conc concrete
rl
cbrd. cupboard
fp fireplace
RIDG ridge level
GUTTER gutter level
svp soil and vent pipe
rwp rain water pipe
fb floorboard direction
DH 1990 door height
BH 2000 beam height
AH 2500 arch head
SPR 1800spring point
FS 0780 floor to sill
SH 1850 sill to head
U/S 1950underside
SC 2100 sloping ceiling
CH 2520 room height
overhead slope
radiator
section marker
CBR6
BH1
BH1A
CBR5
TP3
CBR1
TP1
BH2
CBR4
CBR3
A
A

APPENDIX C –

GEOTECHNICAL LABORATORY TEST RESULTS

Unconsolidated Undrained Triaxial Compression tests without measurement of pore pressure
Summary of Results

Tests carried out in accordance with BS1377:Part 7 : 1990 clause 8 or 9 as appropriate to test type.

Job No.	Project Name	Programme	
32976	31 Daleham Gardens	Samples received	03/02/2023
		Schedule received	08/02/2023
Project No.	Client	Project started	09/02/2023
2023-002-SIM-DAL	Geofirma	Testing Started	15/02/2023

Hole No.	Sample Ref	Sample Top m	Sample Base m	Sample Type	Soil Description	Test Type	Density bulk Mg/m3	Density dry Mg/m3	w %	Length mm	Diameter mm	σ3 kPa	At failure Axial strain %	At failure σ1 - σ3 kPa	At failure cu kPa	At failure Mode	Remarks
BH1A	-	10.00	10.45	U	High strength dark grey silty CLAY	UU	1.96	1.51	29	198	102	170	6.6	221	110	B	
BH1A	-	14.00	14.45	U	High strength dark grey silty CLAY with occasional pockets of sand and rare decomposed shell fragments	UU	2.03	1.58	28	198	102	250	5.1	226	113	B	
BH1A	-	19.50	19.94	U	High strength dark grey silty CLAY	UU	1.97	1.54	28	198	102	300	4.5	266	133	B	
BH1A	-	22.50	22.95	U	Dark grey silty CLAY with pockets of black slightly sandy peat with occasional wood fragments becoming @ 22.65 m very high strength dark grey silty CLAY	UU	2.02	1.57	29	198	102	330	6.1	355	177	B	Test carried out on silty CLAY section from 22.65m onwards
BH2	-	3.50	3.95	U	Medium strength brown mottled orangish brown sandy silty CLAY with occasional fmc sandstone fragments	UU	1.89	1.48	28	198	102	50	5.6	117	59	B	
BH2	-	5.00	5.45	U	Medium strength dark grey slightly mottled brown slightly fine sandy silty CLAY	UU	1.96	1.53	28	198	102	70	16	101	51	C	
BH2	-	11.00	11.45	U	High strength dark grey silty CLAY	UU	2.01	1.57	28	198	102	170	14	240	120	C	
BH2	-	15.00	15.45	U	High strength dark grey silty CLAY	UU	2.00	1.54	30	198	102	210	5.6	254	127	B	

Legend
UU - single stage test (single and multiple specimens) σ3 Cell pressure Mode of failure ; B - Brittle
UUM - Multistage test on a single specimen σ1 - σ3 Maximum corrected deviator stress P - Plastic
suffix R - remoulded or recompacted cu Undrained shear strength, ½ (σ1 - σ3) C - Compound

Test Report by K4 SOILS LABORATORY
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Checked and Approved

Initials: J.P

Date: 24/02/2023

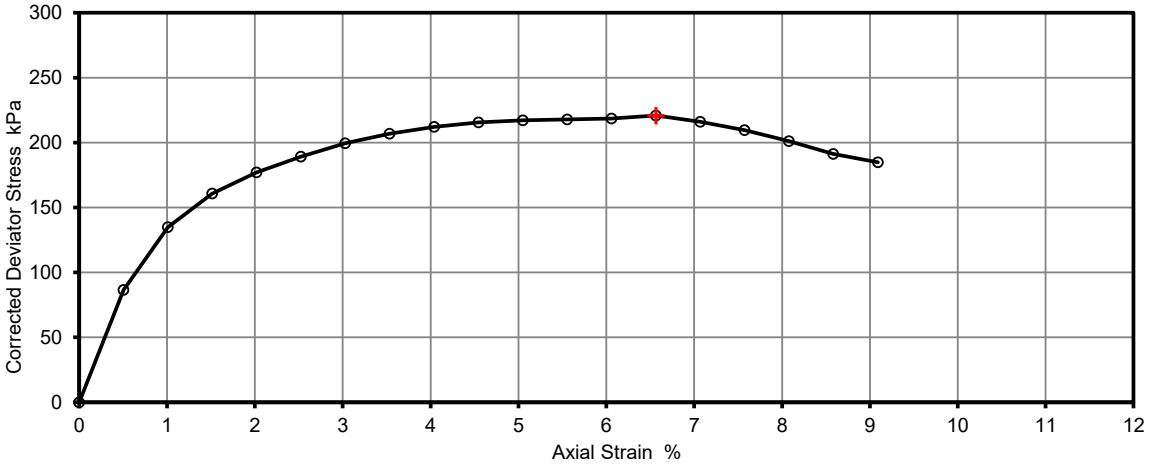
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	10.00 m
Soil Description	High strength dark grey silty CLAY			Depth Base	10.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

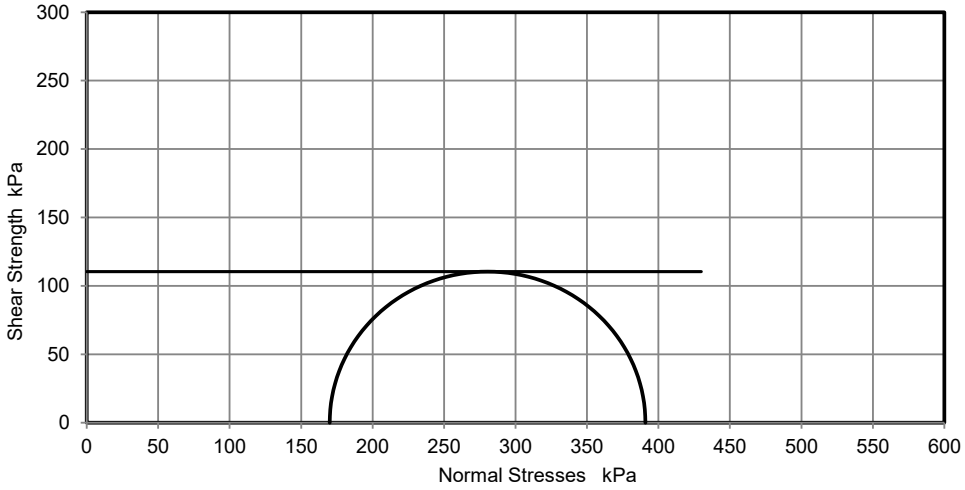
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	1.96	Mg/m3
Moisture Content	29	%
Dry Density	1.51	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	170	kPa
Axial Strain	6.6	%
Deviator Stress, (σ1 - σ3)f	221	kPa
Undrained Shear Strength, cu	110	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

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Checked and Approved
Initials: J.P
Date 24/02/2023

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

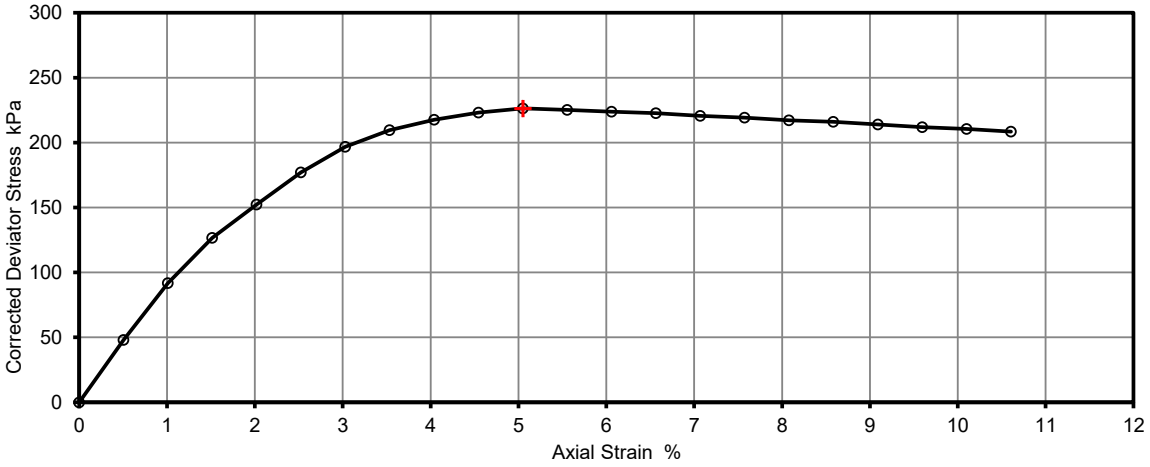
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	14.00 m
Soil Description	High strength dark grey silty CLAY with occasional pockets of sand and rare decomposed shell fragments			Depth Base	14.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

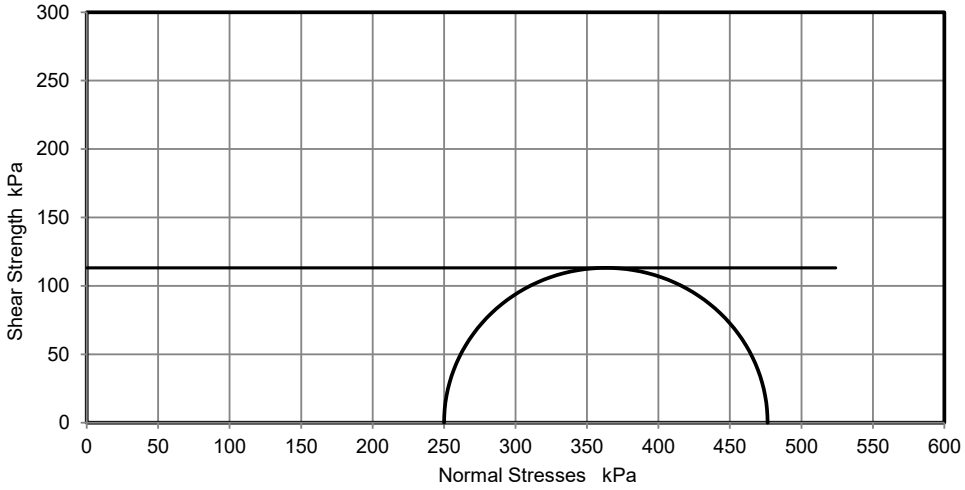
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	2.03	Mg/m3
Moisture Content	28	%
Dry Density	1.58	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	250	kPa
Axial Strain	5.1	%
Deviator Stress, (σ1 - σ3)f	226	kPa
Undrained Shear Strength, cu	113	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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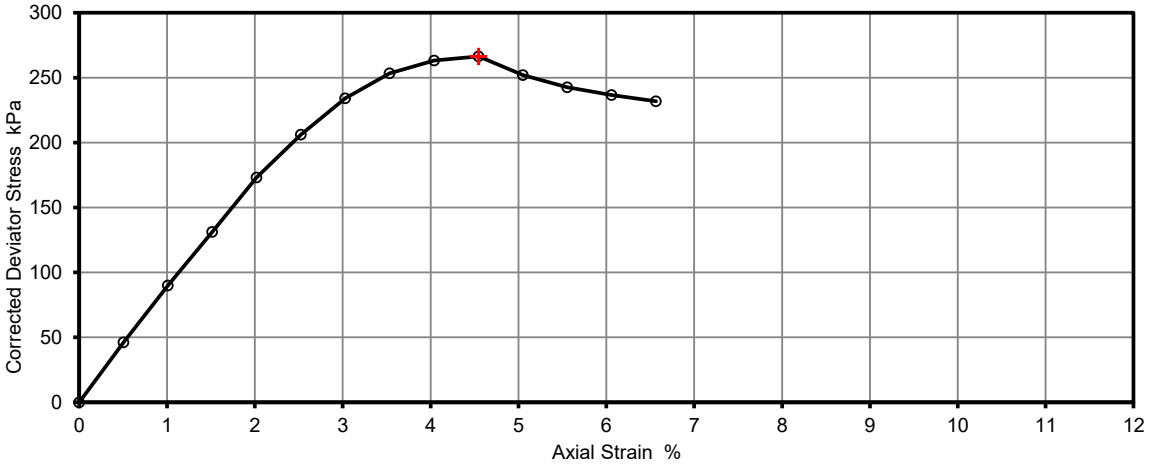
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	19.50 m
Soil Description	High strength dark grey silty CLAY			Depth Base	19.94 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

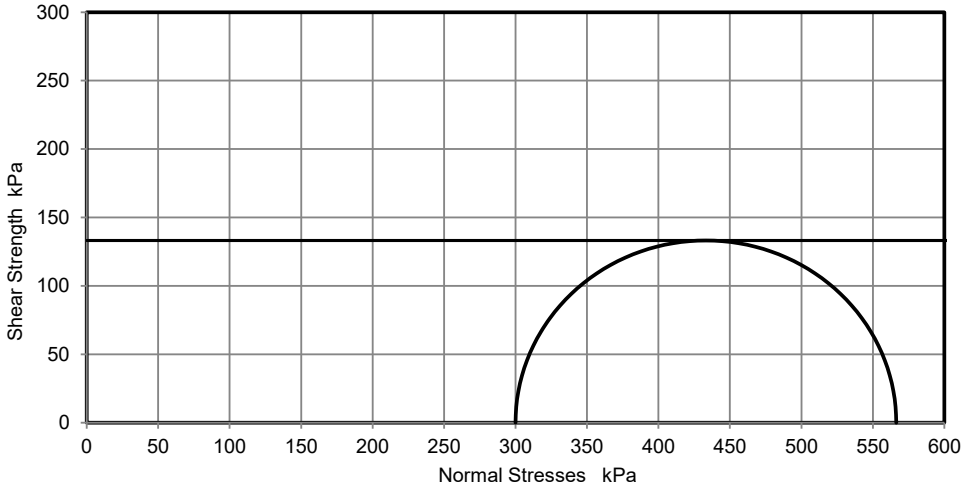
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	1.97	Mg/m3
Moisture Content	28	%
Dry Density	1.54	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	300	kPa
Axial Strain	4.5	%
Deviator Stress, (σ1 - σ3)f	266	kPa
Undrained Shear Strength, cu	133	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Date 24/02/2023

	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	22.50 m
Soil Description	Dark grey silty CLAY with pockets of black slightly sandy peat with occasional wood fragments becoming @ 22.65 m very high strength dark grey silty CLAY			Depth Base	22.95 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

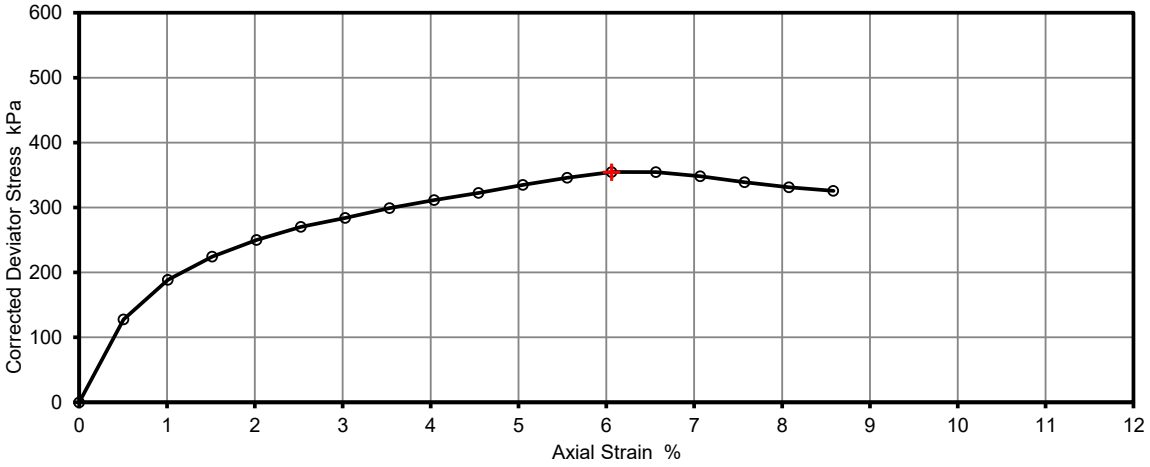
Remarks

Test carried out on silty CLAY section from 22.65m onwards

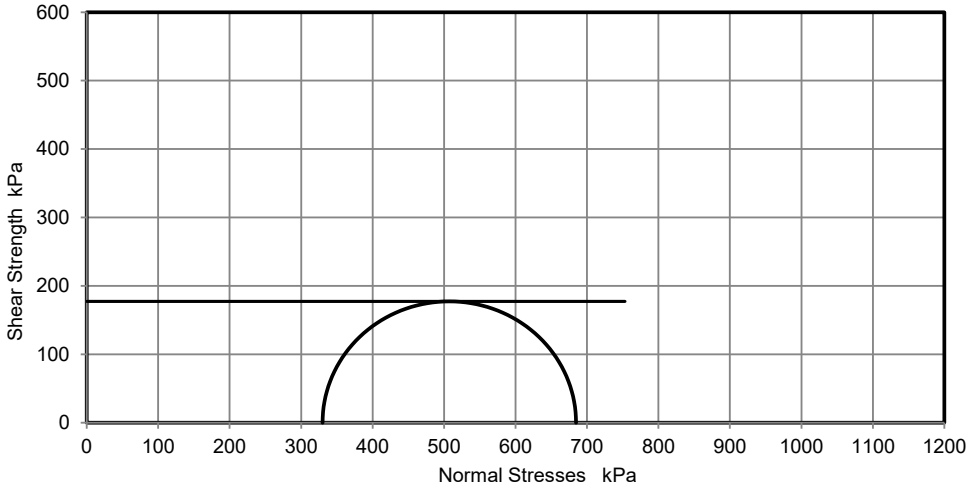
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	2.02	Mg/m3
Moisture Content	28	%
Dry Density	1.57	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	330	kPa
Axial Strain	6.1	%
Deviator Stress, (σ1 - σ3)f	355	kPa
Undrained Shear Strength, cu	177	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Checked and Approved
Initials: J.P
Date 24/02/2023

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

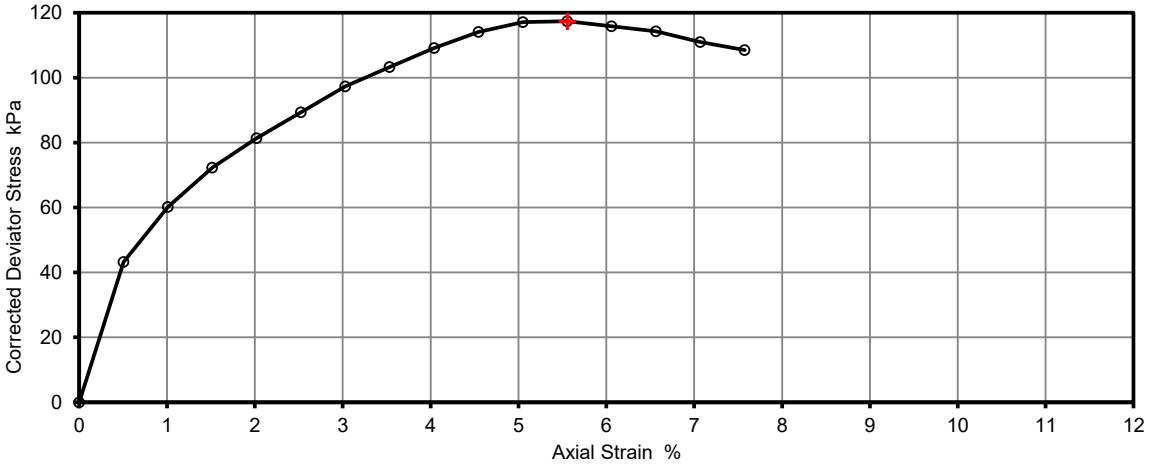
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	3.50 m
Soil Description	Medium strength brown mottled orangish brown sandy silty CLAY with occasional fmc sandstone fragments			Depth Base	3.95 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

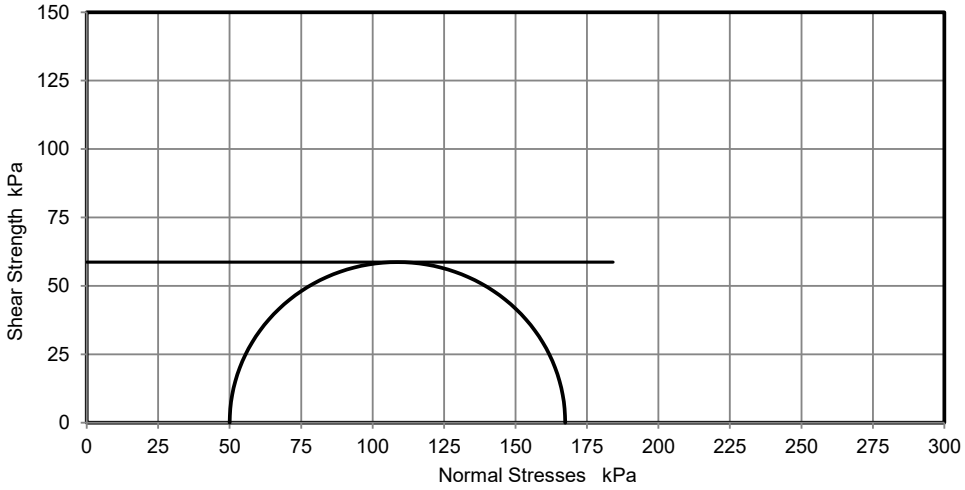
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	1.89	Mg/m3
Moisture Content	28	%
Dry Density	1.48	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	50	kPa
Axial Strain	5.6	%
Deviator Stress, (σ1 - σ3)f	117	kPa
Undrained Shear Strength, cu	59	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Date 24/02/2023

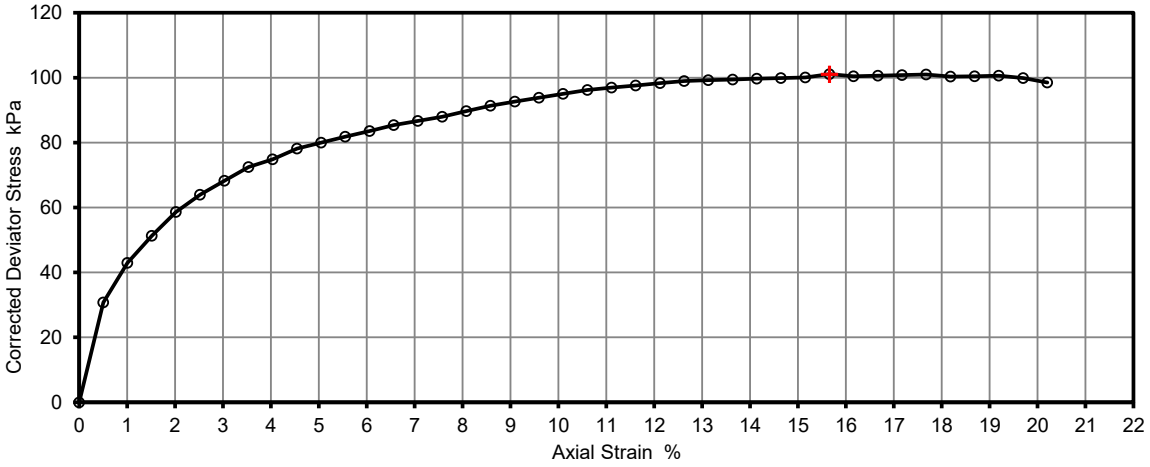
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	5.00 m
Soil Description	Medium strength dark grey slightly mottled brown slightly fine sandy silty CLAY			Depth Base	5.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

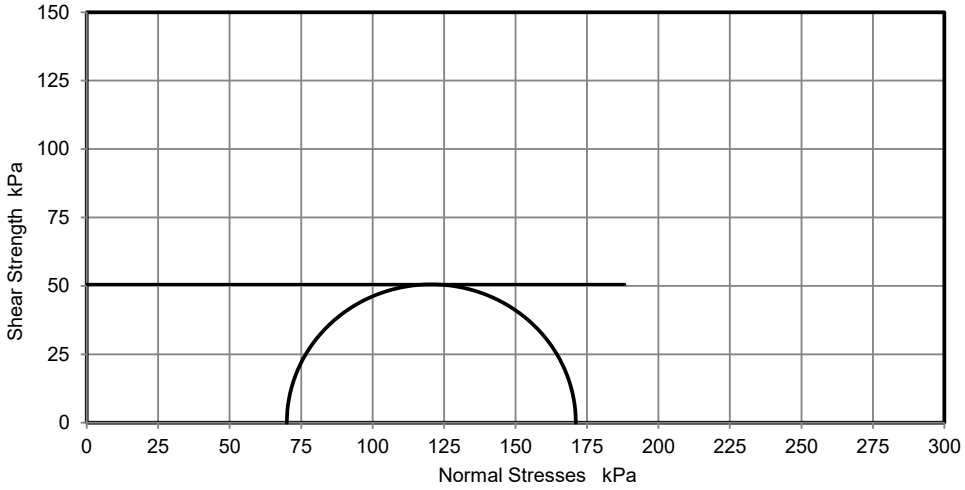
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	1.96	Mg/m3
Moisture Content	28	%
Dry Density	1.53	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	70	kPa
Axial Strain	16	%
Deviator Stress, (σ1 - σ3)f	101	kPa
Undrained Shear Strength, cu	51	kPa ½(σ1 - σ3)f
Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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

