Appendix A.2

Soils Investigations & Basement Impact Assessment

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BASEMENT IMPACT ASSESSMENT

FOR

WOLSEY MEWS

LONDON NW5 2DX

Reference: 15363-c150602 re-001

02/06/2015

ISSUE STATUS

Issue No.	Date of issue	Details	Produced By	Checked by
1	02/06/2015		L.A. McDonald	
2	29/06/15	Minor Revisions	L.A. McDonald	

Report prepared by Lachlan McDonald BSc CEng MIStructE MICE

Report checked by Lachlan McDonald BSc CEng MIStructE MICE

CONTENTS

Appendices:

1.0 Brief

Ellis and Moore Consulting Engineers Ltd have been instructed by Burd Haward Architects Ltd. to undertake a Basement Impact Assessment (BIA) in accordance with the Guidelines prepared by Camden Council.

The wording in the Camden document is as follows:

Subterranean development of the site would trigger the need for a Basement Impact Assessment (BIA) prepared in accordance with Camden CPG4 (Basement and Lightwells). The policy DP27 sets out that applications should demonstrate (by Methodologies appropriate to the site) that schemes comply with the criteria (A) to (H). The BIA should address the impact of the proposals in terms of the stability and water environment, using the screening flow charts set out in the CPG. In particular, structural stability of the existing building on the site is of concern and so is the issue of slope stability which will require attention.

The report follows the Camden Council requirements as per the following Stages.

Stage 1	Screening
Stage 2	Scoping
Stage 3	Site Investigation and Study
Stage 4	Impact Assessment.

In preparing the report, the following Appendices have been relied on to provide information.

Appendix 1	Soils Investigation by Chelmer Site Investigations
Appendix 2	Structural Scheme drawings prepared by Ellis and Moore for the basement
Appendix 3	Thames Water Sewer Records
Appendix 4	Camden Geological, Hydrogeological and Hydrological Maps.

The report has been prepared by Lachlan McDonald BSc MICE MIStructE of Ellis and Moore Consulting Engineers Ltd.

2.0 Stage 1 - Screening

At the present time the site is empty apart from a row of garages fronting onto Wolsey Mews. The buildings are single storey.

The site is generally flat at the approximate level of the road outside the entrance which is in Wolsey Mews. Standing in the street there is a two storey building to the right which does not have a basement. To the left there is not a building on the site boundary.

The intention is to construct a three storey building including part basement as indicated in Appendix 2.

The flow charts Figures 1,2 and 3 in the Camden Planning Guidance document have been considered and it has been decided that a Basement Impact Assessment (BIA) is necessary because of groundwater potential.

The following are the answers to the Flow Screening Chart Figure 1.

1a The site is not located above an aquifer as it is underlain by London Clay.

1b From the soils investigation the level of the basement floor will be similar to the water level found in the borehole as part of the soils investigation i.e. approximately 3 metres below existing ground level.

2. The site is not within 100 metres of a water course.

3. The site is not within the catchment of the pond chains on Hampstead Heath.

4. The proposed basement development will occupy approximately two thirds of the area of the proposed building but more than the existing buildings.

5. The proposed surface water will be attenuated to the same level as the existing by means of on site storage.

6. This does not apply as the site is not near a local pond or spring line.

The following are the answers to the Flow Screening Chart Figure 2 – dealing with slope stability.

1. The existing site is almost flat and does not include any slopes of 1in 8
2. The proposed profiling of the landscape will not change the current slope
3. The development is not close to a railway cutting or any slopes steeper than 1 in 8.
4. The site is not within a hillside setting
5. London Clay is the shallowest strata on the site below the made ground.
6. There is only one tree on the adjacent site which will be retained.
7. There is a history of tree root subsidence in the area, but this will be taken into account in the structural design.
8. The site is not within 100 metres of a water course with potential spring line.
9. The site has been built on in the past and the records are included on the Architect's drawings and in the soils investigation.
10. The site is not within an aquifer. There is a possibility of finding ground water which is believed to be perched and localised pumping may be required during construction
11. The site is not within 50 metres of the Hampstead Heath Ponds
12. The site is within 5 metres of a highway as there is a pavement immediately outside the front of the building.
13. The proposed basement will significantly increase the differential depth of foundations relative to the neighbours on the right hand side..
14. The site is not over any tunnels either railway or underground.

The following are the answers to Flow Screening Chart Figure 3.

1. The site is not within the catchment area of the ponds on Hampstead Heath.
2. The surface water on the site will increase and will be attenuated into the Thames Water drains.
3. The proposed development will result in a change in the proportion of hard surfaced external areas.