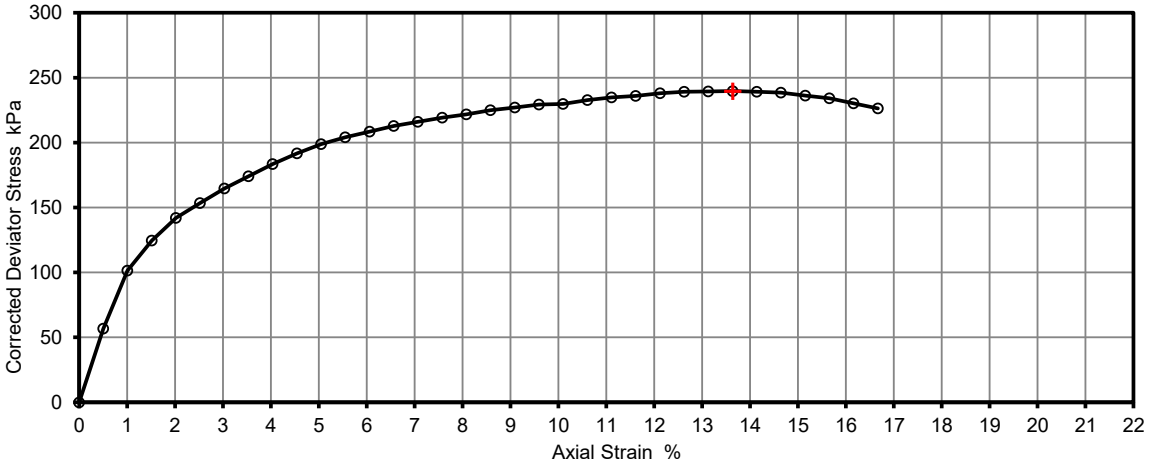
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	11.00 m
Soil Description	High strength dark grey silty CLAY			Depth Base	11.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

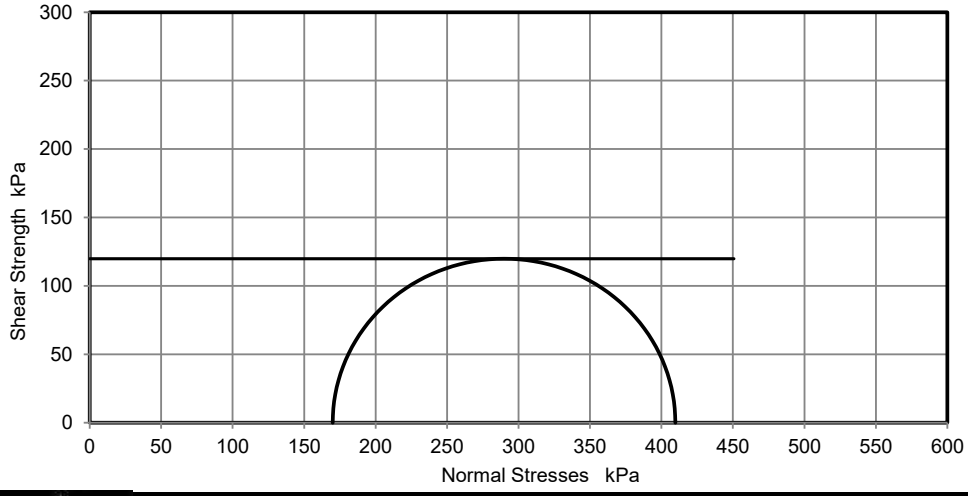
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	2.01	Mg/m3
Moisture Content	28	%
Dry Density	1.57	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	170	kPa
Axial Strain	14	%
Deviator Stress, (σ1 - σ3)f	240	kPa
Undrained Shear Strength, cu	120	kPa ½(σ1 - σ3)f
Mode of Failure	Compound	

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

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Date 24/02/2023

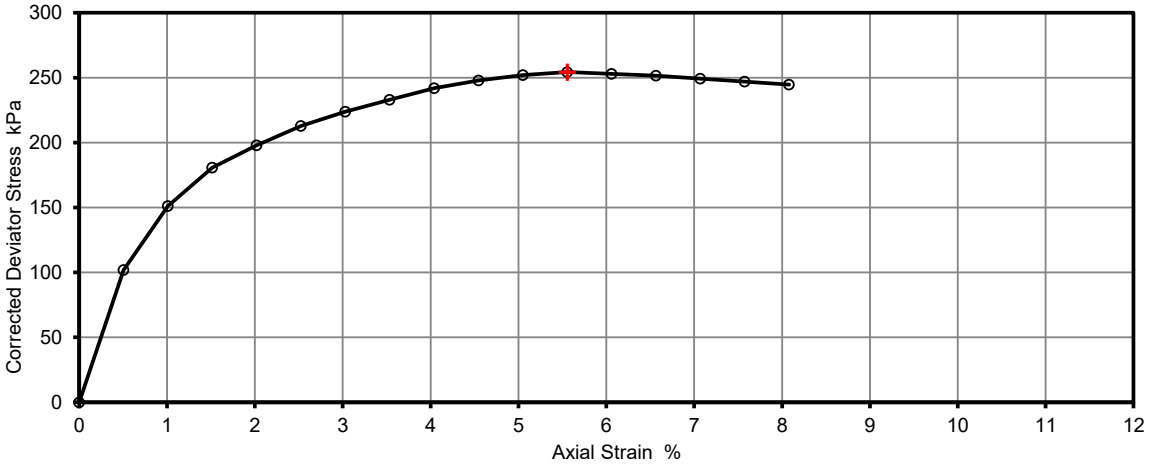
	Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen			Job Ref	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	15.00 m
Soil Description	High strength dark grey silty CLAY			Depth Base	15.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377 : Part 7 : 1990, clause 8, single specimen			Date of test	15/02/2023

Remarks

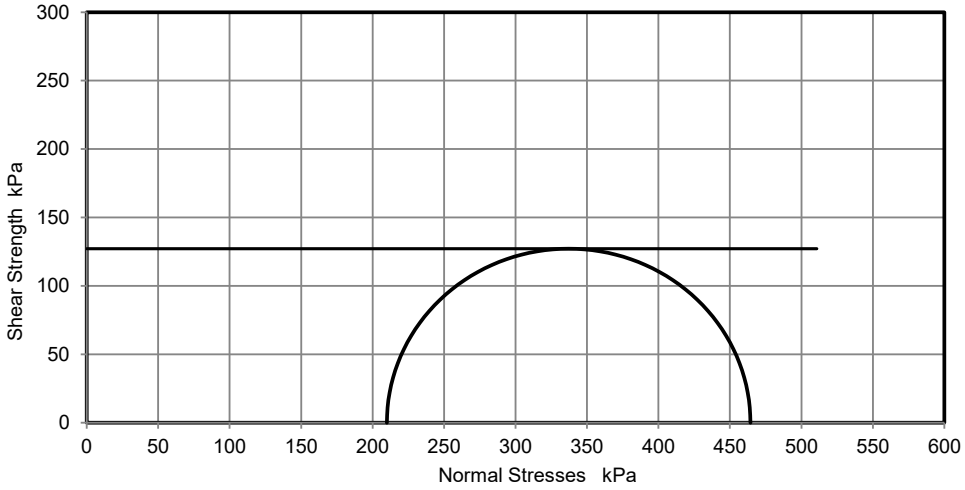
Position within sample

Test Number	1	
Length	198.0	mm
Diameter	102.0	mm
Bulk Density	2.00	Mg/m3
Moisture Content	30	%
Dry Density	1.54	Mg/m3
Rate of Strain	2.0	%/min
Cell Pressure	210	kPa
Axial Strain	5.6	%
Deviator Stress, (σ1 - σ3)f	254	kPa
Undrained Shear Strength, cu	127	kPa ½(σ1 - σ3)f
Mode of Failure	Brittle	

Deviator Stress v Axial Strain



Mohr Circles



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Date 24/02/2023

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

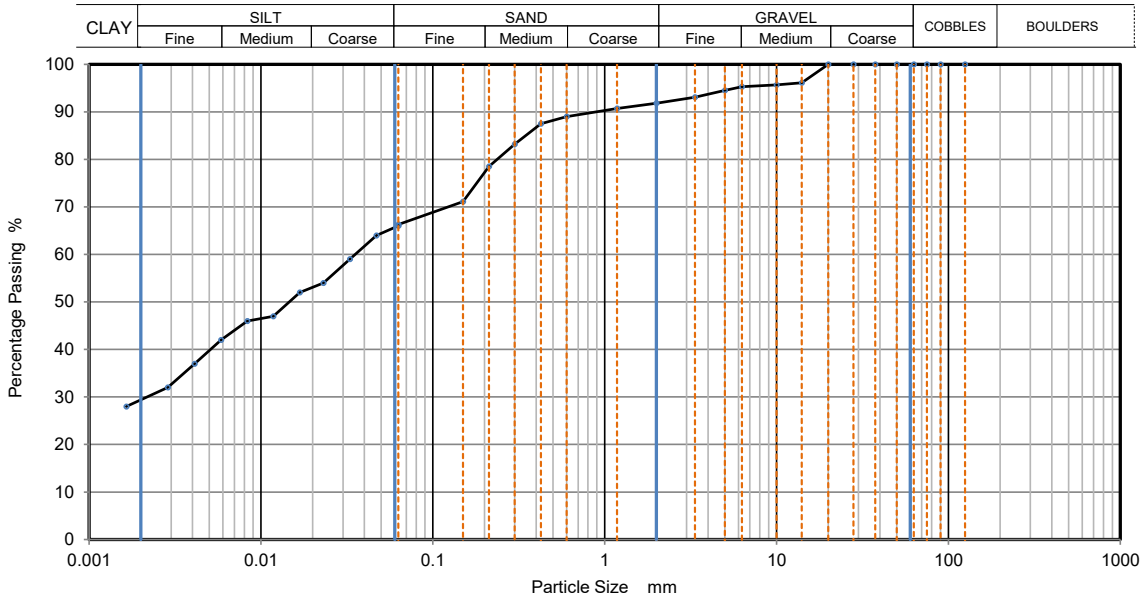
PARTICLE SIZE DISTRIBUTION

Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	2.00 m
Soil Description	Brown slightly gravelly slightly sandy silty CLAY with occasional fine carbonaceous deposits (gravel is fm concrete and pottery fragments)			Depth Base	- m
				Sample Type	D
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	09/02/2023
				Date tested	16/02/2023

Job Ref: 32976

Borehole/Pit No.: BH1A

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	66
90	100	0.0469	64
75	100	0.0329	59
63	100	0.0231	54
50	100	0.0168	52
37.5	100	0.0118	47
28	100	0.0083	46
20	100	0.0058	42
14	96	0.0041	37
10	96	0.0029	32
6.3	95	0.0016	28
5	95		
3.35	93		
2	92		
1.18	91		
0.6	89	Particle density (assumed)	
0.425	88	2.70 Mg/m3	
0.3	83		
0.212	79		
0.15	71		
0.063	66		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	8.2
Sand	25.4
Silt	37.3
Clay	29.1

Grading Analysis		
D100	mm	
D60	mm	0.0353
D30	mm	0.00224
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

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Email: james@k4soils.com

Tel: 01923 711288

Checked and Approved

Initials: J.P

Date: 24/02/2023

2519 Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) MSF-5-R3

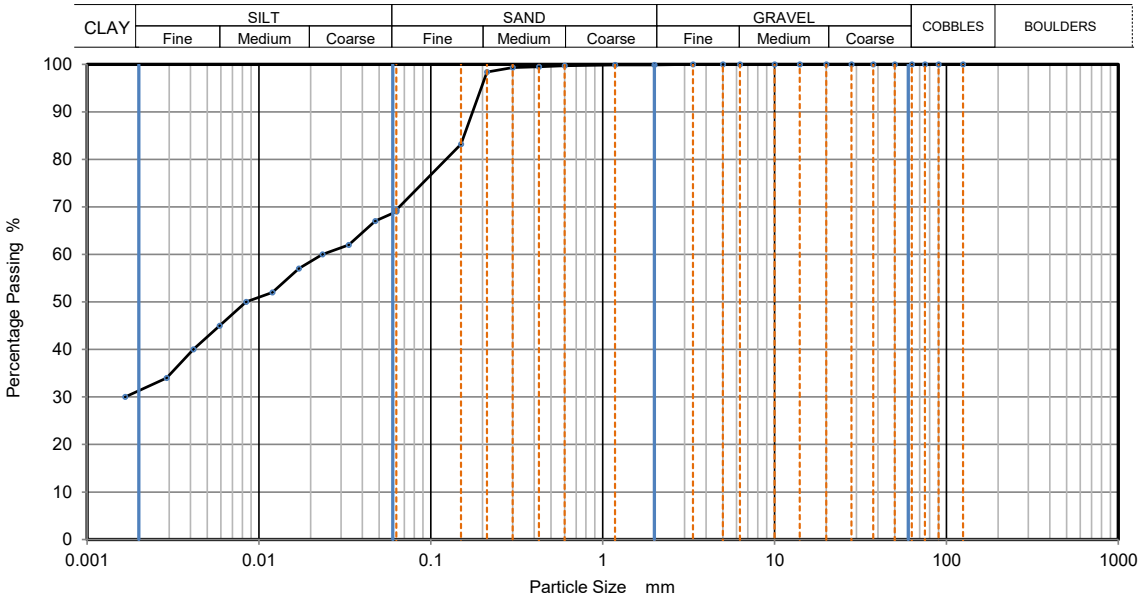
PARTICLE SIZE DISTRIBUTION

Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	6.00 m
Soil Description	Dark grey slightly fine sandy silty CLAY with rare decomposed shell fragments			Depth Base	6.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	09/02/2023
				Date tested	17/02/2023

Job Ref: 32976

Borehole/Pit No.: BH1A

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	69
90	100	0.0474	67
75	100	0.0333	62
63	100	0.0234	60
50	100	0.0170	57
37.5	100	0.0120	52
28	100	0.0084	50
20	100	0.0059	45
14	100	0.0041	40
10	100	0.0029	34
6.3	100	0.0017	30
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.70 Mg/m3	
0.3	99		
0.212	98		
0.15	83		
0.063	69		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.1
Sand	30.5
Silt	38.2
Clay	31.2

Grading Analysis		
D100	mm	
D60	mm	0.025
D30	mm	0.00175
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377 unless noted below

K4 Soils Laboratory

Unit 8, Olds Close, Watford, Herts, WD18 9RU

Email: james@k4soils.com

Tel: 01923 711288

Checked and Approved

Initials: J.P

Date: 24/02/2023

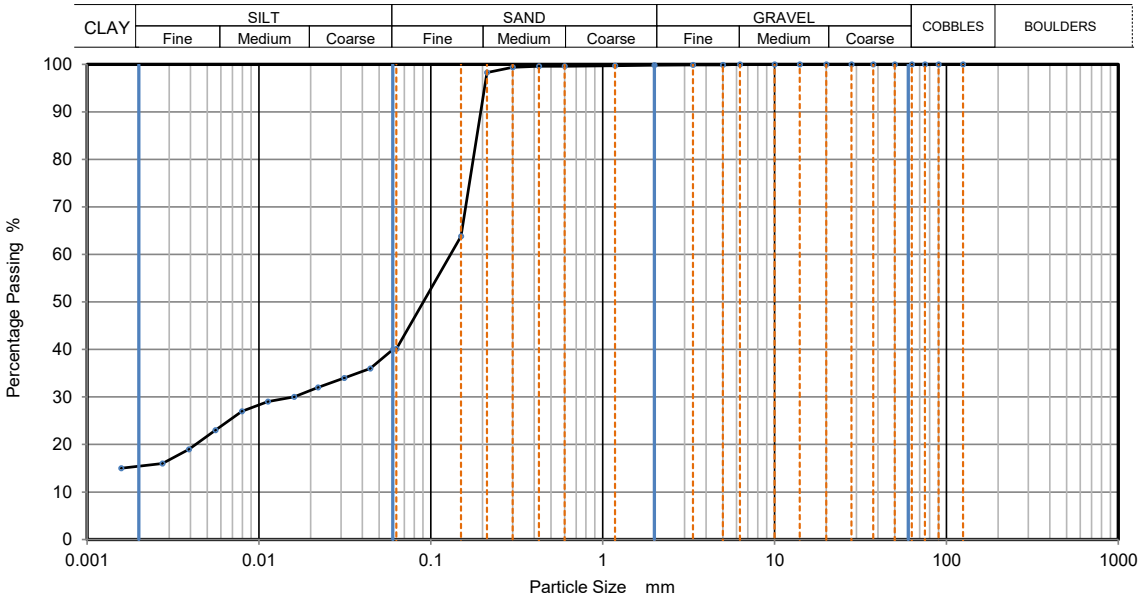
PARTICLE SIZE DISTRIBUTION

Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	1.50 m
Soil Description	Brown, light grey and orangish brown fine sandy silty CLAY with rare intrusion of black possiby carbonaceous deposit			Depth Base	1.95 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	09/02/2023
				Date tested	17/02/2023

Job Ref: 32976

Borehole/Pit No.: BH2

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0603	40
90	100	0.0445	36
75	100	0.0313	34
63	100	0.0220	32
50	100	0.0160	30
37.5	100	0.0113	29
28	100	0.0079	27
20	100	0.0056	23
14	100	0.0039	19
10	100	0.0027	16
6.3	100	0.0016	15
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.70 Mg/m3	
0.3	99		
0.212	98		
0.15	64		
0.063	40		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.2
Sand	59.6
Silt	25.1
Clay	15.1

Grading Analysis		
D100	mm	
D60	mm	0.13
D30	mm	0.0147
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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Date: 24/02/2023

2519 | Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) | MSF-5-R3

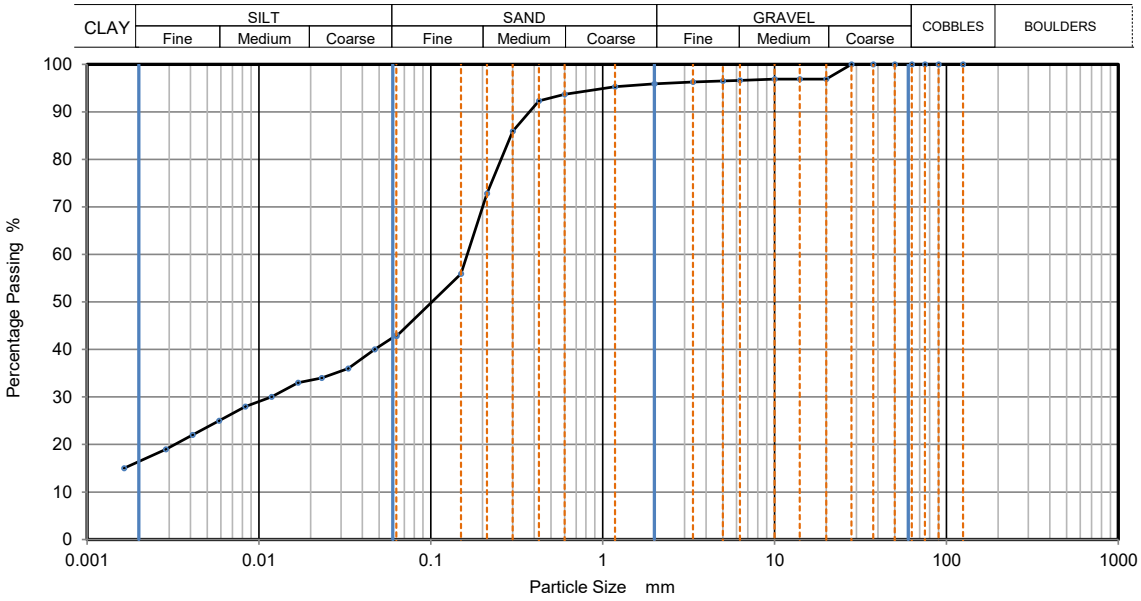
PARTICLE SIZE DISTRIBUTION

Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	3.50 m
Soil Description	Medium strength brown mottled orangish brown sandy silty CLAY with occasional fmc sandstone fragments			Depth Base	3.95 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	09/02/2023
				Date tested	17/02/2023

Job Ref: 32976

Borehole/Pit No.: BH2

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	43
90	100	0.0471	40
75	100	0.0330	36
63	100	0.0232	34
50	100	0.0169	33
37.5	100	0.0118	30
28	100	0.0083	28
20	97	0.0058	25
14	97	0.0041	22
10	97	0.0029	19
6.3	97	0.0016	15
5	97		
3.35	96		
2	96		
1.18	95		
0.6	94	Particle density (assumed)	
0.425	92	2.70	Mg/m3
0.3	86		
0.212	73		
0.15	56		
0.063	43		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	4.1
Sand	53.1
Silt	26.5
Clay	16.3

Grading Analysis		
D100	mm	
D60	mm	0.163
D30	mm	0.0123
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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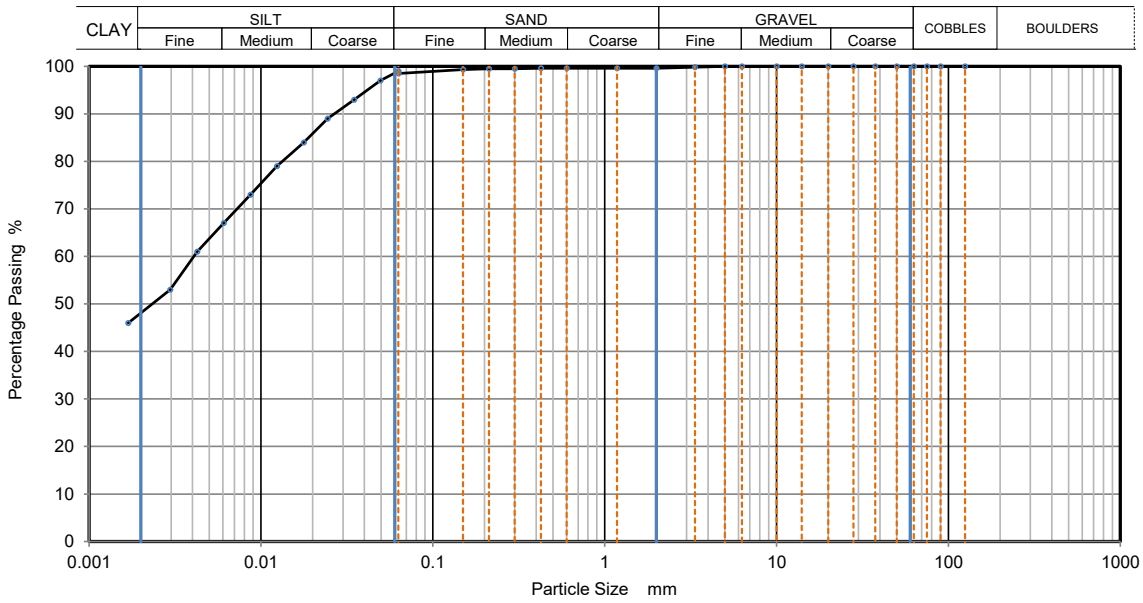
Date: 24/02/2023

PARTICLE SIZE DISTRIBUTION

				Job Ref	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	13.00 m
Soil Description	Dark grey silty CLAY			Depth Base	13.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
Test Method	BS1377:Part 2: 1990, clause 9.0			Project started	09/02/2023
				Date tested	17/02/2023

These results only apply to the items tested



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	99
90	100	0.0494	97
75	100	0.0348	93
63	100	0.0244	89
50	100	0.0177	84
37.5	100	0.0124	79
28	100	0.0087	73
20	100	0.0061	67
14	100	0.0043	61
10	100	0.0030	53
6.3	100	0.0017	46
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed)	
0.425	100	2.70 Mg/m3	
0.3	100		
0.212	100		
0.15	99		
0.063	99		

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.4
Sand	1.1
Silt	50.4
Clay	48.1

Grading Analysis		
D100	mm	
D60	mm	0.00411
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

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Date: 24/02/2023

2519 Approved Signatories: K.Phaure (Tech.Mgr) J.Phaure (Lab.Mgr) MSF-5-R3

Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
32976	31 Daleham Gardens	Samples received	03/02/2023
		Schedule received	08/02/2023
Project No.	Client	Project started	09/02/2023
2023-002-SIM-DAL	Geofirma	Testing Started	21/02/2023

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
BH1A	-	1.00	-	D	Greyish brown slightly sandy gravelly silty CLAY with slag and pottery fragments (gravel is fmc and angular to sub-angular)	28					
BH1A	-	1.50	-	D	Brownish grey silty CLAY with frequent lenses of yellowish brown silt	28					
BH1A	-	2.00	-	D	Brown slightly gravelly slightly sandy silty CLAY with occasional fine carbonaceous deposits (gravel is fm concrete and pottery fragments)	37	88	50	17	33	Sample washed to obtain test fraction
BH1A	-	3.00	-	D	Greyish brown slightly sandy silty CLAY with brick fragments and rare fmc sub-angular and tabular gravel	38					
BH1A	-	3.50	-	D	Grey silty CLAY	31					
BH1A	-	5.00	-	D	Grey silty CLAY with rare fine sub-angular gravel	28	98	51	18	33	
BH1A	-	6.00	6.45	U	Dark grey slightly fine sandy silty CLAY with rare decomposed shell fragments	29	100	49	16	33	
BH1A	-	10.00	10.45	U	High strength dark grey silty CLAY	29					
BH1A	-	14.00	14.45	U	High strength dark grey silty CLAY with occasional pockets of sand and rare decomposed shell fragments	28					
BH1A	-	19.50	19.94	U	High strength dark grey silty CLAY	28					
BH1A	-	22.50	22.95	U	Dark grey silty CLAY with pockets of black slightly sandy peat with occasional wood fragments becoming @ 22.65 m very high strength dark grey silty CLAY	28					
BH2	-	1.00	-	D	Orangish brown fine sandy silty CLAY with traces of roots and rootlets	28	100	43	18	25	

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3, 4.4 and 5.0
These results only apply to the items tested

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Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
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Checked and Approved
Initials J.P
Date: 24/02/2023

Summary of Natural Moisture Content, Liquid Limit and Plastic Limit Results

Job No.	Project Name	Programme	
32976	31 Daleham Gardens	Samples received	03/02/2023
		Schedule received	08/02/2023
Project No.	Client	Project started	09/02/2023
2023-002-SIM-DAL	Geofirma	Testing Started	21/02/2023

Hole No.	Sample				Soil Description	NMC	Passing 425µm	LL	PL	PI	Remarks
	Ref	Top m	Base m	Type		%	%	%	%	%	
BH2	-	1.50	1.95	U	Brown, light grey and orangish brown fine sandy silty CLAY with rare intrusion of black possiby carbonaceous deposit	15					
BH2	-	2.00	-	D	Yellowish brown slightly sandy very silty CLAY	16					
BH2	-	2.50	-	D	Brownish grey silty CLAY with frequent lenses of yellowish brown silt	21					
BH2	-	3.00	-	D	Orangish brown and occasional grey fine sandy silty CLAY	19	100	47	18	29	
BH2	-	3.50	3.95	U	Medium strength brown mottled orangish brown sandy silty CLAY with occasional fmc sandstone fragments	27					
BH2	-	4.00	-	D	Brown slightly sandy very silty CLAY	27					
BH2	-	5.00	5.45	U	Medium strength dark grey slightly mottled brown slightly fine sandy silty CLAY	28	100	54	18	36	
BH2	-	11.00	11.45	U	High strength dark grey silty CLAY	28					
BH2	-	15.00	15.45	U	High strength dark grey silty CLAY	30					

UKAS TESTING

Test Methods: BS1377: Part 2: 1990:
Natural Moisture Content : clause 3.2
Atterberg Limits: clause 4.3, 4.4 and 5.0
These results only apply to the items tested

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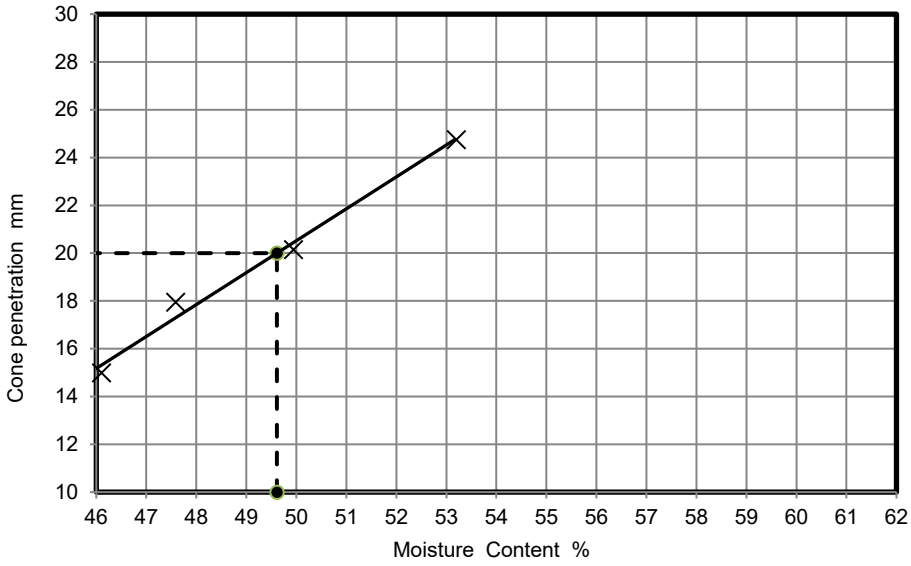
Checked and Approved

Initials J.P

Date: 24/02/2023

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

				Job No.	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	2.00 m
Soil Description	Brown slightly gravelly slightly sandy silty CLAY with occasional fine carbonaceous deposits (gravel is fm concrete and pottery fragments)			Depth Base	- m
				Sample Type	D
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023

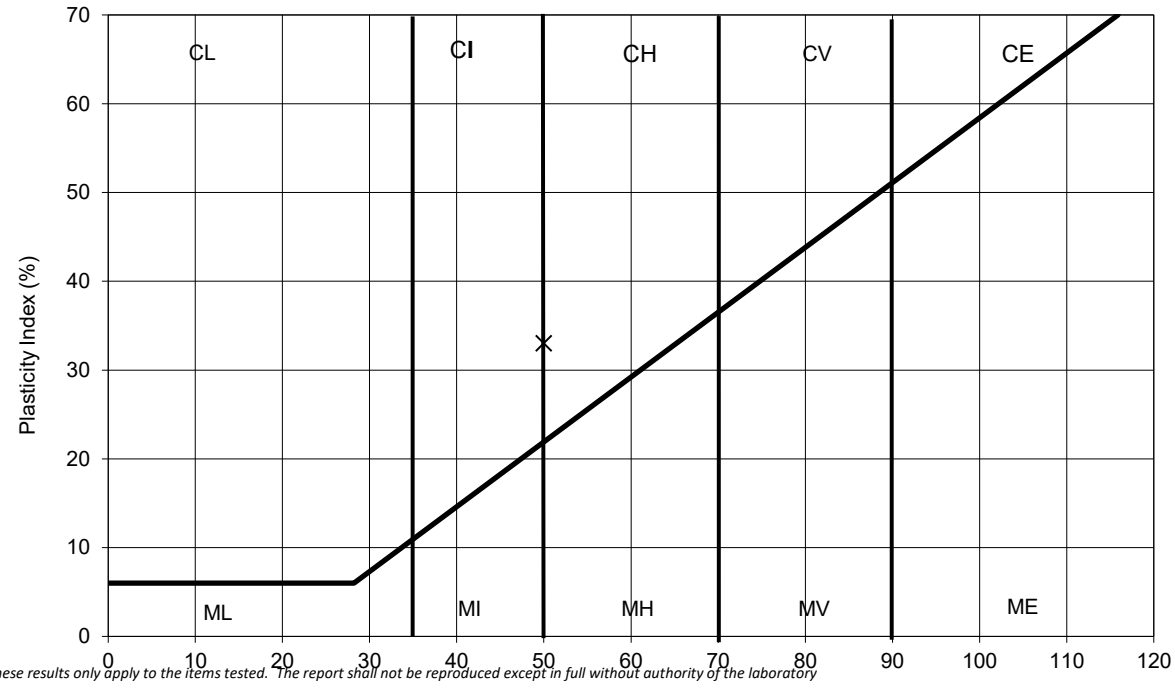


NATURAL MOISTURE CONTENT	**37**	**%**
% PASSING 425µm SIEVE	**88**	**%**
LIQUID LIMIT	**50**	**%**
PLASTIC LIMIT	**17**	**%**
PLASTICITY INDEX	**33**	**%**

Remarks

Sample washed to obtain test fraction

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 24/02/2023

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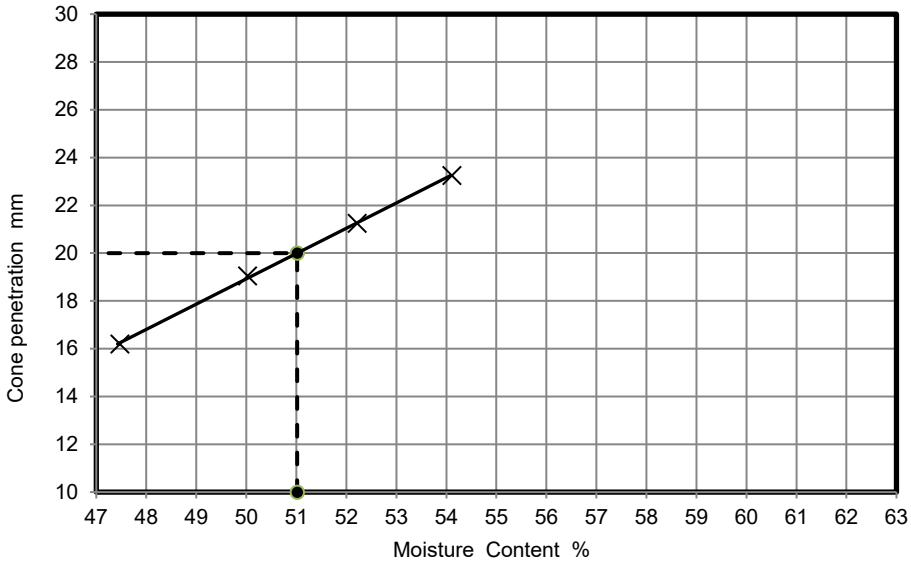
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

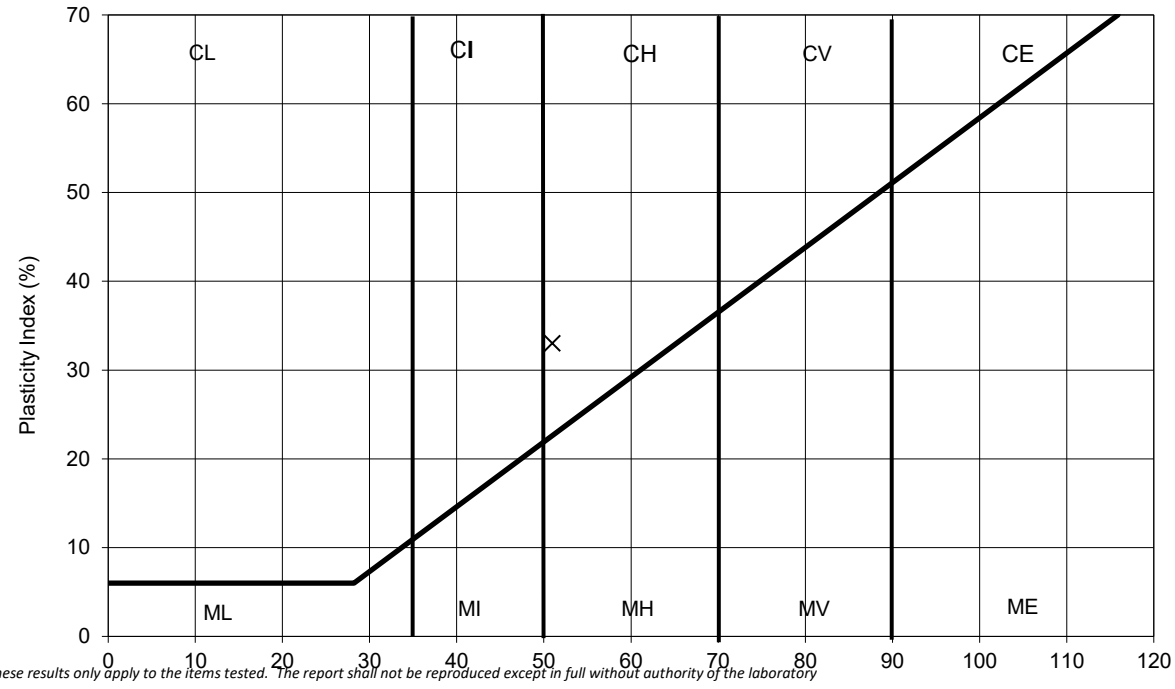
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	5.00 m
Soil Description	Grey silty CLAY with rare fine sub-angular gravel			Depth Base	- m
				Sample Type	D
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023
				Job No.	32976
				Borehole/Pit No.	BH1A



NATURAL MOISTURE CONTENT	**28**	**%**
% PASSING 425µm SIEVE	**98**	**%**
LIQUID LIMIT	**51**	**%**
PLASTIC LIMIT	**18**	**%**
PLASTICITY INDEX	**33**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 24/02/2023

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
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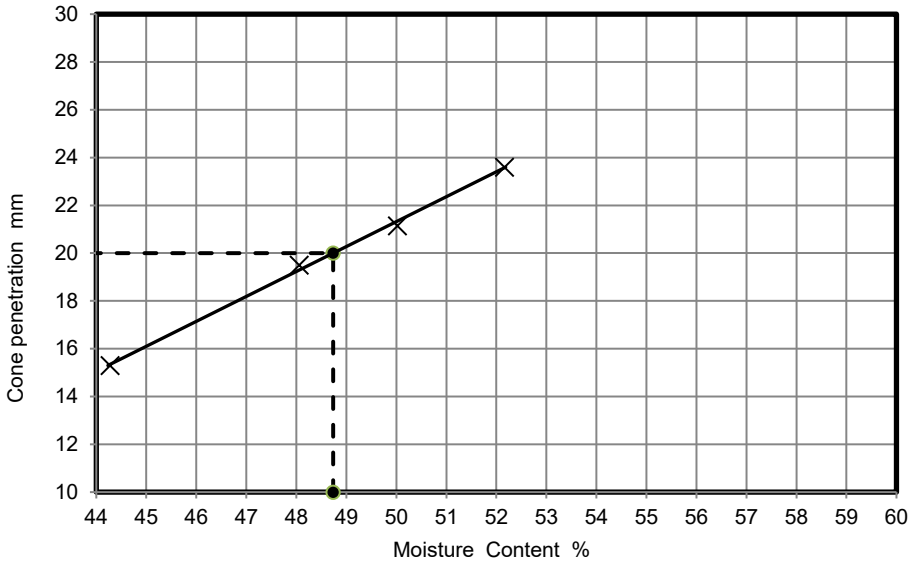
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

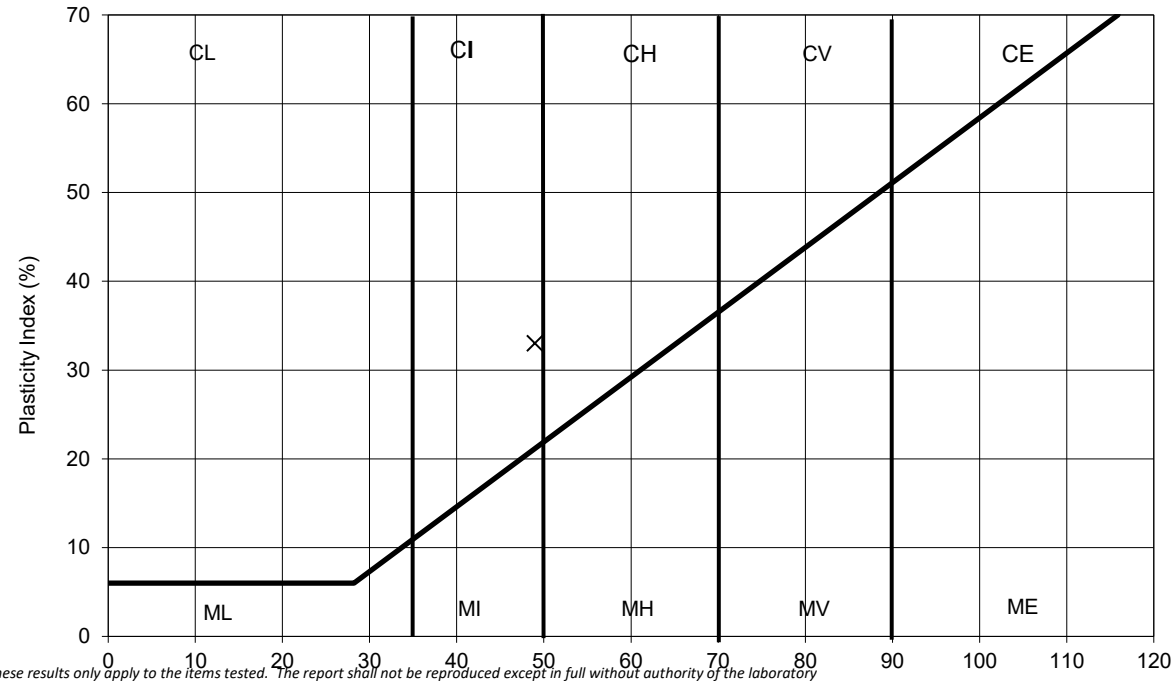
				Job No.	32976
				Borehole/Pit No.	BH1A
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	6.00 m
Soil Description	Dark grey slightly fine sandy silty CLAY with rare decomposed shell fragments			Depth Base	6.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023



NATURAL MOISTURE CONTENT	**29**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**49**	**%**
PLASTIC LIMIT	**16**	**%**
PLASTICITY INDEX	**33**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 24/02/2023

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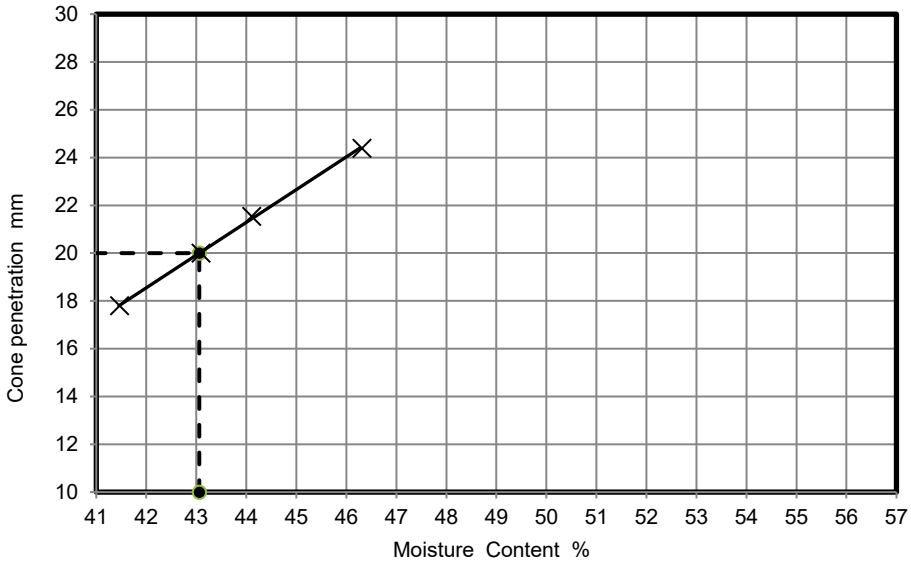
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

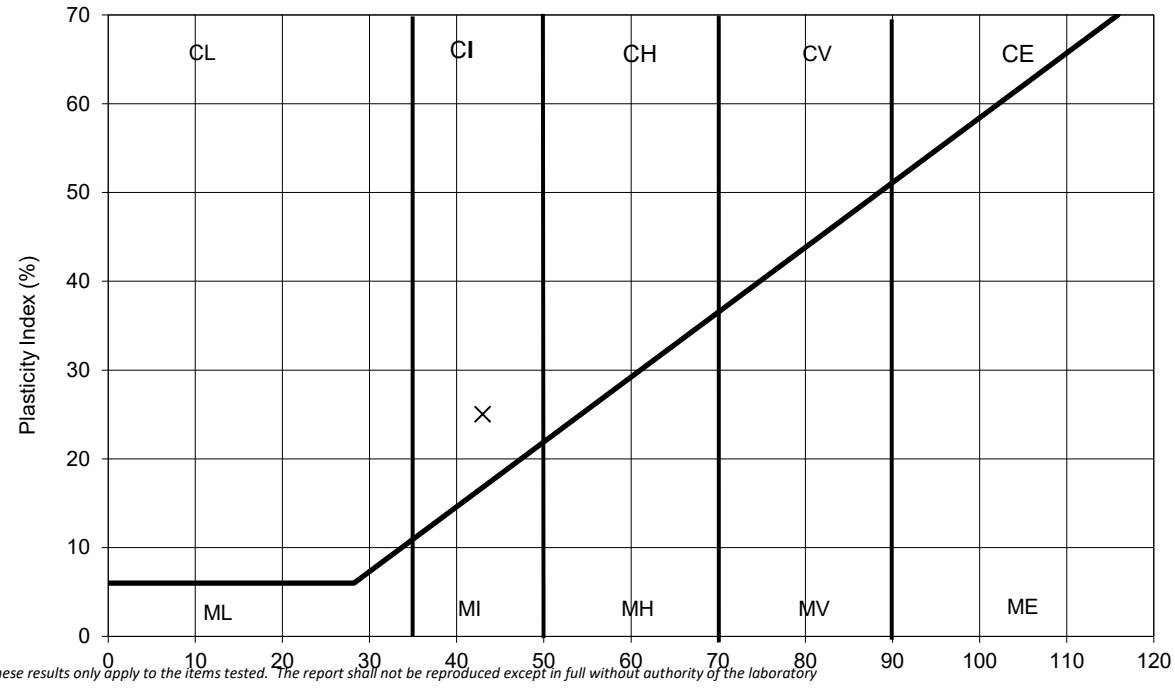
				Job No.	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	1.00 m
Soil Description	Orangish brown fine sandy silty CLAY with traces of roots and rootlets			Depth Base	- m
				Sample Type	D
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023



NATURAL MOISTURE CONTENT	**28**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**43**	**%**
PLASTIC LIMIT	**18**	**%**
PLASTICITY INDEX	**25**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 24/02/2023

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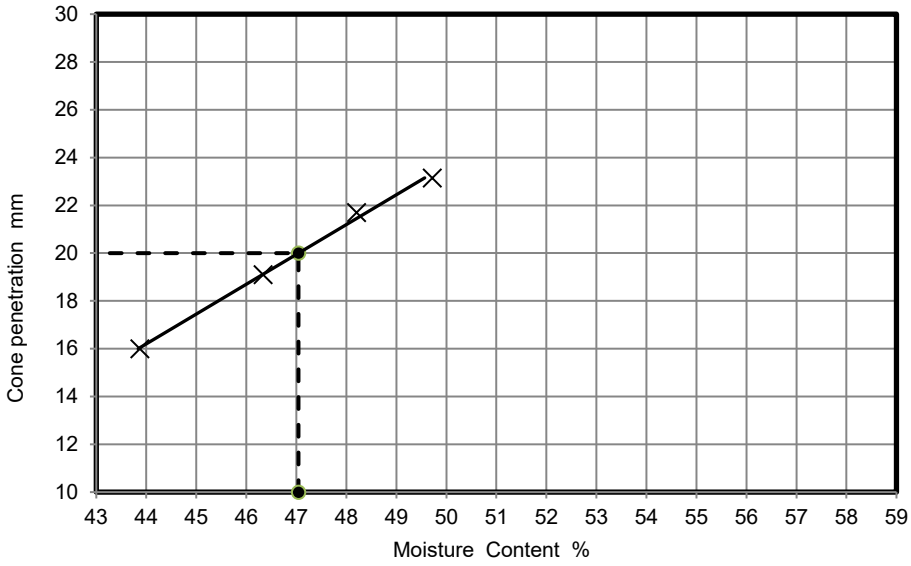
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

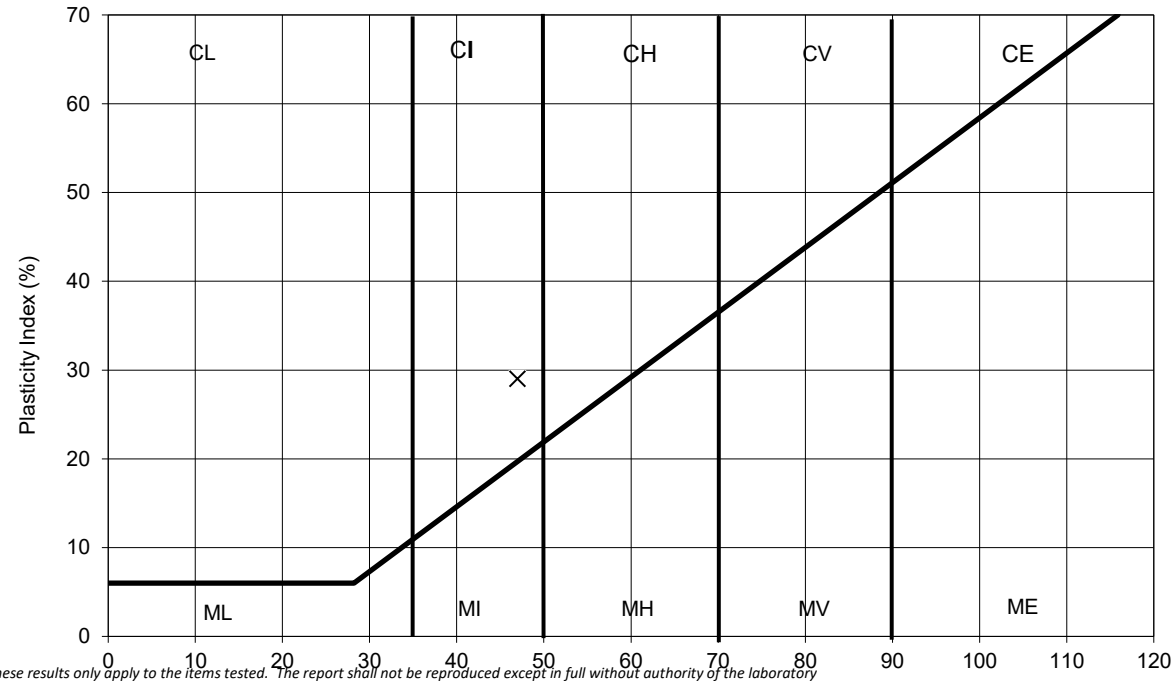
				Job No.	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	3.00 m
Soil Description	Orangish brown and occasional grey fine sandy silty CLAY			Depth Base	- m
				Sample Type	D
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023