4. The proposal is to collect the surface water and attenuate into the main sewer in the existing road.
5. The quality of the surface water will be similar to the existing, mainly from the roofs.

Stage 2 – Scoping - this Section deals with the points raised in Stage 1 which require further investigation

Part of this Section answers have been given as part of the Flow Screening exercise as follows.

For this Stage, information has been sought from various sources including the Camden Geological, Hydrogeological and Hydrological maps together with the sewer records.

As the site is in Zone 1 it is proposed that a Flood Risk Assessment will not be undertaken as part of the exercise due to the limited size of the development. It is concluded that the site is not prone to flooding.

Referring to the map indicating water courses near the site it is to the east of the River Fleet which is culverted.

The geology of the area indicates that the site is underlain by made ground and London Clay of a substantial thickness.

In Appendix 3, the Thames Water Sewer Records indicate that there is a combined sewer in the road immediately outside the property which will take both the foul and the rainwater.

As a result of the information obtained it was concluded that an intrusive soils investigation was required to be part of this report.

Stage 3 – Site Investigation and Study

A soils investigation has been undertaken by Chelmer Site Investigations and is included in Appendix 1.

The survey can be summarised as follows. A single borehole and two trial pits were excavated to expose the existing conditions on the boundaries and the foundations to the next door property on the right hand side.

The property on the right hand side has a shallow strip foundation consisting of mass concrete bearing on made ground. The other trial pit near the left hand boundary indicated there was made ground near the surface and mixed soil containing clay and gravel below. Again the borehole encountered mixed soils near the surface containing clays and gravels before clay was found at 2.9 metres below existing ground level.

In this instance it is considered that sufficient soils investigation work has been undertaken to conclude on the soil conditions given the size of the project.

The water that was encountered in the borehole is likely to be a perched water table, the water running on top of the clay in the gravel just above. It will be investigated further at the commencement of the site works.

At this stage no further monitoring of the ground water conditions is required due to the depth it was recorded in the soils investigation of 4.6 metres below ground on completion of the borehole.

Stage 4 – Impact Assessment

From the information gathered in the previous Stages 1 to 3, it is considered that the most applicable structural solution would be to construct the basement within a contiguous piled wall as this would make the construction simple and reduce any likelihood of damage to the building on the right hand side. The details are indicated on the attached drawings. Within the contiguous piled wall a basement slab will be constructed and reinforced concrete walls on all sides to create a basement. The ground floor will be reinforced concrete such that a concrete box has been created.

It is likely that the ground slab and walls would be formed in waterproof concrete using one of the waterproofers either Caltite or Pudlo.

For the new basement it is likely that the foul water will flow by gravity into the existing drains. It will be necessary to undertake a CCTV survey of the existing drainage prior to the works commencing so that access can be achieved into the existing foul drainage. It is concluded that the proposed drainage will adequately take care of any rainfall and runoff as it is likely to be similar to the existing.

Due to the site works it is likely that localised pumping of excavations may be required as a result of rainfall and the possibly a perched water table.

Conclusions

The following conclusions are drawn based on the investigative work undertaken to date:

- From the Soils Investigation it is concluded that this building will not impose any restrictions on the flow of ground water as the underside of the basement is approximately 300mm below the water level that was measured at the borehole.

- As far as flooding is concerned, the existing drainage should be able to cope.

- Various flood maps have been consulted and they generally indicate that the site is in the area of low flood risk therefore no flood protection precautions are required for this development.

- As a result of the use of a contiguous piled wall the likelihood of movement to the adjacent building is reduced and underpinning will not be required as the piles will be designed to take into account the vertical loads imposed by the building next door.

- Monitoring will be undertaken with target points on the building at the right hand side. Vertical movements of the wall will be measured with the limits set as follows:
  5mm green – OK
  10mm amber – review working methods
  15mm red – stop work.

Relative measurements will also be taken between points.

Given the properties of the clay and the information in the soils investigation settlements are likely to be of the order of 15mm to 20mm taking into account theoretical heave. Past experience indicates that this would result in Category of Damage 2 which is crack widths of less than 5mm which can easily be filled. Using the working methods proposed it is considered that this is realistic in conjunction with the proposed monitoring.

Method statements will be required for both the installation of the contiguous wall and the basement slab and retaining walls.

- It is concluded that when the basement is completed there should be no residual issues affecting the property next door or the land surrounding the building. It will be aim of the contractor to undertake the work using the safest possible techniques given the type of structure that has been selected.

- In summary it is concluded that this basement can be constructed successfully as long as the guidelines in this report are followed. It is likely that there will be no effect on the groundwater conditions below the site.