NATURAL MOISTURE CONTENT	**19**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**47**	**%**
PLASTIC LIMIT	**18**	**%**
PLASTICITY INDEX	**29**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

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BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

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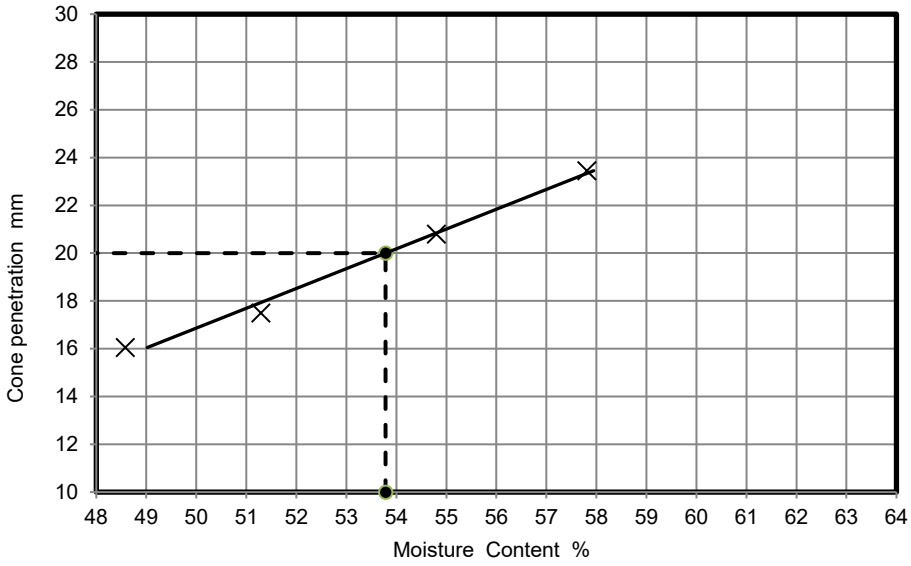
Tel: 01923 711 288 Email: James@k4soils.com

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

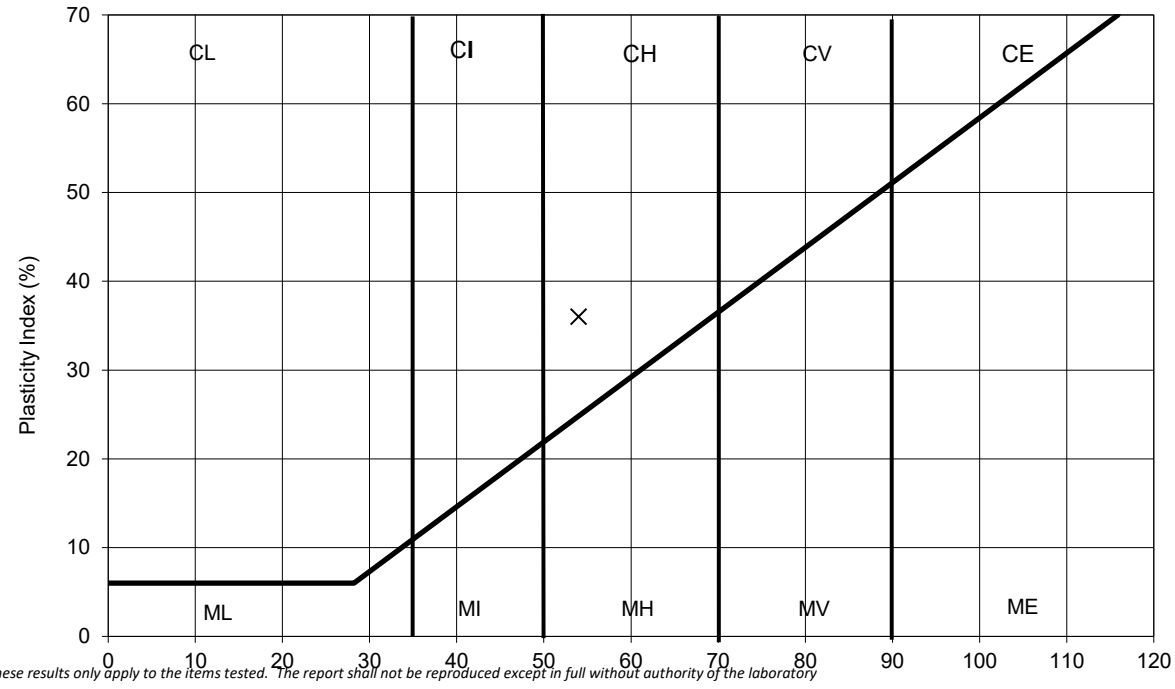
				Job No.	32976
				Borehole/Pit No.	BH2
Site Name	31 Daleham Gardens			Sample No.	-
Project No.	2023-002-SIM-DAL	Client	Geofirma	Depth Top	5.00 m
Soil Description	Medium strength dark grey slightly mottled brown slightly fine sandy silty CLAY			Depth Base	5.45 m
				Sample Type	U
				Samples received	03/02/2023
				Schedules received	08/02/2023
				Project Started	09/02/2023
				Date Tested	21/02/2023



NATURAL MOISTURE CONTENT	**28**	**%**
% PASSING 425µm SIEVE	**100**	**%**
LIQUID LIMIT	**54**	**%**
PLASTIC LIMIT	**18**	**%**
PLASTICITY INDEX	**36**	**%**

Remarks

PLASTICITY INDEX



TEST METHOD

BS1377: Part 2 :Clause 4.3 : 1990 Determination of the liquid limit by the cone penetrometer method
BS1377: Part 2 :Clause 5.0 : 1990: Determination of the plastic limit and plasticity index
BS1377: Part 2 :Clause 3.2 : 1990:Determination of the moisture content by the oven drying

Checked and Approved

Initials: J.P
Date: 24/02/2023

Test Report by K4 SOILS LABORATORY Unit 8 Olds Close Olds Approach Watford Herts WD18 9RU
Tel: 01923 711 288 Email: James@k4soils.com

APPENDIX D –

INSITU CBR TEST RESULTS

In Situ California Bearing Ratio (CBR)

				Job Ref	32972
				CBR No.	CBR1
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.30
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Brown slightly sandy silty CLAY with occasional rootlets and traces of fine brick fragments				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	1

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

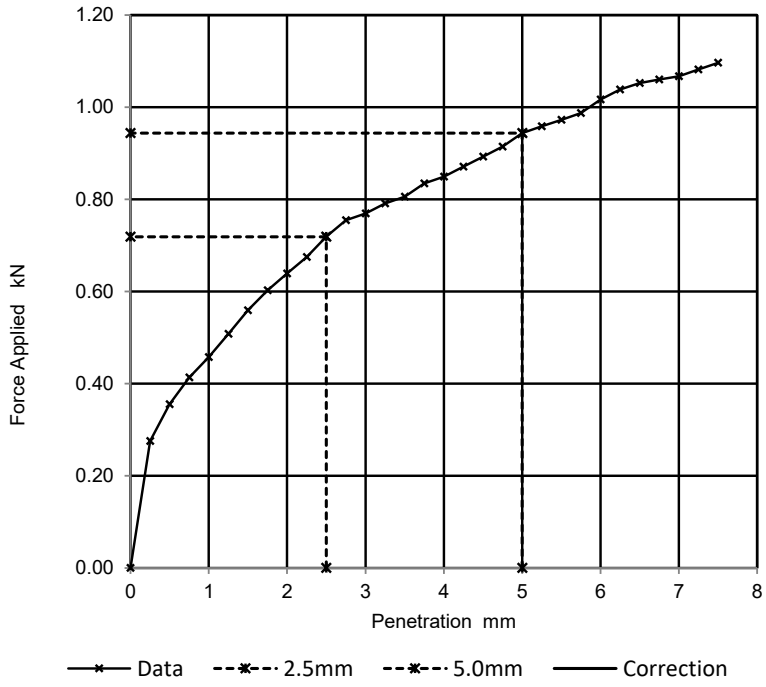
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	7.26	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger: Dial Reading	Force on Plunger: Load kN
0.00	0	0.00
0.25	38	0.28
0.50	49	0.36
0.75	57	0.41
1.00	63	0.46
1.25	70	0.51
1.50	77	0.56
1.75	83	0.60
2.00	88	0.64
2.25	93	0.68
2.50	99	0.72
2.75	104	0.76
3.00	106	0.77
3.25	109	0.79
3.50	111	0.81
3.75	115	0.83
4.00	117	0.85
4.25	120	0.87
4.50	123	0.89
4.75	126	0.91
5.00	130	0.94
5.25	132	0.96
5.50	134	0.97
5.75	136	0.99
6.00	140	1.02
6.25	143	1.04
6.50	145	1.05
6.75	146	1.06
7.00	147	1.07
7.25	149	1.08
7.50	151	1.10

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, % Penetration 2.5mm	CBR Values, % Penetration 5mm	CBR Value	Moisture Content %
No	5.4	4.7	**5.4**	23

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: **J.P**

Date: 10/02/2023

	In Situ California Bearing Ratio (CBR)			Job Ref	32972
				CBR No.	CBR2
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.30
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Brown slightly sandy silty CLAY with occasional rootlets and traces of fine brick fragments				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	2

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

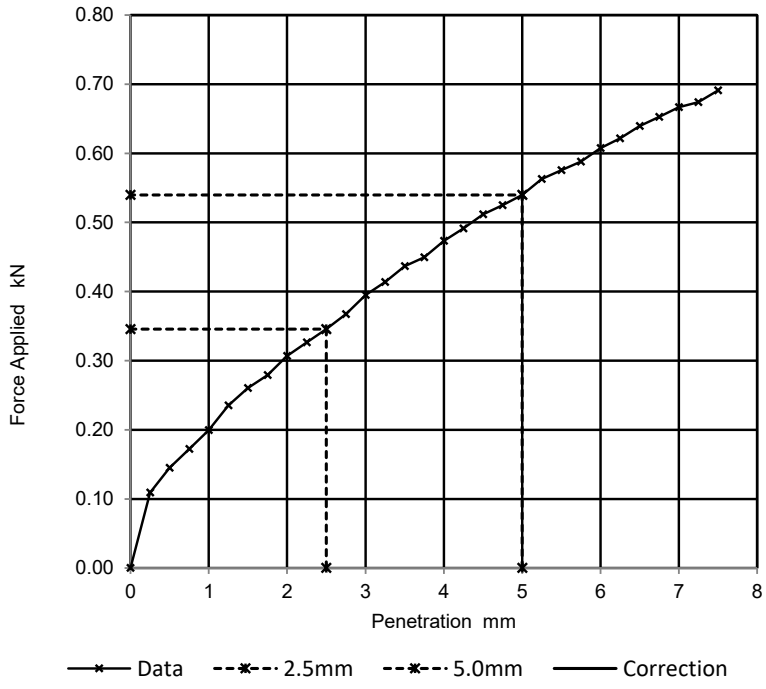
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	0.42	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger	
	Dial Reading	Load kN
0.00	0	0.00
0.25	260	0.11
0.50	345	0.14
0.75	410	0.17
1.00	475	0.20
1.25	560	0.24
1.50	620	0.26
1.75	665	0.28
2.00	730	0.31
2.25	777	0.33
2.50	823	0.35
2.75	875	0.37
3.00	940	0.39
3.25	985	0.41
3.50	1040	0.44
3.75	1070	0.45
4.00	1127	0.47
4.25	1170	0.49
4.50	1218	0.51
4.75	1250	0.53
5.00	1285	0.54
5.25	1340	0.56
5.50	1370	0.58
5.75	1400	0.59
6.00	1446	0.61
6.25	1480	0.62
6.50	1523	0.64
6.75	1554	0.65
7.00	1587	0.67
7.25	1605	0.67
7.50	1645	0.69

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, %		CBR Value	Moisture Content
	Penetration 2.5mm	Penetration 5mm		%
No	2.6	2.7	**2.7**	25

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: **J.P**

Date: 10/02/2023

In Situ California Bearing Ratio (CBR)

				Job Ref	32972
				CBR No.	CBR3
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.40
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Brown slightly sandy silty CLAY with occasional rootlets and traces of fine brick fragments				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	3

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

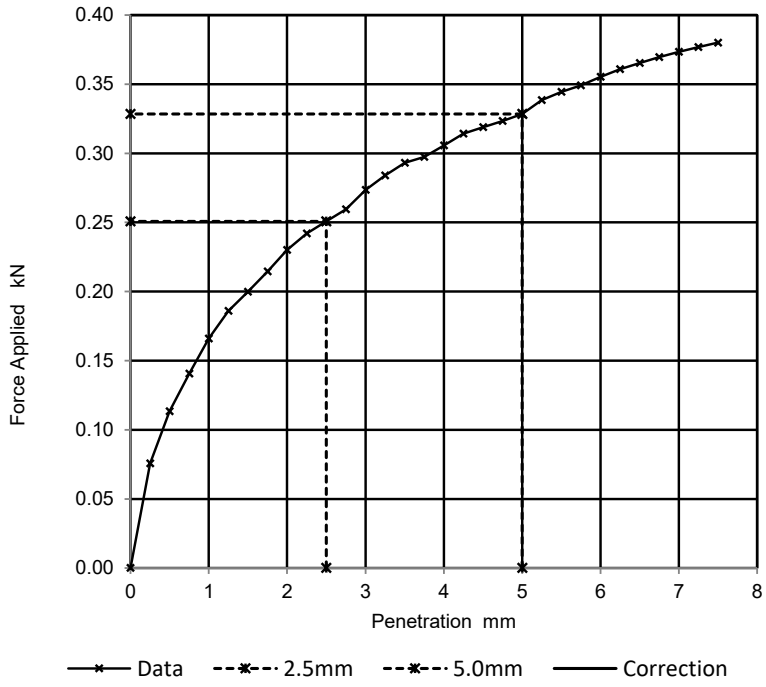
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	0.42	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger: Dial Reading	Force on Plunger: Load kN
0.00	0	0.00
0.25	180	0.08
0.50	270	0.11
0.75	335	0.14
1.00	395	0.17
1.25	443	0.19
1.50	476	0.20
1.75	511	0.21
2.00	548	0.23
2.25	576	0.24
2.50	597	0.25
2.75	618	0.26
3.00	651	0.27
3.25	676	0.28
3.50	698	0.29
3.75	708	0.30
4.00	728	0.31
4.25	748	0.31
4.50	759	0.32
4.75	770	0.32
5.00	782	0.33
5.25	806	0.34
5.50	820	0.34
5.75	831	0.35
6.00	846	0.36
6.25	859	0.36
6.50	870	0.37
6.75	880	0.37
7.00	889	0.37
7.25	897	0.38
7.50	905	0.38

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, % Penetration 2.5mm	CBR Values, % Penetration 5mm	CBR Value	Moisture Content %
No	1.9	1.6	**1.9**	27

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved

Initials: **J.P**

Date: 10/02/2023

	In Situ California Bearing Ratio (CBR)			Job Ref	32972
				CBR No.	CBR4
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.00
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Dark grey sandy silty CLAY				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	4

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

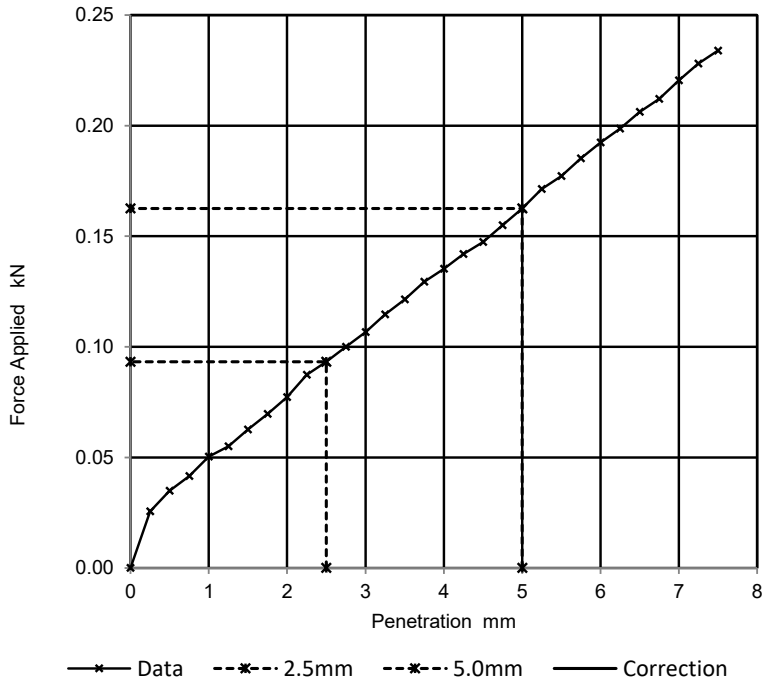
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	0.42	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger: Dial Reading	Force on Plunger: Load kN
0.00	0	0.00
0.25	61	0.03
0.50	83	0.03
0.75	99	0.04
1.00	120	0.05
1.25	131	0.06
1.50	149	0.06
1.75	166	0.07
2.00	184	0.08
2.25	208	0.09
2.50	222	0.09
2.75	238	0.10
3.00	254	0.11
3.25	273	0.11
3.50	289	0.12
3.75	308	0.13
4.00	322	0.14
4.25	338	0.14
4.50	351	0.15
4.75	369	0.15
5.00	387	0.16
5.25	408	0.17
5.50	422	0.18
5.75	441	0.19
6.00	458	0.19
6.25	473	0.20
6.50	491	0.21
6.75	505	0.21
7.00	525	0.22
7.25	543	0.23
7.50	557	0.23

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, % Penetration 2.5mm	CBR Values, % Penetration 5mm	CBR Value	Moisture Content %
No	0.71	0.81	**0.81**	39

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: **J.P**
Date: 10/02/2023

	In Situ California Bearing Ratio (CBR)			Job Ref	32972
				CBR No.	CBR5
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.00
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Dark grey sandy silty CLAY				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	5

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

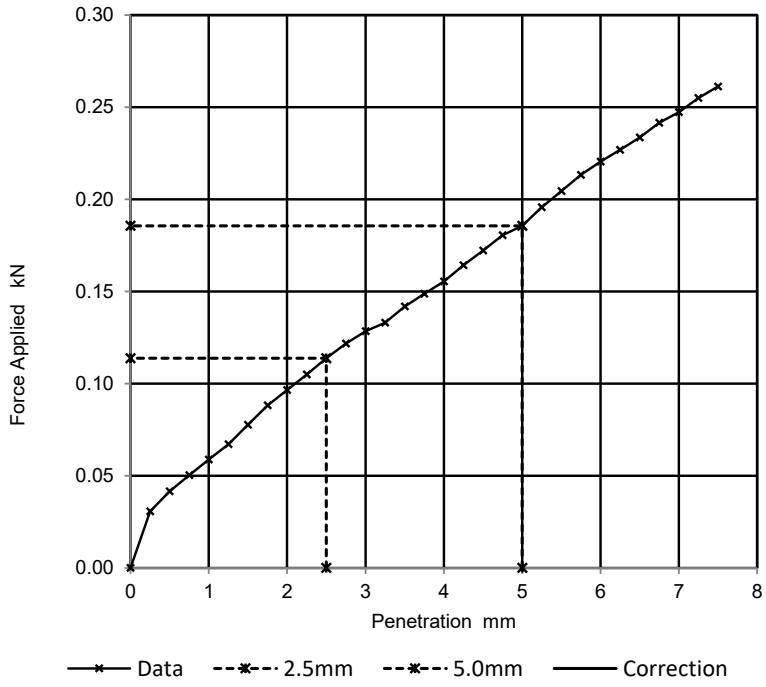
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	0.42	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger: Dial Reading	Force on Plunger: Load kN
0.00	0	0.00
0.25	73	0.03
0.50	99	0.04
0.75	120	0.05
1.00	140	0.06
1.25	160	0.07
1.50	185	0.08
1.75	210	0.09
2.00	230	0.10
2.25	250	0.11
2.50	271	0.11
2.75	290	0.12
3.00	306	0.13
3.25	317	0.13
3.50	338	0.14
3.75	354	0.15
4.00	370	0.16
4.25	391	0.16
4.50	410	0.17
4.75	430	0.18
5.00	442	0.19
5.25	466	0.20
5.50	487	0.20
5.75	508	0.21
6.00	525	0.22
6.25	540	0.23
6.50	556	0.23
6.75	575	0.24
7.00	589	0.25
7.25	607	0.25
7.50	622	0.26

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, % Penetration 2.5mm	CBR Values, % Penetration 5mm	CBR Value	Moisture Content %
No	0.86	0.93	**0.93**	36

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: **J.P**
Date: 10/02/2023

	In Situ California Bearing Ratio (CBR)			Job Ref	32972
				CBR No.	CBR6
Site Name	31 Daleham Gardens, Finchley, London, NW3 5BU			Depth m	0.45
Project No.	2023-002-SIM-DAL	Client	Geofirma	Date of Test	02/02/2023
Soil Description	Brown slightly sandy silty CLAY with occasional rootlets and traces of fine brick fragments				
Test Method	BS1377 : Part 9 : 1990, clause 4.3			CBR Test Number	6

Note: Test only applicable when maximum particle size beneath the plunger does not exceed 20mm

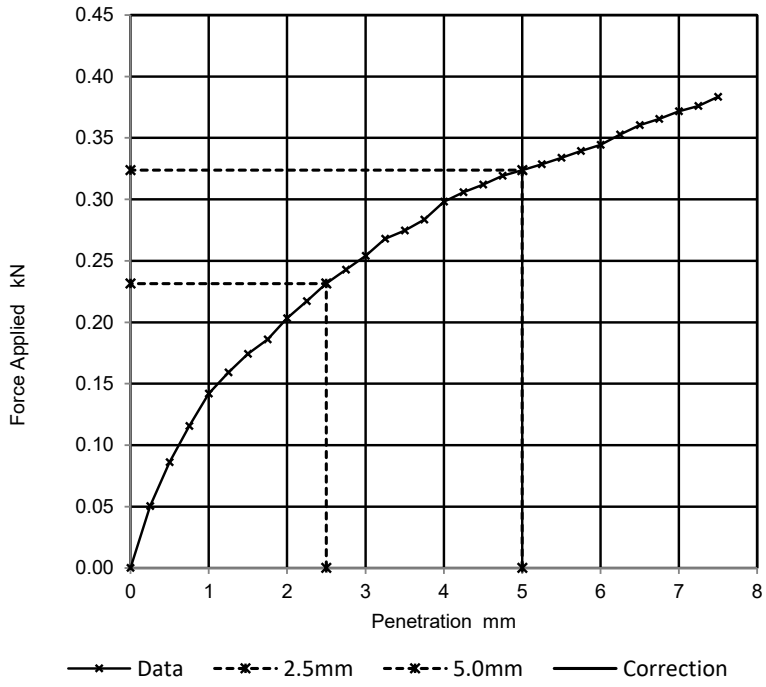
Rate if Strain	1.00	mm/min
Mass of Surcharge	4.5	kg
Proving Ring Factor	0.42	N/div

Temperature	11	0C
Environmental Conditions	Partly sunny	

Readings

Penetration of Plunger mm	Force on Plunger: Dial Reading	Force on Plunger: Load kN
0.00	0	0.00
0.25	120	0.05
0.50	205	0.09
0.75	275	0.12
1.00	338	0.14
1.25	379	0.16
1.50	415	0.17
1.75	443	0.19
2.00	484	0.20
2.25	517	0.22
2.50	551	0.23
2.75	578	0.24
3.00	605	0.25
3.25	638	0.27
3.50	654	0.27
3.75	675	0.28
4.00	710	0.30
4.25	728	0.31
4.50	743	0.31
4.75	760	0.32
5.00	771	0.32
5.25	782	0.33
5.50	795	0.33
5.75	808	0.34
6.00	820	0.34
6.25	840	0.35
6.50	858	0.36
6.75	870	0.37
7.00	885	0.37
7.25	895	0.38
7.50	913	0.38

Force versus Penetration Plot



Remarks

Results

Curve correction applied	CBR Values, % Penetration 2.5mm	CBR Values, % Penetration 5mm	CBR Value	Moisture Content %
No	1.8	1.6	**1.8**	34

Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: **J.P**
Date: 10/02/2023

APPENDIX E –

CHEMICAL TEST RESULTS

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	23-46814
Issue:	1
Date of Issue:	24/02/2023
Contact:	James Phaure
Customer Details:	K4 Soils Laboratory Ltd Unit 8 Watford HertfordshireWD18 9RU
Quotation No:	Q22-03477
Order No:	32976
Customer Reference:	32976
Date Received:	17/02/2023
Date Approved:	24/02/2023
Details:	31 Daleham Gardens
Approved by:	

Mike Varley, General Manager

Sample Summary

Report No.: 23-46814, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
312684	BH1A 1.00	Not Provided	17/02/2023	Sandy clayey loam	a
312685	BH1A 3.50	Not Provided	17/02/2023	Clay	a
312686	BH1A 22.50	Not Provided	17/02/2023	Sandy clayey loam	a
312687	BH2 13.00	Not Provided	17/02/2023	Clay	a

Results Summary

Report No.: 23-46814, issue number 1

			ELAB Reference	312684	312685	312686	312687
			Customer Reference				
			Sample ID				
			Sample Type	SOIL	SOIL	SOIL	SOIL
			Sample Location	BH1A	BH1A	BH1A	BH2
			Sample Depth (m)	1.00	3.50	22.50	13.00
			Sampling Date	Not Provided	Not Provided	Not Provided	Not Provided
Determinand	**Codes**	**Units**	**LOD**				
Soil sample preparation parameters							
Moisture Content	N	%	0.1	17.8	21.3	21.9	19.3
Material removed	N	%	0.1	13.1	< 0.1	12.1	< 0.1
Description of Inert material removed	N		0	Stones/Brick	None	Stones/Wood	None
Anions							
Water Soluble Sulphate	M	g/l	0.02	0.62	0.22	0.21	0.07
Inorganics							
Total Sulphur	N	%	0.01	0.24	0.50	0.28	0.63
Acid Soluble Sulphate (SO4)	U	%	0.02	0.53	0.09	0.09	0.05
Miscellaneous							
pH	M	pH units	0.1	10.4	8.7	8.7	9.1

Method Summary

Report No.: 23-46814, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
pH	M	Air dried sample	23/02/2023	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	23/02/2023	115	Ion Chromatography
Water soluble anions	M	Air dried sample	22/02/2023	172	Ion Chromatography
Total organic carbon/Total sulphur	N	Air dried sample	21/02/2023	216	IR

Tests marked N are not UKAS accredited

Report Information

Report No.: 23-46814, 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

Jaime Wils
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WD3 1RE

e: jaime@geofirmaconsultants.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-16525

Project / Site name:	31 Daleham Gardens	**Samples received on:**	07/02/2023
Your job number:	2023-002-SIM-DAL	**Samples instructed on/ Analysis started on:**	08/02/2023
Your order number:		**Analysis completed by:**	20/02/2023
Report Issue Number:	1	**Report issued on:**	21/02/2023
Samples Analysed:	1 10:1 WAC sample		

Signed:

Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

i2 Analytical
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Croxley Green Business Park
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Waste Acceptance Criteria Analytical Results

Report No:	**23-16525**						
					Client:	**GEOFIRMA**	
Location	**31 Daleham Gardens**						
Lab Reference (Sample Number)	2578826 / 2578827				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	01/02/2023				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP3						
Depth (m)	0.10						
Solid Waste Analysis							
TOC (%)**	5.0				3%	5%	6%
Loss on Ignition (%) **	10.1				--	--	10%
BTEX (µg/kg) **	< 5.0				6000	--	--
Sum of PCBs (mg/kg) **	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	35				500	--	--
Total PAH (WAC-17) (mg/kg)	4.64				100	--	--
pH (units)**	8.1				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	6.4				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0090			0.0642	0.5	2	25
Barium *	0.0187			0.134	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0014			0.010	0.5	10	70
Copper *	0.058			0.42	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0101			0.0723	0.5	10	30
Nickel *	0.0033			0.024	0.4	10	40
Lead *	0.0030			0.022	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.023			0.16	4	50	200
Chloride *	2.4			17	800	15000	25000
Fluoride*	0.16			1.2	10	150	500
Sulphate *	7.3			53	1000	20000	50000
TDS*	180			1300	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	38.6			276	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.4						
Dry Matter (%)	71						
Moisture (%)	29						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 23-16525
Project / Site name: 31 Daleham Gardens

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2578826	TP3	None Supplied	0.1	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 23-16525
Project / Site name: 31 Daleham Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073-PL	W	MCERTS
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025

Analytical Report Number : 23-16525
Project / Site name: 31 Daleham Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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Analytical Report Number : 23-16521

Project / Site name:	31 Daleham Gardens	**Samples received on:**	07/02/2023
Your job number:	2023-002-SIM-DAL	**Samples instructed on/ Analysis started on:**	08/02/2023
Your order number:		**Analysis completed by:**	17/02/2023
Report Issue Number:	1	**Report issued on:**	17/02/2023
Samples Analysed:	2 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-16521
Project / Site name: 31 Daleham Gardens

Lab Sample Number				2578805	2578806
Sample Reference				BH1 A	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				0.30	0.50
Date Sampled				02/02/2023	02/02/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	23
Total mass of sample received	kg	0.001	NONE	1.4	1.4

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	JSW	JSW

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.8	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.18
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.59
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.59
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.44
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.44
Benzo(b)fluoranthene & Benzo(k)fluoranthene	mg/kg	0.1	ISO 17025	< 0.1	0.99
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.53
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.31
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.37

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	4.44

Heavy Metals / Metalloids

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	9.6
Barium (aqua regia extractable)	mg/kg	1	MCERTS	34	50
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.73	0.41
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	2.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	36	12
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	32	48
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Molybdenum (aqua regia extractable)	mg/kg	0.25	MCERTS	0.61	1
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	9.9
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	39	82

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0

Analytical Report Number: 23-16521
Project / Site name: 31 Daleham Gardens

Lab Sample Number				2578805	2578806
Sample Reference				BH1 A	BH2
Sample Number				None Supplied	None Supplied
Depth (m)				0.30	0.50
Date Sampled				02/02/2023	02/02/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	MCERTS	< 8.0	12
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	12

TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	< 10	14

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-16521
Project / Site name: 31 Daleham Gardens

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2578805	BH1 A	None Supplied	0.3	Brown clay and sand.
2578806	BH2	None Supplied	0.5	Brown loam with vegetation.

Analytical Report Number : 23-16521
Project / Site name: 31 Daleham Gardens

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

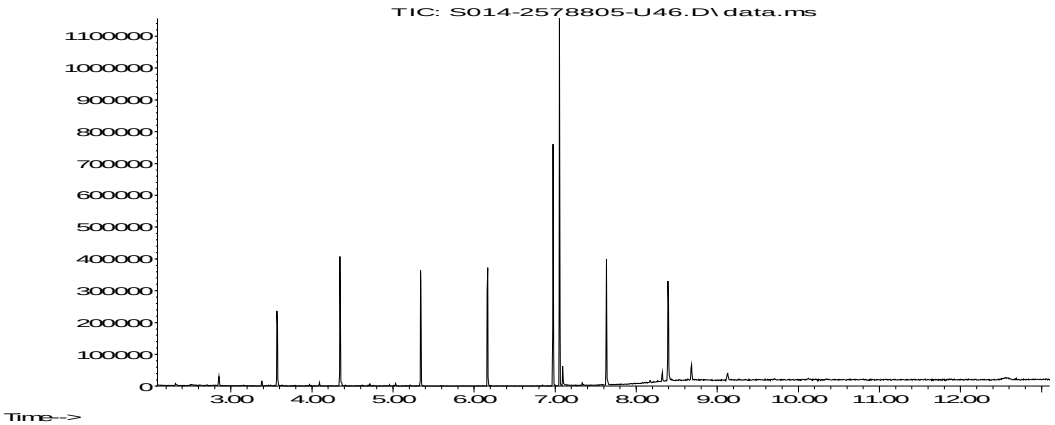
Analytical Report Number : 23-16521
Project / Site name: 31 Daleham Gardens

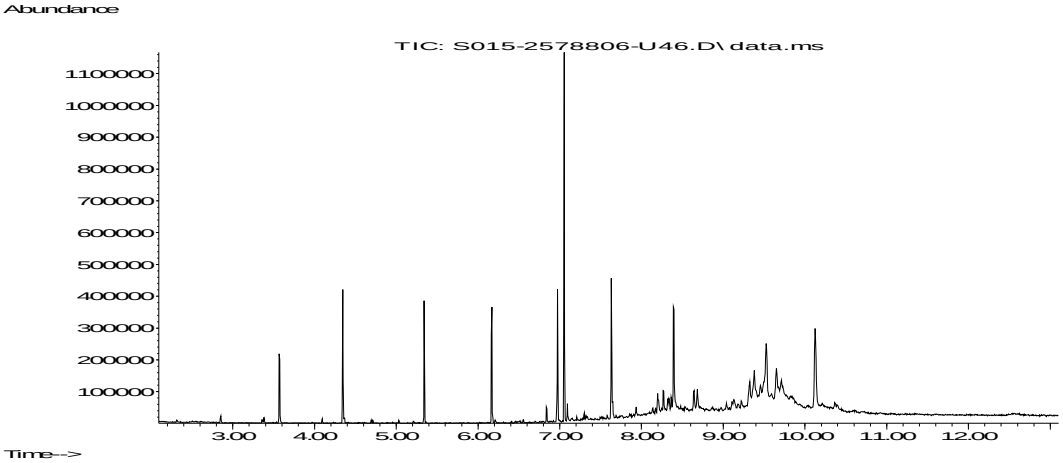
Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total



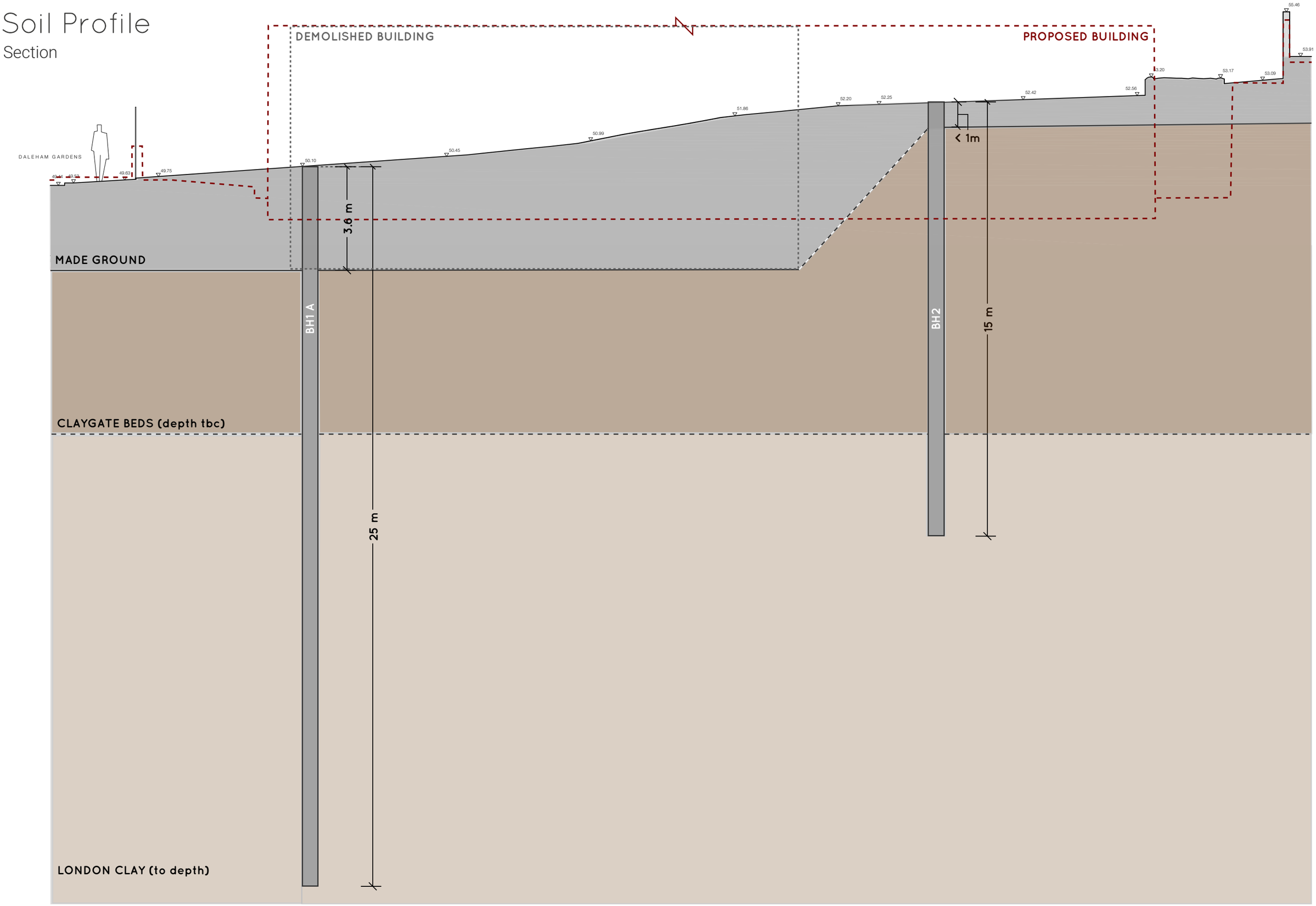


APPENDIX F –

RELEVANT DRAWINGS

Soil Profile

Section



PROJECT: DALEHAM GARDENS
SKETCH No: 1803-XX-SK-01

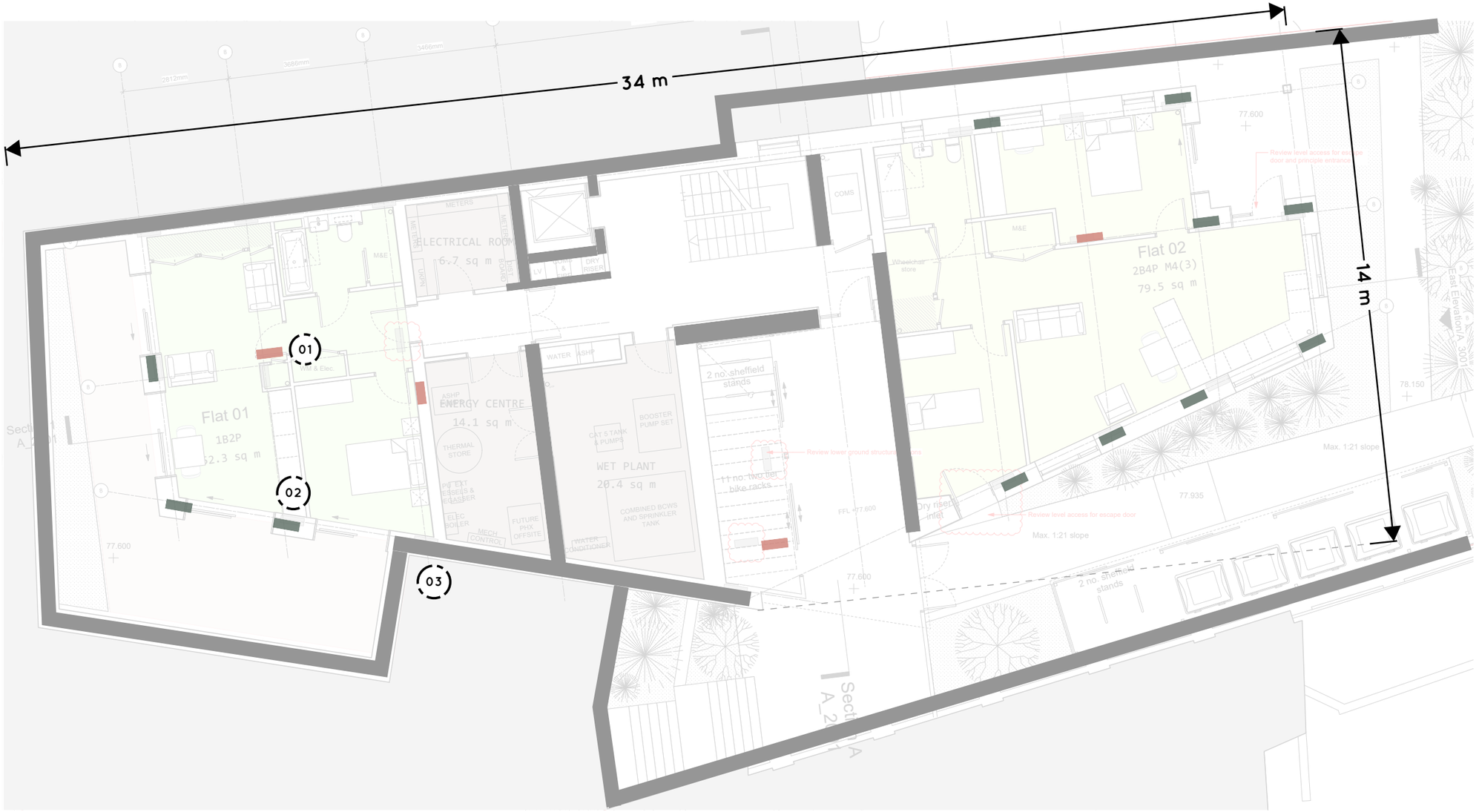
REV: 00
DATE: 06/03/23

TITLE: SOIL PROFILE SECTION
DRAWN BY (CHECK): EC (AC)

SIMPLE WORKS, UNIT 301, 203/213
MARE ST STUDIOS, LONDON, E8 3JS

COLUMNS AND WALLS FOUNDATION ESTIMATED LOADS

FOR PILED FOUNDATIONS OR SHALLOW FOUNDATIONS (IF SUITABLE)



NOTES:
ASSUMED PILE DIAMETER: 450mm U.N.O.
ASSUMED PILE LENGHT: 15m TBC BY SOIL SPECIALIST
PILED RETAINING WALL ASSUMED ALL AROUND

ASSUMED DEPTH OF PILE CAPS: 1000mm

PILES ASSUMED SLEEVED TO ORIGINAL BASEMENT (DEMOLISHED) FOUNDING LEVEL

ESTIMATED LOADINGS (UNFACTORED):

(01)
WORST CASE - INTERNAL COLUMN
DL = 465 kN, LL = 210 kN

(02)
EXTERNAL COLUMN
DL = 465 kN, LL = 115 kN

(03)
RETAINING WALL
DL = 111 kN/m, LL = 23 kN/m

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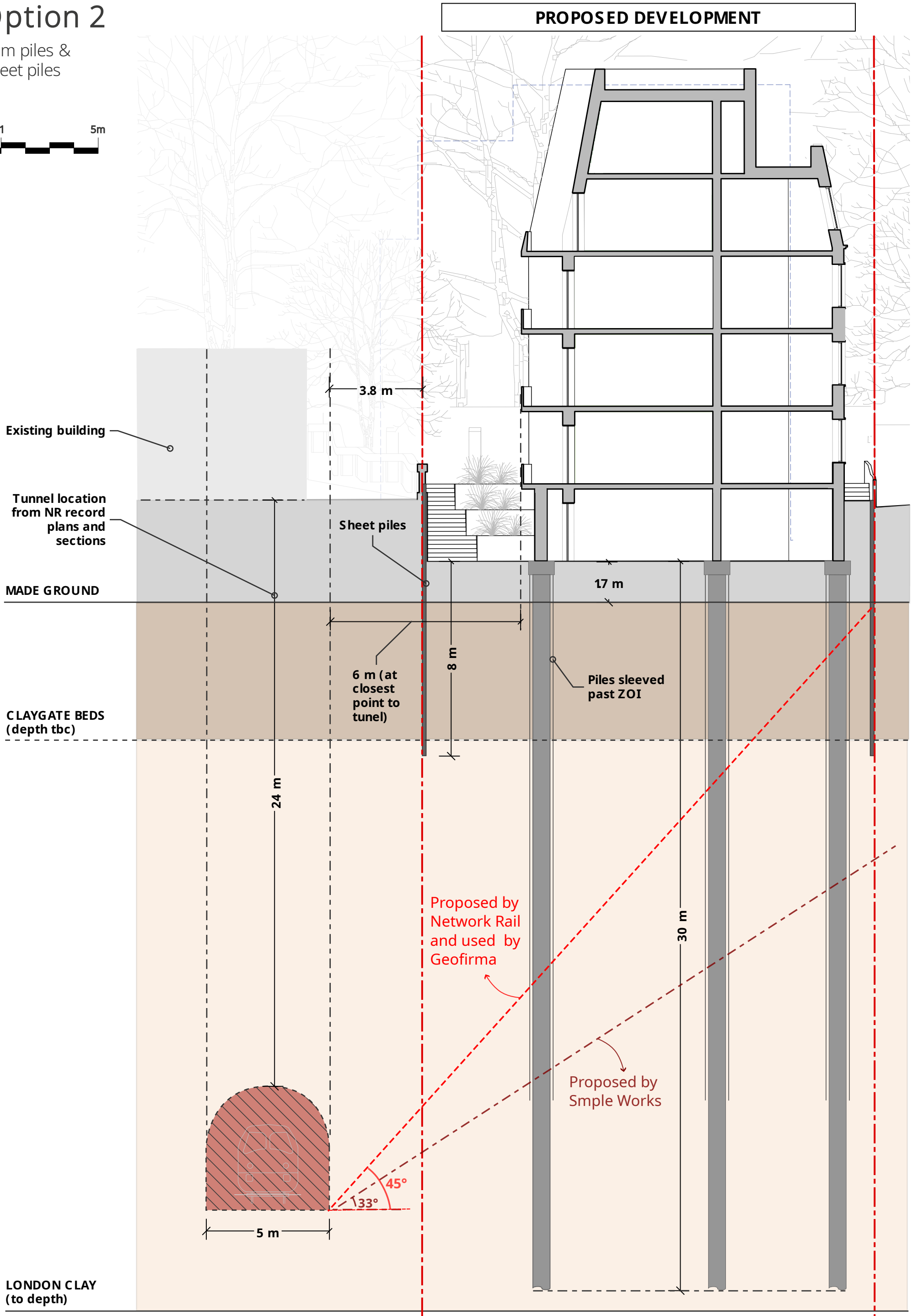
MARE ST STUDIOS, LONDON, E8 3JS

Option 2

30m piles &
sheet piles

0 1 5m



Drawing done by simple works and modified by GEOFRIMA Ltd

SIMPLE WORKS, UNIT 301, 203/213
MARE ST STUDIOS, LONDON, E8 3J S

APPENDIX G –

SITE PHOTOGRAPHS

SITE PHOTOGRAPH 1

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

SITE PHOTOGRAPH 2

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

SITE PHOTOGRAPH 3

Project Title	31 Daleham Gardens, London NW3 5BU
Project No	2023/002/SIM/DAL

GEOFIRMA
GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS

SITE PHOTOGRAPH 4

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

SITE PHOTOGRAPH 5

Project Title	31 Daleham Gardens, London NW3 5BU
Project No	2023/002/SIM/DAL

GEOFIRMA
GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS

SITE PHOTOGRAPH 6

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

SITE PHOTOGRAPH 7

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

SITE PHOTOGRAPH 8

Project Title	31 Daleham Gardens, London NW3 5BU	GEOFIRMA GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS
Project No	2023/002/SIM/DAL	

APPENDIX H –

GAS AND GROUNDWATER MONITORING RESULTS

GEOFIRMA
GEOTECHNICAL & CIVIL ENGINEERING CONSULTANTS

GAS AND GROUNDWATER MONITORING RESULTS

Contract Name :	31 Daleham Gardens
Contract No :	2023-002-SIM-DAL
Date :	6.2.23

Background Readings:																	
	O_2% v/v :	20.4	CO_2% v/v :	0.0	CH_4% v/v :	0.0	Weather Conditions :	Sunny Warm						Equipment Used:		Technician:	
	H_2S ppm :	0	CO ppm :	0	Pressure Trend :	Stable	Ground Conditions :	Damp						GFM436		ES	

Location	Date	Atmospheric Pressure (mb)	Differential Pressure (mb)	O_2(% v/v)		CO_2 (% v/v)		CH_4 (% v/v)		H_2S (ppm)	CO (ppm)	Gas Flow Rate (l/hr)		VOC (ppm)	Depth to LNAPL	Water Depth	Depth to DNAPL	Total Depth
				Low	Steady	High	Steady	High	Steady	Peak	Peak	Peak	Steady	Peak	(mbgl)	(mbgl)	(mbgl)	(mbgl)
BH2	6.2.23	1032	0.00	16.3	16.3	3.4	3.3	0.0	0.0	0	0	0.0	0.0	0.0	n.a.	5.49	n.a.	5.50
BH1a		1032	0.00	12.3	14.2	0.1	0.1	0.0	0.0	0	10	0.0	0.0	0.0	n.a.	3.25	n.a.	10.20
BH2	9.3.23	982	0.00	14.5	14.5	5.4	5.4	0.0	0.0	0	0	0.0	0.0	0.0	n.a.	DRY	n.a.	5.50
BH1a		982	0.00	18.9	18.9	0.2	0.2	0.0	0.0	0	0	0.0	0.0	0.0	n.a.	3.20	n.a.	10.20

APPENDIX I –

DEMOLITION RECYCLING REPORT

Demolition Recycling Report

Site Name:	Daleham Gardens
Address:	31 Daleham Gardens, London, NW3 5BU
Date:	22nd December 2021
Audit By:	Karl Larcombe
Audit Details	This report was completed by Karl Larcombe of M&M Demolition Co Ltd. Senior Project Manager

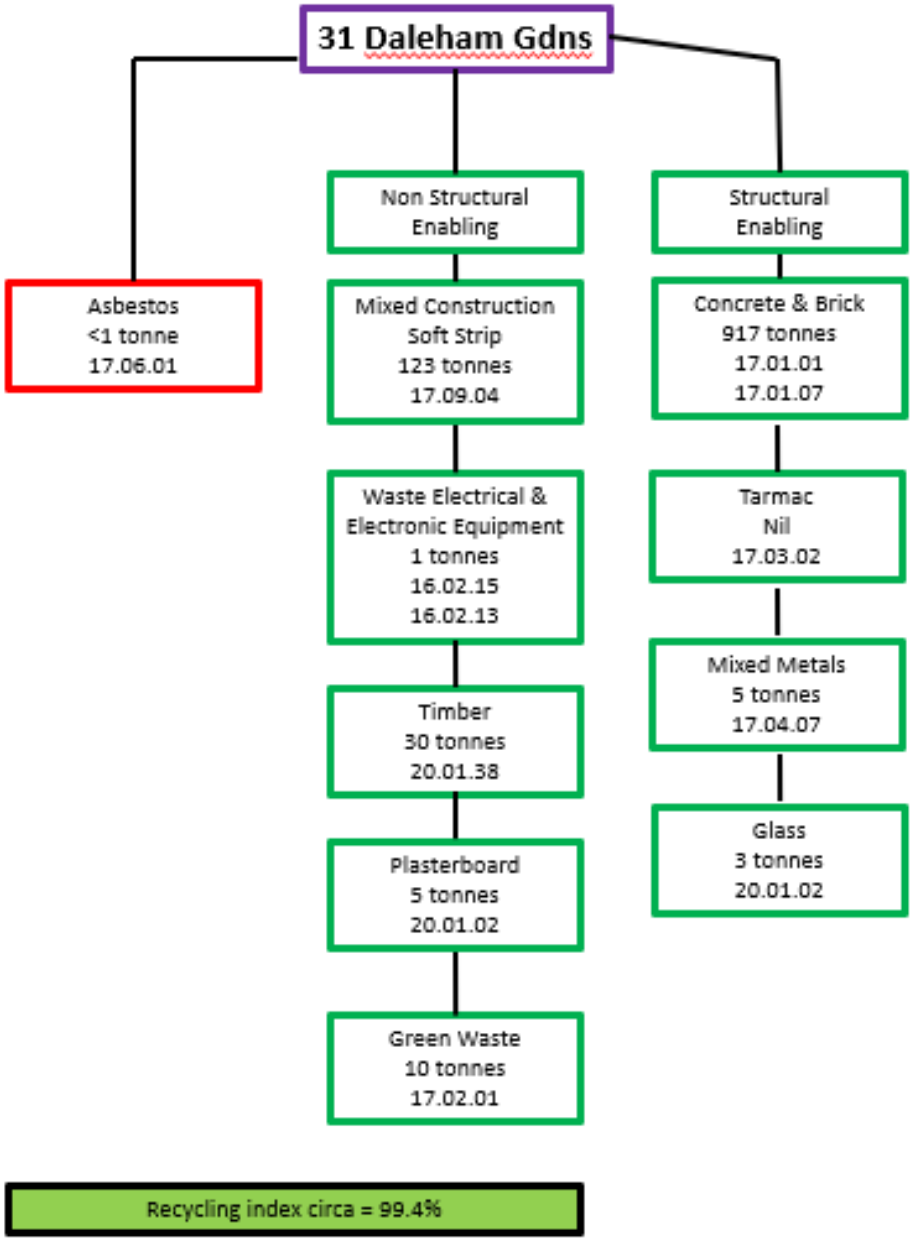
M & M Demolition Co Ltd were contracted by Camden Council to demolish the severely fire damaged property at 31 Daleham Gardens. M & M Demolition managed to achieve recycling return of 99.4% of the demolition materials for this project. These figures are based on the waste carriers average recycling returns with only a small percentage of the general construction waste and the asbestos being used as landfill. The majority of the waste, hardcore and concrete, is processed with a crushing plant and used to produce recycled aggregate. M & M Demolition are able to recycle aggregate on site using their own mobile crushing plant should the client require this within their package.

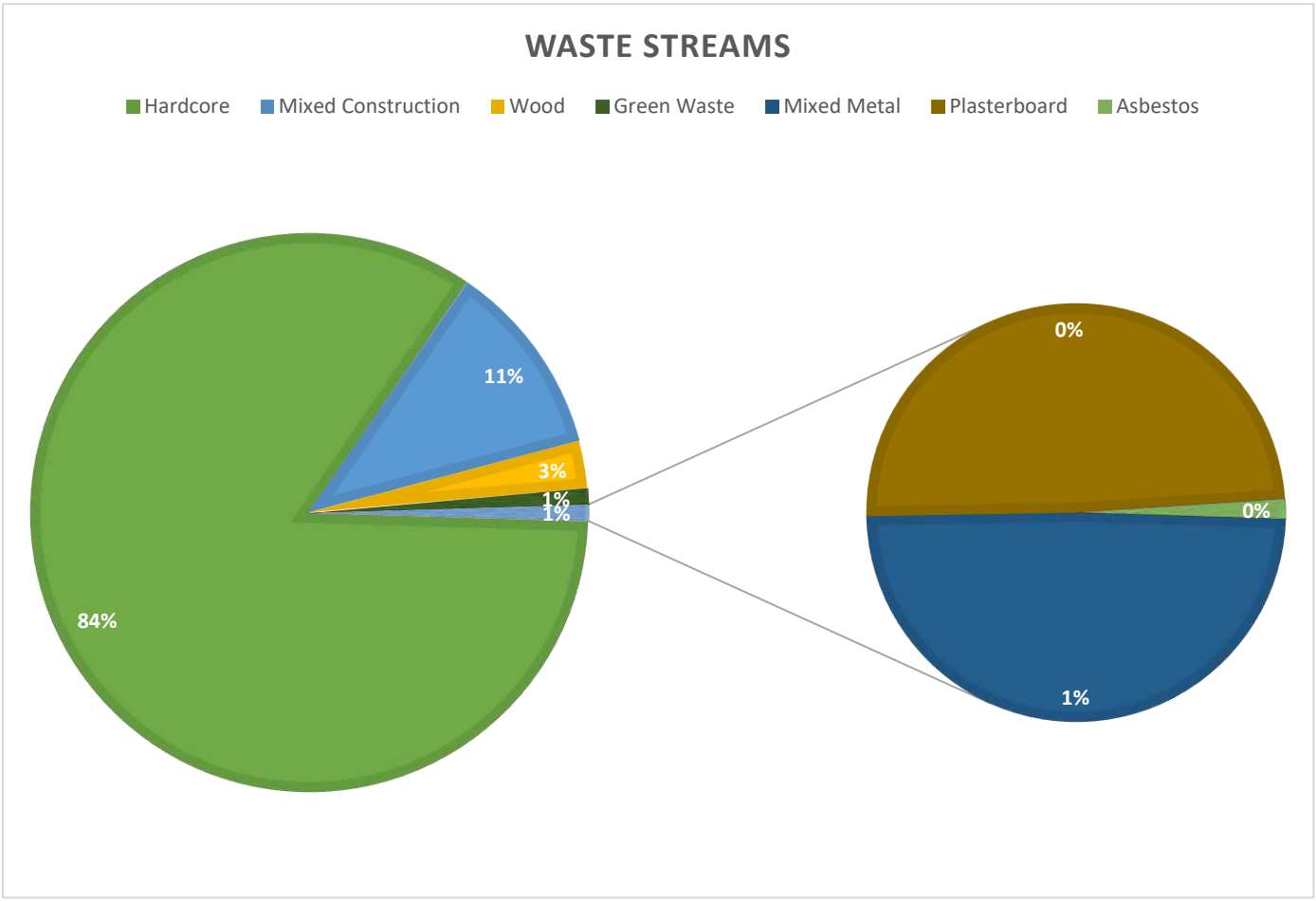
Due to the severity of the fire damage and structural instability of the property, the recognised process of soft stripping the building prior to structural demolition was not possible. To segregate the demolition spoil into separate waste streams, the hardcore produced from mechanical demolition was processed by hand picking and mechanically using the selector grab attachment separating the mixed construction waste (plastic, wood, paper etc.) and metal from the hardcore. The mixed construction waste was loaded into 40 yard Roll On Roll Off bins and sent to a transfer station for further segregation. The metal waste was loaded into a 40 yard Roll On Roll Off bin and sent to EMR's yard for re-cycling. Hardcore and concrete was loaded into 8 wheeled tipper lorries and sent away for crushing. Asbestos waste was removed prior to demolition wrapped and removed from site by our licensed asbestos contractor ECT Environmental.

Waste Carriers on Project		
Product	**Carriers Name**	**Waste Carrier License**
Mixed Metal	EMR LTD	CBDU188448
Mixed Construction Waste	Manns Waste	CBDU83142
Green Waste	Manns Waste	CBDU83142
Mixed Construction Waste	Rhino Waste	CBDU112723
Hardcore	RMS Haulage	CBDU149396
Hardcore	O'Donovan	CBDU116673
Asbestos	ECT Environmental	CB/CBDU650625

Segregation Arrangements	Applicable	Notes & Details	Application of recycled material	Associated Issues
Plasterboard / Gypsum	Yes	Non-hazardous, fully recycled	A closed loop recycling solution.	None
Glass	Yes	Non-hazardous, fully recycled	A closed loop recycling solution	None
Cables	Yes	Non-hazardous, fully recycled	Plastic and copper separated to make plastic furniture etc and new cable	None
Contaminated Metals (Dangerous Substances)	No	Hazardous – treatment of residual and then fully recycled.	N/A	
Refrigerators / Air Cond.	No	Non-hazardous if re-purposed, fully recycled	A closed loop recycling solution.	None
WEEE	Yes	Hazardous / Non-hazardous, fully recycled	Products stripped to make new electrical components and plastic recycled.	None
Solvents, Paints, Chemicals	No	Hazardous, recovered and treated / re-used.	N/A	
Concrete	Yes	Non-hazardous, fully recycled	Crushed to make aggregate for building	None
Tarmac	No	Non-hazardous, fully recycled	Crushed and reused for hardstanding	None
Canteen Waste	Yes	Non-hazardous, fully recycled	Used to make compost	None
Mixed Construction Waste	Yes	Non-hazardous, fully recycled	Sent to Transfer Station sorted into separate waste streams, Wood shredded for Fibre Board Plastic recycled into carpets, plastic furniture. Paper and cardboard recycled into egg boxes, car insulation, dust masks etc. can be turned into biofuel for energy	None
Mixed Metals	Yes	Non-hazardous, fully recycled	Shredded and melted down to metal plates etc	None
Timber / Doors	Yes	Non-hazardous, fully recycled	Shredded to reform into MDF or similar material	None
Mineral Oils	No	Treatment, disposal and re-use	A Closed loop recycling solution	

Items containing CFCs / HFCs	No	Recovery, treated, fully recycled	N/A	
Fluorescent Tubes	No	Hazardous, recovered, treated and recycled	Mercury and glass separated and reused to make fluorescent tubes	None
Mix of concrete, bricks, tiles and rubble.	Yes	Non-hazardous, fully recycled	Crushed to make aggregate for building	None
Soils & Stones	No	Non-hazardous, fully recycled	N/A	
Asbestos	Yes	Hazardous non-recyclable	Sent to Licensed Tip	None
Green Waste	Yes	Non-hazardous Fully recycled	Recycled board, compost, bio-fuel	None





Recycling Index Circa 99.4%

Daleham Gardens			M&M DEMOLITION	WASTE LOG			
				Conveyance note		Disposal Site	
Date	Carrier Registration	Haulier	Veh Reg	Waste Description	E W Code	Name	Ticket No
21-Oct-21	CB/CBDU650625	ECT	CR19 LSU	Doors & debris	17 06 01	CM13 3HD	3105
10-Nov-21	CBDU112723	Rhino Waste	LN68 ZPX	General Waste	17 09 04	EPR/FB3203LL/A001	33711
15-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138129
16-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138209
17-Nov-21	CBDU112723	Rhino Waste	LN68 ZNX	General Waste	17 09 04	EPR/FB3203LL/A001	34186
17-Nov-21	CBDU112723	Rhino Waste	LN68 ZNX	General Waste	17 09 04	EPR/FB3203LL/A001	34187
17-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138332
18-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138333
22-Nov-21	CBDU149396	RMS Ltd	EA66 BHZ	Hardcore	17 01 07	EPR/KB3136AM	630657
22-Nov-21	CBDU149396	RMS Ltd	EY68 YPA	Hardcore	17 01 07	EPR/KB3136AM	631716
24-Nov-21	CBDU149396	RMS Ltd	EY20 YTD	Hardcore	17 01 07	EPR/KB3136AM	625461
24-Nov-21	CBDU149396	RMS Ltd	EY64 CCE	Hardcore	17 01 07	EPR/KB3136AM	635705
24-Nov-21	CBDU149396	RMS Ltd	EY15 BYL	Hardcore	17 01 07	EPR/KB3136AM	634206
24-Nov-21	CBDU149396	RMS Ltd	EY20 YTB	Hardcore	17 01 07	EPR/KB3136AM	633713
24-Nov-21	CBDU149396	RMS Ltd	E65 BZU	Hardcore	17 01 07	EPR/KB3136AM	633424
24-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138813
25-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138814
29-Nov-21	CBDU83142	MANNS Waste	EY71 SYW	General Waste	17 09 04	EPR/HP3098VH	138975
29-Nov-21	CBDU149396	RMS Ltd	EJ68 TGK	Hardcore	17 01 07	EPR/KB3136AM	626094
29-Nov-21	CBDU149396	RMS Ltd	EK19 UUV	Hardcore	17 01 07	EPR/KB3136AM	631586
29-Nov-21	CBDU149396	RMS Ltd	EU66 XEX	Hardcore	17 01 07	EPR/KB3136AM	631372
29-Nov-21	CBDU149396	RMS Ltd	EH19 UMA	Hardcore	17 01 07	EPR/KB3136AM	636824
29-Nov-21	CBDU149396	RMS Ltd	EK19 UVJ	Hardcore	17 01 07	EPR/KB3136AM	626838
30-Nov-21	CBDU116673	O'Donovan	KT19 JPV	Hardcore	17 01 07	N15 4QF	325380
30-Nov-21	CBDU116673	O'Donovan	KW17 YMR	Hardcore	17 01 07	N15 4QF	330081
30-Nov-21	CBDU116673	O'Donovan	GR18 XCM	Hardcore	17 01 07	N15 4QF	329756
30-Nov-21	CBDU116673	O'Donovan	WP15 EOO	Hardcore	17 01 07	N15 4QF	327446
30-Nov-21	CBDU116673	O'Donovan	YN16 FTL	Hardcore	17 01 07	N15 4QF	329851

31 Daleham Gardens			M&M DEMOLITION	Import Log	

Date	Carrier Registration	Haulier	Veh Reg	Material Description	Collection Point	Ticket No
08-Dec-21	CBDU116673	O'Donovan	EK19 UWN	6F2	N15 4QF	326399
08-Dec-21	CBDU116673	O'Donovan	496 JOE	6F2	N15 4QF	319081
08-Dec-21	CBDU116673	O'Donovan	EK19 UWL	6F2	N15 4QF	320076
08-Dec-21	CBDU116673	O'Donovan	KR68 UDU	6F2	N15 4QF	319160
13-Dec-21	CBDU116673	O'Donovan	EY18 HBF	6F2	N15 4QF	328810
13-Dec-21	CBDU116673	O'Donovan	GF18 ZTU	6F2	N15 4QF	327584
13-Dec-21	CBDU116673	O'Donovan	GF18 ZTP	6F2	N15 4QF	329244
13-Dec-21	CBDU116673	O'Donovan	GF18 ZTP	6F2	N15 4QF	329246
14-Dec-21	CBDU93685	LYNCH	EX21 HVT	Top Soil	UB9 4DF	T4818211214065230
14-Dec-21	CBDU93685	LYNCH	EX21 HVT	Top Soil	UB9 4DF	T4818211214102645
14-Dec-21	CBDU93685	LYNCH	EX21 HVT	Top Soil	UB9 4DF	T4818211214085115
14-Dec-21	CBDU93685	LYNCH	KR69 OSY	Top Soil	UB9 4DF	377337
14-Dec-21	CBDU93685	LYNCH	KR69 OSY	Top Soil	UB9 4DF	377338
14-Dec-21	CBDU93685	LYNCH	KR69 OSY	Top Soil	UB9 4DF	377339
14-Dec-21	CBDU93685	LYNCH	KR69 OSW	Top Soil	UB9 4DF	381987
14-Dec-21	CBDU93685	LYNCH	KR69 OSW	Top Soil	UB9 4DF	381988

31 Daleham Gardens					Import Log	

Date	Carrier Registration	Haulier	Veh Reg	Material Description	Collection Point	Ticket No

HEALTH AND SAFETY FILE/POST DEMOLITION WORKS REPORT (CDM 2015)

Project Name: 31 Daleham Gardens, Belsize Park, London, NW3 5BU

The Professional Team					
Client:	**London Borough of Camden**		**Principal Contractor:**		**M&M Demolition Co Ltd**
Construction Consultants:	**Heritage Surveys Ltd**	**Quantity Surveyors:**	**Heritage Surveys Ltd**	**Principal Designer:**	**Bailey Garner (Health and Safety) Ltd**

Description of the Site	
Original Site Use & Description:	**M&M Demolition Ltd were contracted by London Borough of Camden to demolish the severely fire damaged property at 31 Daleham Gardens, Belsize Park, NW3 5BU.** **The site is located within a residential area in the London Borough of Camden the site will be sold to others for future Re-Development.**
Site Location:	**31 Daleham Gardens, Belsize Park, London, NW3 5BU**
Description of Works Carried Out:	• **Site Set Up & Welfare** • **Rodent Survey** • **CCTV Survey** • **Dilapidation Survey** • **Disconnection of Services** • **Tree Protection Works** • **Installation of Environmental Monitors** • **Asbestos Removal Works** • **Erection of Demolition Scaffolding** • **Mechanical Demolition of Structure** • **Removal of All Scaffolding** • **Reclaiming Red Bricks** • **Removal of Slabs and Foundations** • **Site Clearance Works** • **Formation of Site Levels** • **Removal of High Level Hoarding** • **Soil and Seeding** • **Erection Boundary Fence** • **Erection of Site Hoarding Front of the Site**

Access to Work Site:	**Via Main Site Temporary Entrance Vehicular Gates at the front of the Site**
Date of Possession of the Site and Completion Date:	**18th October, 2021 to 17th December, 2021**
Description of Completed Works	
Description of Completed Works:	• Site Set Up & Welfare • Rodent Survey • CCTV Survey • Dilapidation Survey • Disconnection of Services • Tree Protection Works • Installation of Environmental Monitors • Asbestos Removal Works • Erection of Demolition Scaffolding • Mechanical Demolition of Structure • Removal of All Scaffolding • Reclaiming Red Bricks • Removal of Slabs and Foundations • Site Clearance Works • Formation of Site Levels • Removal of High Level Hoarding • Soil and Seeding • Erection Boundary Fence • Erection of Site Hoarding Front of the Site
Remaining Site Hazards and Location:	**None Known**
Remaining Installed Temporary Works:	**Site Hoarding – Design and Calculations Attached.** 

Description of Completed Works (continued)	
Remaining Scaffolding:	**Not Applicable**
Waste Materials moved from Site	
Hazardous Wastes:	**Asbestos Containing Materials** **Hazardous Waste Consignment Note Attached.**
Non-hazardous Wastes:	**General Waste & Metal** **Waste Log Attached.**
Waste Removal Contractors details	
Hazardous Wastes:	**ECT Environmental Ltd – Waste Consignent Note Attached**
Non-hazardous Wastes:	**Rhino – General Waste Away From Site** **Manns Waste – General Waste Away From Site** **RMS – Hardcore & Concrete Away From Site** **O'Donovan - Hardcore & Concrete Away From Site** **EMR – Scrap Metal Away From Site** **Waste Log Attached.**
Final Site Conditions:	**The Site was left Clean and Tidy and as per the clients requirements.**

	 **<u>Remaining Structures</u>** New Boundary Fencing 
Noted Structural Defects: (on site and adjacent properties)	**Not Applicable**
Services:	**Services Disconnected by prior to demolition works commencing.**

	Electrical Disconnection Certificate Attached. **Gas Disconnection Certificate Attached.** **BT Disconnection Email Attached.** **Water – Turned off stop valve outside the Boundary.**
Remaining Licences and Notices in Force:	**Not Applicable**
Final Site Condition Acceptance/Sign off date:	**Site Handover 17.12.2021**
Documents and Drawings Submitted with this Report	
Waste Disposal	**Waste Log Attached**
Isolation & Disconnection Certificates	**Attached**

This report has been compiled in accordance with our requirements of the Construction (Design & Management) Regulations 2015 (CDM2015). The information forms our contribution to the Health and Safety File which is submitted to our client on completion of our works.

For: London Borough of Camden

Name: Matthew P Saunders

Signature:

Title: Director

M&M Demolition Co Ltd

Date: 17th December, 2021


Clinic
40m
Private Property
UK 9h
UK 9h
C/B 2.5h
Retaining Wall 1.2h
Wall 0.3h
UK 3h
Concrete
Pallets
DR
VP
ST04
ST05
MH
CL 80.42
Step
Flat Roof
87.44
C/B 2h
UK 4h Multi
Stump
PO
Retaining Wall 0.8h
MH
CL 79.62
Hoarding 3h
Unable to Survey
Due to Scaffolding
Paving
h1 tenbaC
h5.2 liaW
MH
CL 78.95
ST03
Canopy
MH
78.72
LP
TV
h3.0 liaW
I/R 1h
Step
h3 gnipreH
15.2m
Private Gardens
Grass
Stone Wall 0.3h
UK 10h
Soil
BU
UK 6h
Flat Roof
88.60
Flat Roof
88.58
31 Daleham Gardens
Three Storey Brick Building
Flat Roof
88.16
Flat Roof
88.17
ST06
Grass
Soil
Shrubs 2h
Herras 2h
No Access
EL
89.90
EL
89.83
DR
Shed
Concrete
Wall 0.2h
h5.0 liaW
TV
Canopy
Sl
21.3m
UK 12h Multi
Private Gardens
Unable to Determine Thickness of Rear Wall
Stone Wall 0.3h
Rubble Pile
UK 4h
UK 6h
UK 3h
ST07
Soil
Grass
Wall 1.6h
41.6m
Structurual Damage to
Corner of Wall
Private Flats
Three Storey Brick Building
h8.0 MetH
Paving
GG
Scale 1:200 (m)
0 2 4 6 8 10
76.2m
32a
32b
Shaf

APPENDIX 4 – FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY REPORT

SUBTENO ENGINEERING CONSULTANTS LTD

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

DALEHAM GARDENS, LONDON

S221215-SUB-99-XX-FRA-C-00001

APRIL 2023

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Crafton House
Rosebery Business Park
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Poringland
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solutions@subteno.co.uk

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Registered in England 10891962.
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Prepared By	Nathan Rowe	Senior Civil Engineer	25 January 2023
Reviewed By	Andrew Dye	Director	25 January 2023
Approved By	Andrew Dye	Director	25 January 2023

Revision	Author	Date	Reason
01	Nathan Rowe	25/01/2023	Stage 2 Issue
02	Nathan Rowe	17/04/2023	Stage 3 Issue
02	Nathan Rowe	27/04/2023	Final Stage 3 Issue

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1 INTRODUCTION

Subteno Engineering Consultants have been commissioned by Simple Works on behalf of NW3 CLT Community Land Trust to carry out a Flood Risk Assessment report (FRA) for a proposed development of a site off Daleham Gardens, London, NW3 5BU. A site location plan is enclosed in Appendix A.

With reference to the indicative flood maps published by the Environment Agency, the site appears to lie outside an area at risk of flooding. This FRA report has been prepared in accordance with the requirements contained within National Planning Policy Framework (NPPF, July 2021) and the associated Technical Guidance. The guidance refers to the E. vio met Age ys stad ing adi e " on flood i sk. Based on e quie ments set y the Enviro met Agency, a Flood Risk assessment is needed to support the planning application.

This report has been prepared in accordance with (i) National Planning Policy Framework (NPPF), (Department for Communities and Local Government, July 2021) and the accompanying (ii) Planning Practice Guidance (Ministry of Housing, Communities and Local Government, May 2022); and (iii) Other statutory laws and local bylaws and rules.

It is stated in Paragraph 167 of the NPPF that:

. Whe deteri i ng a y planning applia tio s, loa l planning authorities should esu re that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- *Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;*
- *Development is appropriately flood resilient and resistant, such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- *It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- *Any residual risk can be safely managed; and*
- *Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

This report has been prepared to address the requirements of the NPPF and has derived the following data/information from various sources including:

- *Information published or explicitly provided by the Environment Agency;*
- *Information published on the Local Planning Authority website;*
- *London Borough of Camden Strategic Flood Risk Assessment (SFRA), July 2014 (including updated figure 6)*
- *Camden Flood Risk Management Strategy 2022-2027;*
- *LBC Section 19 Flood Investigation Report on 12th and 25th July 2021 Flood Incidents;*
- *Camden Flood-SuDS Pro Forma;*
- *British Geological Society Mapping*
- *A site specific topographical survey;*
- *Specific design works carried out for this report.*

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www.subteno.co.uk

2 THE EXISTING SITE

2.1 Site Conditions

The proposed development is located at National Grid Reference (NGR) 526673, 185076 off Daleham Gardens, London NW3 5BU.

The site formally consisted of residential apartments but was subject to a fire in 2017. The building was subsequently demolished and is now vacant land.

Figure 2.1.1 – Satellite View of the site (approximate site boundary edged red) taken prior to demolition

2.2 Topography

A topographical survey was conducted in March 2022, after demolition of the structure.

The levels fall in an easterly direction by approximately 4m from the western to the eastern boundaries.

Details of the existing site levels are enclosed in Appendix B.

2.3 Geological Ground Conditions

The focus of an FRA study on geology is on the potential movement of water through Made Ground, Drift Geology and Solid Geology.

The British Geological Survey (BGS) Geology Viewer and GeoIndex has been referred to understand the superficial deposits and bedrock at the site:

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Formation	Description
Artificial Ground (Made Ground)	None identified on BGS Data
Superficial Deposits (Drift Deposits)	None identified on BGS Data
Bedrock	The Claygate Member – comprising dark grey clays with sand laminae, passing up into thin alternations of clays, silts and fine-grained sand, with beds of bioturbated silt. Average thickness of 16m in the London area.

Table 2.3.1 – Geological Ground Conditions

2.4 Hydrogeology

The hydrogeological features of the site are depicted below, and are taken from The Department for Environment, Food & Rural Affairs (Defra) Magic mapping records. The findings are summarised within Table 2.4.1.

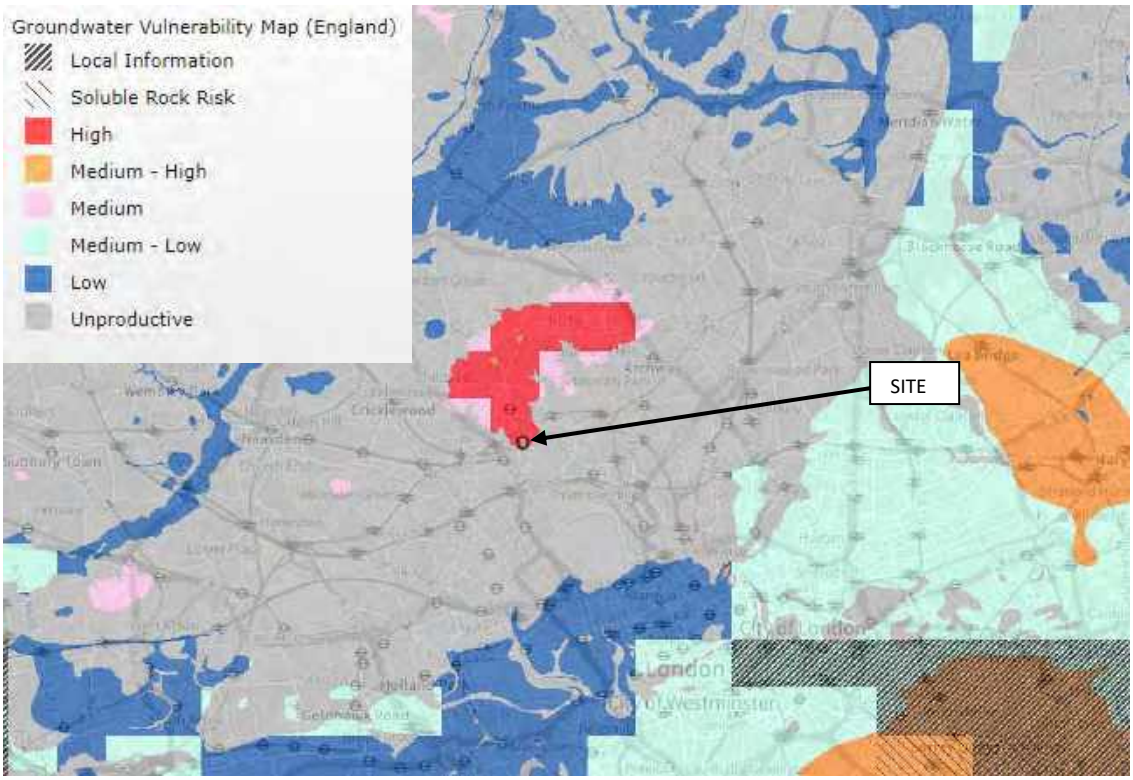

Figure 2.4.1 – Ground Water Vulnerability Zones (approximate site location marked)

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Figure 2.4.2 – Aquifer Designation Map (Bedrock) (approximate site location marked)

Figure 2.4.3 – Ground Water Source Protection Zone (approximate site location marked)

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Map Dataset	Designation	Comment
Groundwater Vulnerability	High	This category classifies the underlying groundwater in terms of vulnerability from activities carried out on the surface. Figue 2.. 1 ideti fies that the site has a Hi gh de signation ha at ei sed by the Secondary A aquifer with permeable leaching soils close to ground level, resulting in a high vulnerability to pollutants.
Aquifer Maps: Bedrock Deposits Designation	Secondary A	This category identifies the type of aquifer present in solid permeable formations. Figue 2.. indiat es that the supefi i al deposits ae in the Seo nda y A designation, consisting of permeal e stata ap a le of suppoti ng water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.
Ground Water Source Protection Zone	N/A	Figure 2.4.3 shows the site is not located within a source protection zone.

Table 2.4.1 – Summary of Hydrogeological conditions

2.5 Existing Surface Water Management

The existing apartment building has been demolished at the time of writing this report. Associated building drainage was also removed during the demolition works.

A CCTV drainage survey of the external drainage was undertaken in September 2021, which confirms an existing 100mmØ combined outfall into the existing Thames Water sewer under Daleham Gardens.

Due to insufficient depth, the existing outfall is not suitable for re-use during the re-development and as such a new 150mmØ outfall will be required into the existing Thames Water sewer.

A copy of the CCTV survey drainage plan can be found within Appendix B.

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3 DEVELOPMENT PROPOSALS

The proposed development includes the construction of a new apartment building, comprising 14 flat apartments.

The proposed development plans are enclosed in Appendix C.

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4 PROBABILITY OF FLOODING

The NPPF identifies six potential sources of flooding:-

- *Flooding from rivers (fluvial flooding);*
- *Flooding from the sea (tidal flooding);*
- *Flooding from land;*
- *Flooding from sewers;*
- *Flooding from groundwater; and*
- *Flooding from reservoirs, canals, and other artificial sources.*

These are considered below.

4.1 Flooding from Rivers (Fluvial) & the Sea (Tidal)

The assessment of flood risk in this report is based on the definitions in Table 1 of the Flood Risk and Coastal Change, Planning Practice Guidance, which recognises the following Flood Zones:

- *Flood Zone 1 - little or no risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000-year)*
- *Flood Zone 2 - low to medium risk, with annual probability of flooding between 0.1% and 1.0% from rivers and between 0.1% and 0.5% from the sea*
- *Flood Zone 3a - high risk of flooding with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea*
- *Flood Zone 3b – the Fu nti o al Floodplain ith an a nual pro ability of flooding of 5% or greater.*

An extract from the Ei ronmet Ag ey s online flood map published on the Government website is shown in Figure 4.1.1 below, with Flood Zone 3a & 3b denoted by dark blue hatch and Flood Zone 2 a light blue:

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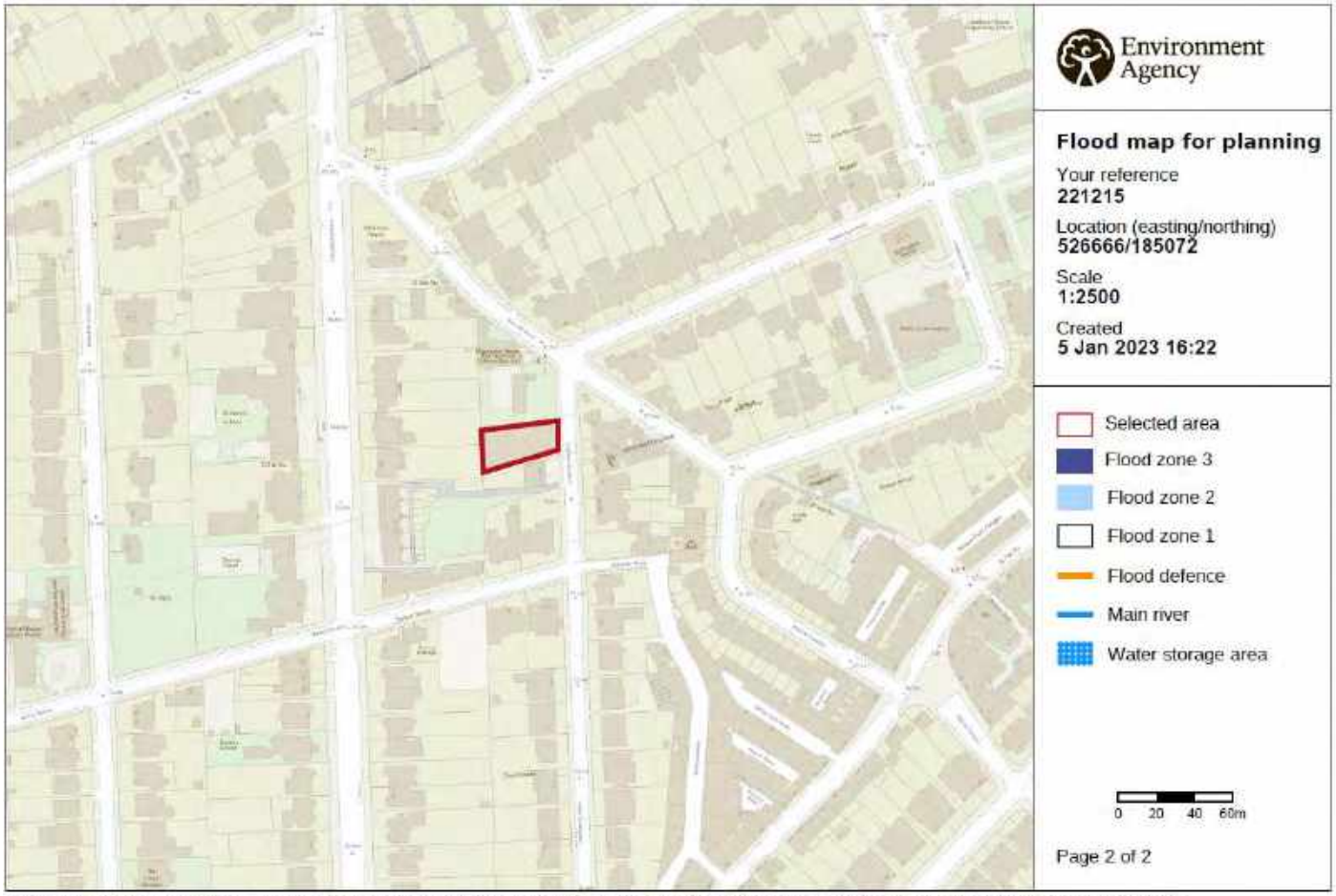

Figure 4.1.1 – Environment Agency Online Flood Map for Planning (Approximate Site Extents Edged Red)

The site is loa ted ithin a Flood Zone 1 Lo Proba ility a ea a d theef oe lies outside a aea at i sk of fluvial/tidal flooding.

4.2 Flooding from Land & Sewers

The potential for flooding as a result of existing local sewerage systems becoming overwhelmed during an extreme storm event is always a potential risk in urban areas. This can result in surface water run-off flows following the natural topography into neighbouring properties or land.

With reference to Environment Agency long term flood risk mapping, published on the Government website, the below extract shows the site in relation to indicative flood risk from surface water:

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Figure 4.2.1 – Environment Agency Online Surface Water Flood Map Extract (Site Marked)

The mapping does not take into consideration any positive drainage systems that may be present and provides an indication of flood risk based on topography. The mapping indicates a very low risk of surface water flooding on the site and does not indicate an overland flow pathway from neighbouring land.

The London Borough of Camden SFRA, Figure 5a Rev 1 shows areas with recorded internal flooding from sewers. The site is not located within one of these areas.

Figure 5b Rev1 shows areas with recorded external flooding from sewers. The site falls within an area with recorded external sewer flooding, area reference NW3_5, where one property was affected. This is likely due to the historic Thames Water combined sewers beneath the carriageway becoming overwhelmed during a rare storm event. As the site levels fall towards the Daleham Gardens carriageway, the site is unlikely to be affected as the proposed building will be higher than the carriageway, which falls south away from the site.

Based on the above, the site is deemed at low risk of flooding from these sources.

4.3 Flooding from Groundwater

Groundwater flooding occurs as a result of water rising to the surface from the ground and underlying aquifers. Flood risk from this source is more uncertain, difficult to predict and can occur sporadically. Excessive rainfall, impermeable strata and adjacent river/watercourse levels can all influence the water table. Flooding usually occurs in locally isolated areas and does not usually pose a significant risk to life due to the slow rate of the water level rising. It can however lead to significant damage to property, the environment and ground stability.

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A Phase 1 Contaminated Land Risk Assessment for the site was undertaken by STM environmental in August 2021, ref PH-2021-000087, prior to the demolition of the fire-damaged building. This advised that the groundwater level is "likely to e more tha 5. metres belo the go und sufae t hroughout the yea " (section 9.4, page 15) and that the i sk of g oundat e flooding at the site is Negligible set ion 9.. , page 15. This is based on information obtained from the BGS and a Groundsure report.

The London Borough of Camden SFRA, Figure 4e Rev 1 shows areas within the borough with an increased susceptibility to elevated groundwater, as well as historic LBC and EA groundwater flooding incidents. The site is not located within an area of elevated groundwater and is not within proximity to a previous groundwater incident.

Based on the above, it is unlikely that groundwater levels would rise to the surface at the site and cause flooding and is therefore deemed low.

The geological and hydrogeological ground conditions have been investigated within section 2.3 and 2.4 of this report. Figure 2.4.1 shows a groundwater vulnerability class of High. This is likely due to the shallow nature of the Claygate Member soils to the surface. Given the nature of these soils and the existence of made ground from the demolition of the previous building, post-development surface water run-off is unlikely to utilise infiltration and will most likely discharge to sewer, thereby reducing the contamination risk to the underlying water table. As shown on figure 2.4.3, the site is not located within a groundwater protection zone.

4.4 Flooding from Reservoirs, Canals and other Artificial Sources

With reference to the Environment Agency long term flood risk mapping, published on the Government website, the below extract shows the Site is not at risk of flooding from reservoirs:

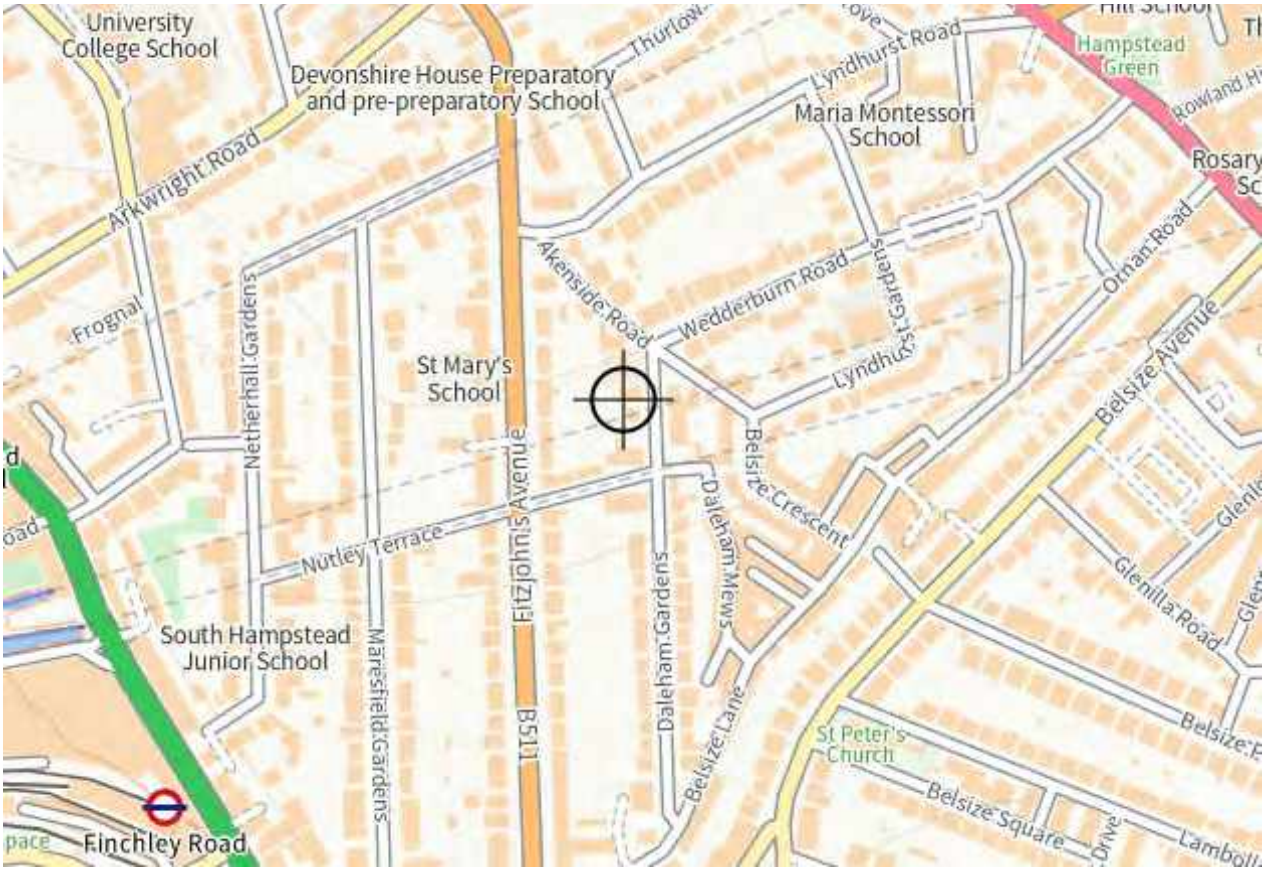

Figure 4.4.1 – Environment Agency Online Reservoir Flood Map Extract (Approximate Site Extents Edged Red)

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4.5 Critical Drainage Areas

The London Borough of Camden SFRA, figure 6a Rev 2 identifies a number of Critical Drainage Areas (CDA) within the borough. Section 4.2 of the SFRA describes these as hydrological catchments where “multiple and interlinked sources of flood risk cause flooding in one o moe Loal Flood Risk Zones dui ng sevee e athe ”. The site falls within a CDA - reference Group3_005.

An area within a CDA may not necessarily be at higher risk of flooding but falls within a catchment area that contributes to a flooding hotspot elsewhere. The LBC Section 19 Flood Investigation Report, into the Flood incidents on 12th and 25th July 2021, Revision 003 dated 20/06/2022 identifies local LBC Flood Hotspots. The Belsize Park Swiss Cottage Hotspot (figure 4-13) is close to the site. The site likely contributes to this flooding hotspot and as such the surface water management of the proposed development is crucial to ensuring flood risk elsewhere is not increased.

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5 POLICY STATUS FOR PROPOSED DEVELOPMENT

5.1 Vulnerability Classification

The proposed development complies with the following principles:

- *The proposed development lies within Flood Zone 1;*
- *The proposed development is classified as 'or e u lnerable in accordance with Annex 3 of the NPPF (reproduced as Table 5.1.1 below).*

Essential Infrastructure	Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood Wind Turbines
Highly Vulnerable	Police stations, Ambulance stations, Fire stations, Command Centres and telecommunications installations required to be operational during flooding Emergency dispersal points Basement dwellings Caravans, mobile homes and park homes intended for permanent residential use Installations requiring hazardous substances consent
More Vulnerable	Hospitals Residential institutions suh as e sidential ae homes, h ilde n's homes, soi al servie s homes, pi sons a d hostels Buildings used for dwelling houses; student halls of residence, drinking establishments, nightclubs and hotels. Non–residential uses for health services, nurseries and educational establishments Landfill and sites used for waste management facilities for hazardous waste. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	Police, ambulance and fire stations which are not required to be operational during flooding. Buildings used for shops; financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-e sidential institutions not inl uded in "moe vulnea ble", and assembly and leisue . Land and buildings used for agriculture and forestry. Waste treatment (except landfill and hazardous waste facilities). Minerals working and processing (except for sand and gravel working). Water treatment plants and sewage treatment plants (if adequate pollution control measures are in place). Sewage treatment works (if adequate measures to control pollution and manage sewage during flood events are in place).
Water-compatible Development	Flood control infrastructure. Water transmission infrastructure, pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel workings.

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	Docks, marinas, wharves Navigation facilities. MOD defense installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Notes

1 - This classification is based partly on Defra/Environment Agency research on Flood Risks to People (FD2321/TR2)21 and also on the need of some uses to keep functioning during flooding.

2 - Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

3 - The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

Table 5.1.1 – Flood Risk Vulnerability Classification

Vulnerability Classification		Essential Infrastructure	Water-compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test	✓	✓
	Zone 3a	Exception Test	✓	×	Exception Test	✓
	Zone 3b	Exception Test	✓	×	×	×

Key

✓ Development is appropriate

× Development should not be permitted

Table 5.1.2 – Flood Risk Vulnerability and Flood Zone 'Compatibility'

The proposed development is appropriate in accordance with Table 3 of the Government Flood Risk and Coastal Change Guidance, reproduced in Table 5.1.2 above.

5.2 Sequential Test & Exception Test

The NPPF requires that all development is sequential tested to steer new development to areas at the lowest probability of flooding (Flood Zone 1). The Sequential Test would normally be completed by the Local Planning

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Authority (LPA) to inform the preparation of the Local Development Framework (LDF), where one exists. However, where this process has not yet been completed the onus for the provision of evidence demonstrating successful application of the Sequential Test falls to the developer, or promoter of the site. The NPPF also requires the layout of a site to be sequentially tested to locate the most vulnerable land uses in the areas at lowest risk of flooding.

The site was previously occupied by residential development and falls within Flood Zone 1, thus satisfying the sequential test.

The NPPF acknowledges that in some circumstances it may not be possible to locate development in areas of low or appropriate (considering development vulnerability) flood risk or that there may be other valid reasons for a development to take place within the floodplain. In these circumstances, it is necessary to apply the Exception Test to clearly demonstrate that the benefits for development of a site outweigh the flood risks to the development and its occupants. Table 3 of the Government Flood Risk and Coastal Change Guidance (reproduced in Table 5.1.2 above) indicates when the Exception Test is required.

The proposed development site falls entirely into Flood Zone 1. The site use is considered appropriate within this zone under NPPF guidance, meaning completion of the Exception Test is not required.

5.3 Local Policy

The Camden Local plan, adopted July 2017, has the following policy in relation to flood risk and drainage:

Policy CC3

> *"The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible.*
>
> *We will require development to:*
>
> *a. Incorporate water efficiency measures;*
> *b. Avoid harm to the water environment and improve water quality;*
> *c. Consider the impact of development in areas at risk of flooding (including drainage);*
> *d. Incorporate flood resilient measures in areas prone to flooding;*
> *e. Utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and*
> *f. Not locate vulnerable development in flood-prone areas.*

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6 FLOOD RISK MANAGEMENT STRATEGY

6.1 Surface Water Discharge

With reference to Paragraph 80 of the Flood Risk and Coastal Change chapter within the Planning Practice Guidance and Part H3 of the Building Regulations, the disposal of surface water should be in accordance with the surface water hierarchy:

- *Infiltration*
- *Watercourse*
- *Sewer*

The geological and hydrogeological conditions have been investigated within section 2.3 and 2.4 of this report. Figure 2.4.1 shows a groundwater vulnerability of high in relation to activities undertaken at surface level. This is likely due to the shallow nature of the Claygate Member soils close to the surface. Given the impermeable nature of these soils and the existence of made ground from the demolition and past use of site, it is not proposed to discharge surface water run-off via the use of infiltration or soakaways. The site also affords little space for the positioning of a below-ground soakaway due to the site of the proposed building and the buffer required between foundations and soakaways.

Further to this, the Phase 1 Contaminated Land Risk Assessment (STM environmental, August 2021, ref PH-2021-000087) undertaken for the site prior to the demolition of the fire-damaged building identified potential contaminants within made ground and significant potential linkages to human health and property receptors. The epo t s e commed ation as that an intrusive site investigation be undertaken to determine the presence and extent of any soil contamination at the site.

There is no watercourse within the site or within close proximity of the site, and as such it is proposed to discharge surface water run-off to the existing Thames Water combined sewer within Daleham Gardens.

Greenfield run-off rates for the 0.074Ha site have been determined as follows:

- *1-year return period – 0.3 l/s*
- *30-year return period – 0.6l/s*
- *100-year return period – 0.8l/s*
- *100-year 360-minute storm – 20m^3 volume*

Given the low nature of these flows and the practicality of flow control devices, it is proposed to restrict all surface water run-off from the site to 1.0 l/s for all storm events up to and including the 1 in 100-year return period including climate change allowance event. Therefore, the following is proposed to be adopted for the surface water drainage strategy at the site:

- *1-year return period – 1.0l/s*
- *30-year return period – 1.0l/s*
- *100-year return period including 40% c/c allowance – 1.0l/s*

Initial calculations for the 100-year, 360-minute return period event including 40% climate change allowance, show an approximate discharge volume of 25m^3.

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Whilst these are higher than the greenfield rates, these provide a significant betterment on the discharge rates that were present during the use of the now-demolished apartment building, which would not have been subject to any flow regulation or control.

A pre-planning enquiry was submitted to Thames Water in March 2023, which confirms that the existing sewer network under Daleham Gardens has capacity for the proposed flows, subject to satisfying the LLFA via the planning process as per normal process. A copy of the pre-planning enquiry can be found within Appendix G.

6.2 Surface Water Management Strategy and Sustainable Drainage Systems (SuDS)

Effective surface water management is crucial when dealing with flood risk on and off site. The use of SuDS on a development help reduce the flow of surface water leaving the site and can help improve water quality by filtering out contaminants.

With reference to Table 26.2 of Ciria C753 The SuDS Manual, the hazard class for the site is considered very low, consisting of residential roof areas and non-vehicularised, pedestrianised external areas.

It is proposed that the fourth-floor roof area (approximately 70m^2) be constructed as a blue roof, with a minimum 150mm layer for storage. The roof will consist of drainage layers and a cellular storage layer with a high void ratio to maximise the volume of temporary attenuation available.

Areas of planting on the site will be constructed as functioning raingardens, receiving areas of run-off. Raingardens provide bioretention areas that can withstand occasionally temporary flooding and also contribute to local biodiversity, surface water retention, attenuation, treatment and evapotranspiration. Due to unsuitable ground conditions for infiltration, the raingardens will have an impermeable liner with a positive overflow outlet into the below-ground drainage system.

Raingardens contribute significantly during the common storm events, particularly in warmer periods when soil moisture deficit is high, generating very little runoff during common intense short duration events. During rare intense storms such as the 1-100 return period, the raingardens are assumed as saturated and therefore do not contribute to peak run-off control or storage during these events.

To achieve the 1.0l/s maximum discharge rate for surface water run-off at the site, an on-site flow control device with storage is required prior to the final outfall to ensure run-off is safely held on-site. Approximately 20m^3 of storage is required to ensure the site does not flood up to and including the 1-100 year + 40% climate change allowance event. Due to site constraints, it is proposed to provide this storage in the form of below-ground cellular attenuation crates as part of the below-ground drainage network. The storage is designed as a maintenance-free solution to mitigate the risks of the crates silting up over time, which would otherwise result in reduced storage capacity and subsequent on-site flood risk. The flow control device will be situated immediately downstream of the storage crates to maximise storage potential.

The achieve the maintenance-free storage solution the distribution pipework is separated from the attenuation crates in stone-filled trenches, with the length of pipe adjacent the crate units perforated and fully wrapped in non-woven geotextile. When water volume exceeds pipe capacity, the perforated pipes will surcharge and enter the crates, before draining down in a controlled manner after the storm event. This ensures that nothing other than water can enter the tank, and so long-term siltation is prevented. Any silts or grits that remain in the pipework would largely be dispersed on the first flush, however the pipe can be accessed and jetted if required with periodic inspections of the pipework carried out. The whole system is to be fully wrapped in an impermeable membrane liner, thus ensuring no infiltration takes place.

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The entire on-site system is to remain in private ownership and under the future maintenance of the developer.

Outline proposed drainage drawings can be found within Appendix D.

6.3 Surface Water Pipe Network Design Parameters

Drainage calculations have been undertaken to the Modified Rational Method, with location specific FSR rainfall data used to simulate various rainfall event durations for the 1 year, 30 year and 100 year + Climate Change (C/C) allowance return periods. Causeway Flow+ software (v10.5.1) has been utilised to demonstrate capability of the surface water drainage system.

The surface water drainage network has been designed to suit the following conditions:

- *1:1 year pipe full.*
- *1:30 year surcharged.*
- *1:100 year + 40% C/C minor flooding acceptable but to be contained within the site boundary. Current calculations show no flooding during this return period.*

Whilst *controlled* flooding is typically accepted during the 1:100-year return period event with an allowance for climate change, due to the topography of the site the drainage design and storage provided ensures of no flooding during this event.

Surface water drainage calculations can be found with Appendix E.

6.4 Flood Risk Elsewhere

As the site is located within Flood Zone 1, flood compensatory storage is not required.

Whilst it is not achievable to restrict the surface water discharge to greenfield rates, the proposed maximum discharge rate of 1.0l/s is significantly lower than the demolished apartment building, which was not subject to flow regulation.

As such, the proposed drainage strategy is not considered to increase flood risk elsewhere.

6.5 Flood Exceedance Events

The proposed development will ensure that all falls are directed away from thresholds and building structures. This ensures that in the event of a drainage system failure or exceedance, run-off flows will be directed away from people and buildings.

The lower-ground lightwell area will be directed to the outer perimeter to mitigate exceedance flood risk.

Refer to Appendix F for the flood exceedance flows drawing.

6.6 Foul Water Drainage

The foul water drainage system is to drain by gravity to the site boundary, where it will connect into a new private combined drain on-site, downstream of the surface water flow regulator, before exiting the site and discharging into

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the existing Thames Water combined sewer within Daleham Gardens. The Thames Water pre-planning enquiry confirms capacity for the foul flows. This can be found within Appendix G.

The foul network will be fully designed in accordance with BS EN 752 and Building Regulations Part H, to self-cleansing velocities. The foul drainage system is fully accessible with the use of inspection chambers as well as full-size man-entry manholes.

The entire on-site system is to remain in private ownership and future maintenance of the developer.

The outline proposed drainage drawings can be found within Appendix D.

6.7 Existing Network Rail Tunnel

It should be noted that there is an existing Network Rail Tunnel, the Belsize Railway Tunnel, passing beneath the adjacent property. The below extract shows the proposed building footprint in orange, with the approximate alignment of the tunnel in salmon colour:

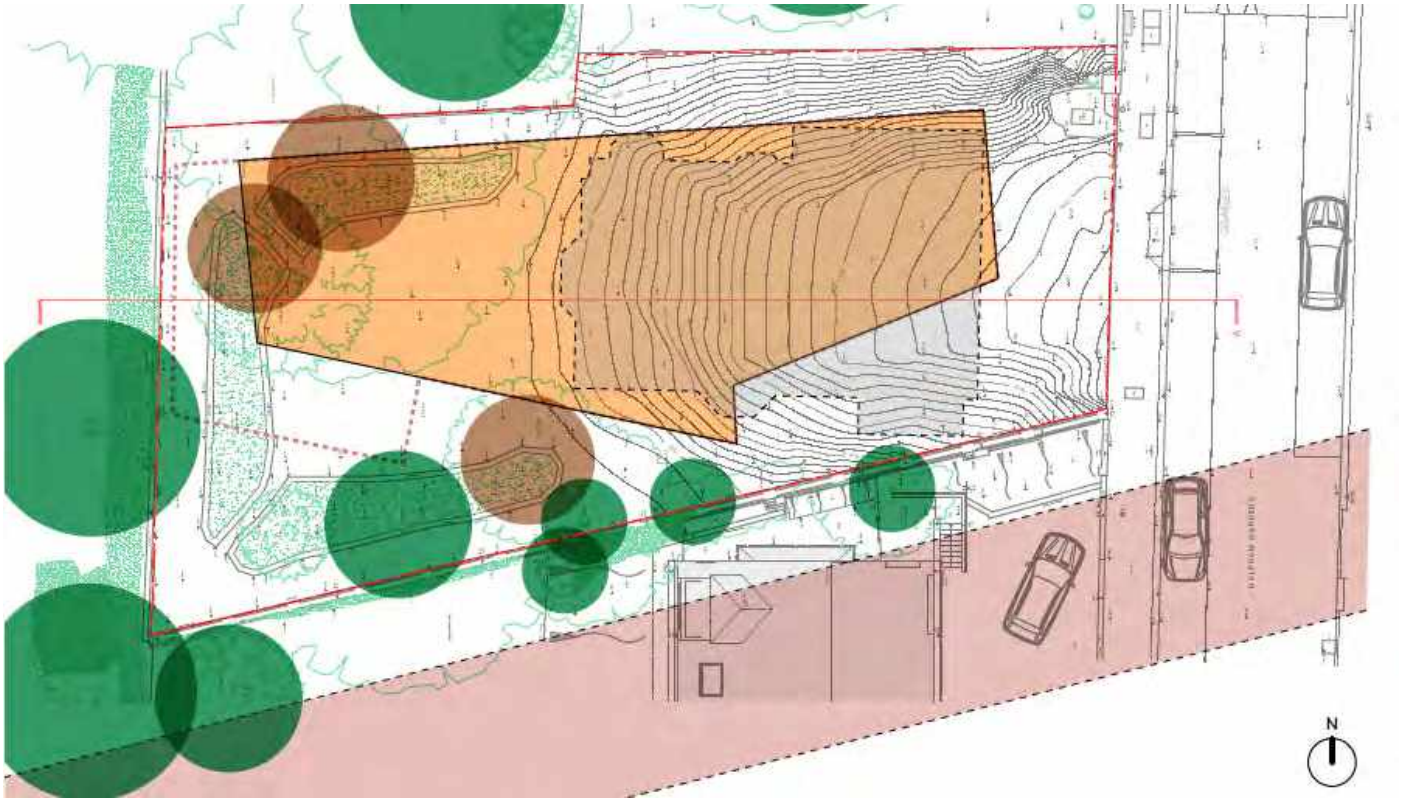

Figure 6.7.1 – Extract of Simple Works Constraints Plan (Drg 1803-XX-SK-01)

The exact alignment and depth of the tunnel is yet to be determined. The surface water drainage design on-site will need to comply with Net ok Rails asset protection guidance and requirements.

These specific requirements are to be confirmed; dialogue with Network Rail is currently ongoing. It is understood that there are minimum proximity requirements for surface water attenuation and flow controls to their assets.

As such, it should be noted that the current drainage proposals are subject to amendment to suit any discussions yet to be held with Network Rail.

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7 MAINTENANCE SCHEDULE

7.1 Drainage channels and gullies

Channel sumps and gullies are to be inspected and cleaned if required every six months. Gratings are also to be checked during this operation to ensure adequate seating and fastening is maintained to prevent the forming of trip hazards and the impediment of water flow.

Channel inverts are to be inspected and jetted or rodded every twelve months. The sumps should also be cleared out following this operation to prevent blockages.

7.2 Surface water flow control device (Hydro-Brake)

Inspection is to be carried out every six months. Any silt accumulation is to be disposed of and any damage present should be reported to the manufacturer/supplier.

7.3 Catchpit manholes

The sump of each catchpit manhole is to be checked and emptied every six months.

7.4 Chamber covers and adjacent areas

Chamber covers, and abutting pavements are to be checked on an annual basis. Any damage or deformities are to be amended to prevent the formation of a trip hazard. Covers are to be replaced with similar performance products as those initially specified by the Civil Engineer.

7.5 Surface and foul water drainage pipes and chambers

The surface and foul water systems have been designed in accordance with current UK standards and good practice to ensure a self-cleansing regime. Any blockages that occur are to be rectified by rodding or jetting as required by a suitably certified organisation.

Chambers are to be visually inspected by lifting the covers every twelve months. Any silt or debris is to be removed. Anyone undertaking this task should ensure that they take relevant safety precautions before accessing the chambers.

For surface water, catchment areas should be well maintained, free of debris and excessive vegetation kept to a minimum to prevent the ingress of debris and silting up of the system.

7.6 Geocellular Attenuation storage tanks (In accordance with the SuDS Manual)

Inspect and identify any areas that are not operating correctly monthly for the first 3 months, then annually. If required, take remedial action in accordance with manufacturer recommendations.

Control Chambers upstream of infiltration tanks are to have catch pits to prevent any silt or debris from entering the system. These are to be checked and cleaned if required annually.

Trees and shrubbery are to be kept clear of any areas that contain storage tanks to prevent root damage. Landscaping/grass can be used effectively as these are not expected to have invasive roots.

During construction, special care is to be taken to not overload the storage tanks by moving plant over them. Any necessary imposed loads are to be checked with the supplier/manufacturer. Additional care to be taken to prevent

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any construction materials from penetrating the tanks while building is taking place. Prior to handing over the buildings, the system is to be jetted and inspected for damage by a suitably certified organisation. Any damage present is to be rectified as required.

Inlets, vents or overflows are to be inspected/checked annually to ensure that they are in good condition and operating as intended.

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8 CONCLUSION

With reference to the flood map for planning published by the Environment Agency, the development site is located i thin Flood Zone 1 Lo po ba ility. Flood risk from other sources has been assessed as low. This has been confirmed by the site specific flood risk assessment as detailed at Section 4.

From Table 5.1.1 the site is classified as More Vulnea ble Flood Risk Vulnea ility Classification), from Table 5.1.2 the developmet i s l assified as app ropi ate.

As the site lies within Flood Zone 1, the Sequential Test is deemed passed and the Exception Test not required.

Due to unsuitable ground conditions and a constrained development footprint, the use of infiltration as a method of surface water disposable is not considered feasible. It is proposed to discharge to the existing Thames Water combined sewer within Daleham Gardens, at a maximum discharge rate of 1.0l/s for all storm events up to and include the 1-100 year return period event with an allowance for climate change.

SuDS are to be incorporated onto the site with a blue roof and functioning rain gardens, as well as below-ground attenuation and a flow control device to restrict surface water flows to 1l/s. The surface water drainage design ensures of no flooding up to and including the 1-100 year return period event with an allowance for climate change.

The current drainage proposals are subject to confirmation of any Network Rail asset protection requirements for the adjacent Belsize Tunnel under the neighbouring property.

Additional water quality measures will be provided by the inclusion of appropriate deep silt trapped gullies and silt boxes to all channel drains.

Foul water will discharge by gravity into the existing Thames Water combined sewer within Daleham Gardens.

Finished levels will ensure that any flood exceedance pathways are directed away from people and property.

The on-site foul and surface water drainage systems are to remain in private ownership, maintained by the developer in accordance with the maintenance schedule.

A completed Camden LLFA Pro-forma can be found within Appendix H.

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APPENDIX A – SITE LOCATION PLAN

Subteno
Engineering Consultants

PROJECT: Daleham Gardens, London, NW3 5BU	REF 221215-SLP	PAGE NO 1	REVISION 01
TITLE: Site Location Plan		BY NR	DATE JAN 2023

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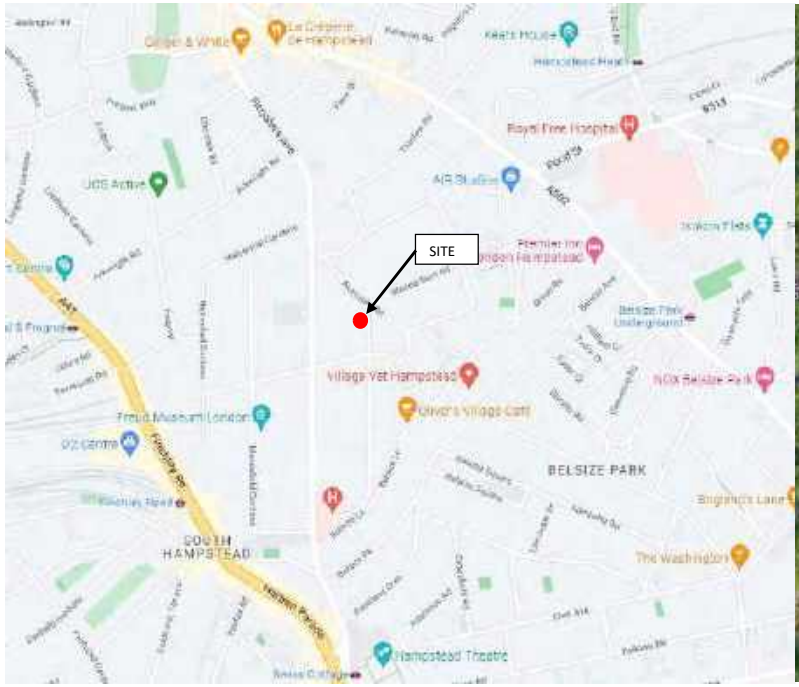

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APPENDIX B – TOPOGRAPHICAL SURVEY AND CCTV DRAINAGE SURVEY PLAN

0 2 4 6m

Key -

TOF	top of fence
TOW	top of wall
ic	inspection cover
cl	cover level
il	invert level
utl	unable to lift
bdg ht	building height
sv	stop valve
dp	depth
bt	telecom
catv	cable television
conc	concrete
rl	roof light
cbrd.	cupboard
fp	fireplace
RIDG	ridge level
GUTTER	gutter level
svp	soil and vent pipe
rwp	rain water pipe
fb	floorboard direction
DH 1990	door height
BH 2000	beam height
AH 2500	arch head
SPR 1800	spring point
FS 0780	floor to sill
SH 1850	sill to head
U/S 1950	underside
SC 2100	sloping ceiling
CH 2520	room height
	overhead slope
	radiator
A	section marker

A

A

DISABLED

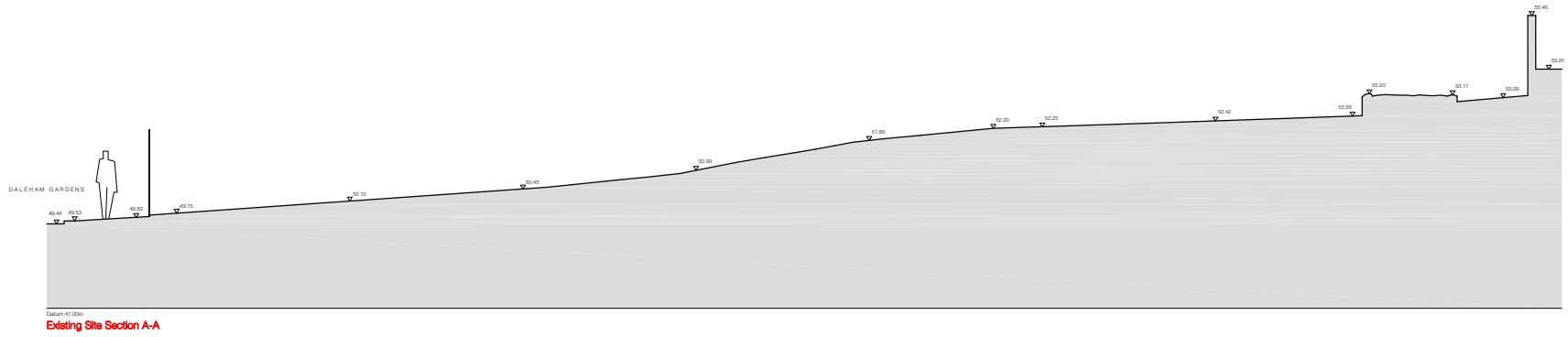
DALEHAM GARDENS

ST02

ST01

indicative North

N



Existing Site Section A-A

General notes -

1. All dimensions are in millimeters unless noted otherwise.
2. All dimensions shall be verified on site before proceeding with the work.

All levels are in meters related to ST01 (value 50.00m)
Coordinates related to a local grid

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E : ejjgardner@icloud.com
W : www.egsurveys.co.uk

client: NW3CLT Ltd.

project: 31 Daleham Gardens, Hampstead, London NW3 5BU

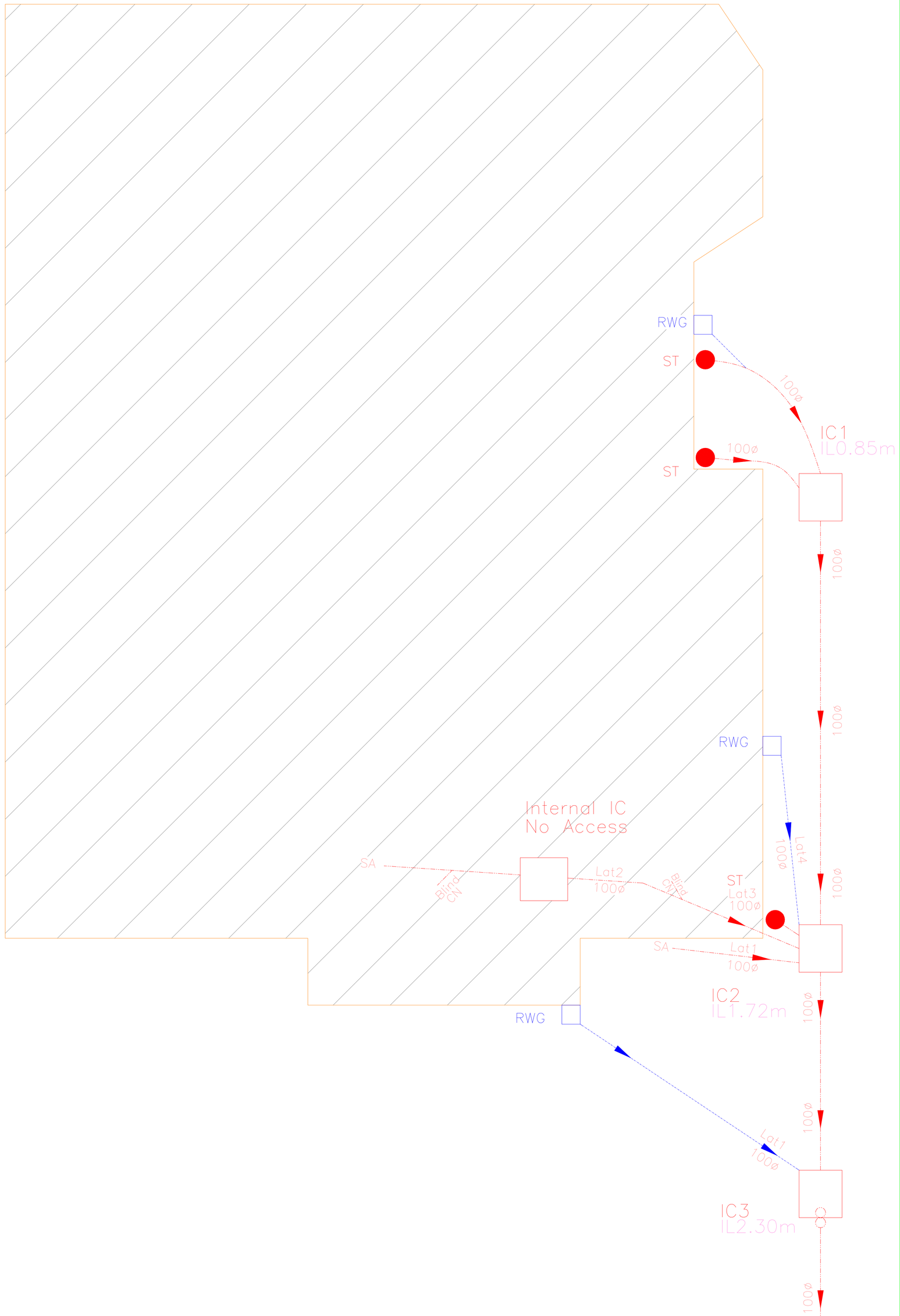
title: **Existing Topographical Survey**

date: March 2022

scale: 1:200 - Plan size A3

drawing: **22-010-1**

edwardgardner surveys



JOB No. 10443

LEGEND

FW MH/IC

SW MH/IC

INTERCEPTOR

FW GULLY

SW GULLLY

ST/VP:STACK

RWP

SW:SURFACE WATER
SURFACE WATER ROUTE

FW:FOUL WATER
FOUL WATER ROUTE

BUILDING OUTLINE

OVERHEAD BUILDING LINE

BOUNDARY LINE

ROAD

PROPOSED

BANK

BANK SYMBOL

UTS: Unable to Survey
UTL: Unable to Lift

TREE

W/C

NOT TO SCALE

Drawing Notes
EDS information shown in red

Rev.	Date	Description	By

EXPRESS SOLUTIONS GROUP

Chas Accredited

Head Office:
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Staines-Upon-Thames
Surrey
TW18 2QW
Tel 020 8979 5444
VAT 851970604
Company No 04935559

Client	Road Rock UK
Site Address	31 Daleham Gardens London NW3 5BU
Drawing title	SITE PLAN
Scales	NOT TO SCALE
Surveyor	DP
Drawn By	EA
Date	24.09.2021
JOB No.	10443