L.A.McDonald
BSc CEng MIStructE MICE
Ellis and Moore Consulting Engineers Ltd.

APPENDIX 1

SITE INVESTIGATION REPORT

BY CHELMER SITE INVESTIGATIONS

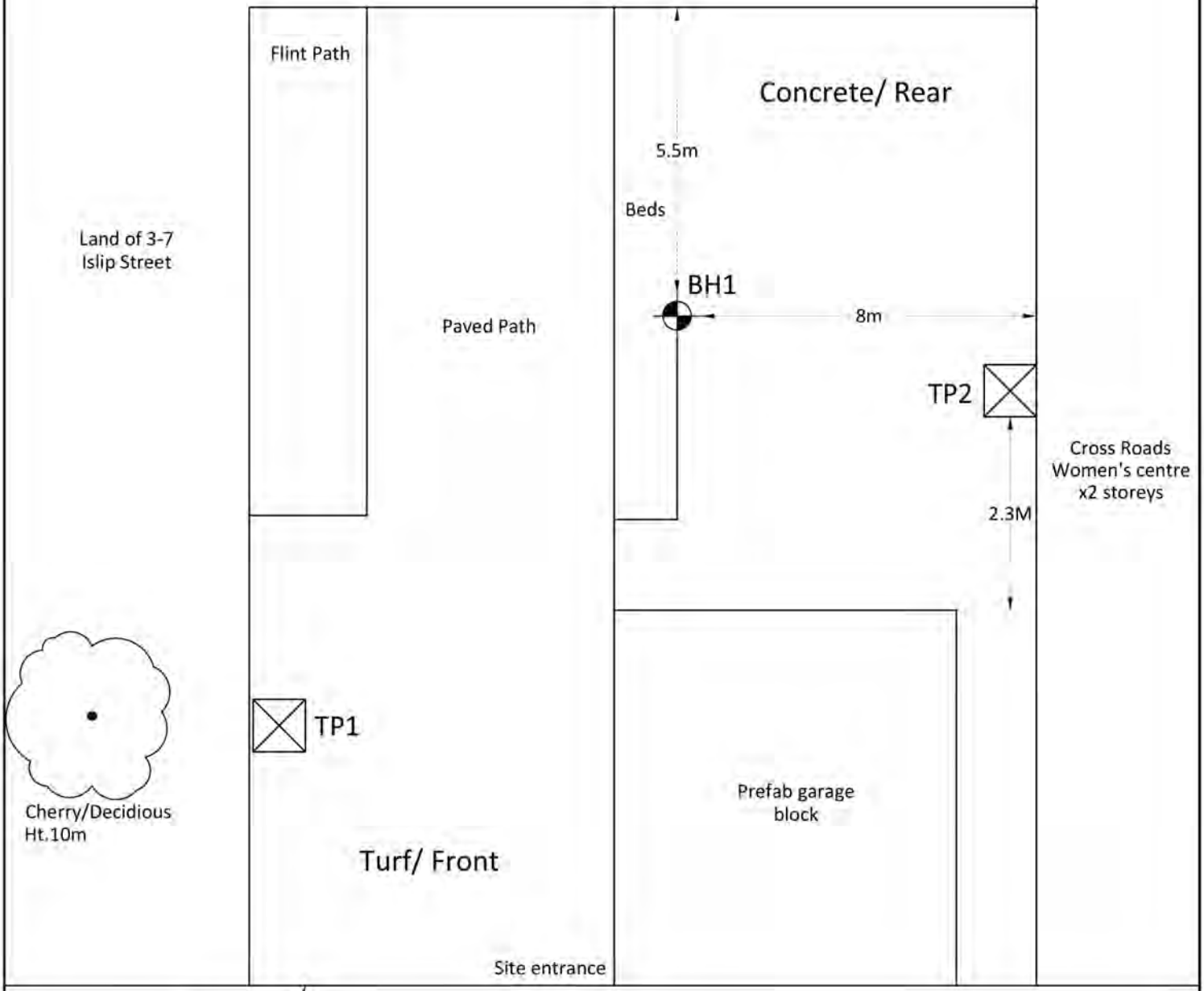
Chelmer
Site Investigations
'Groundbreaking Services'

Factual Report

Site	Wolsey Mews, London, NW5 2DX
Client	Burd Haward Architects Ltd
Date	12th March 2015
Our Ref	FACT/5158

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 67409136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

Client:	Burd Haward Architects Ltd	Scale: N.T.S.	Sheet: 1 of 1	Date: 12.03.15	
Location:	Wolsey Mews, London, NW5 2DX	Job No: 5158	Weather: Fine	Drawn by: MM	Checked by: JH

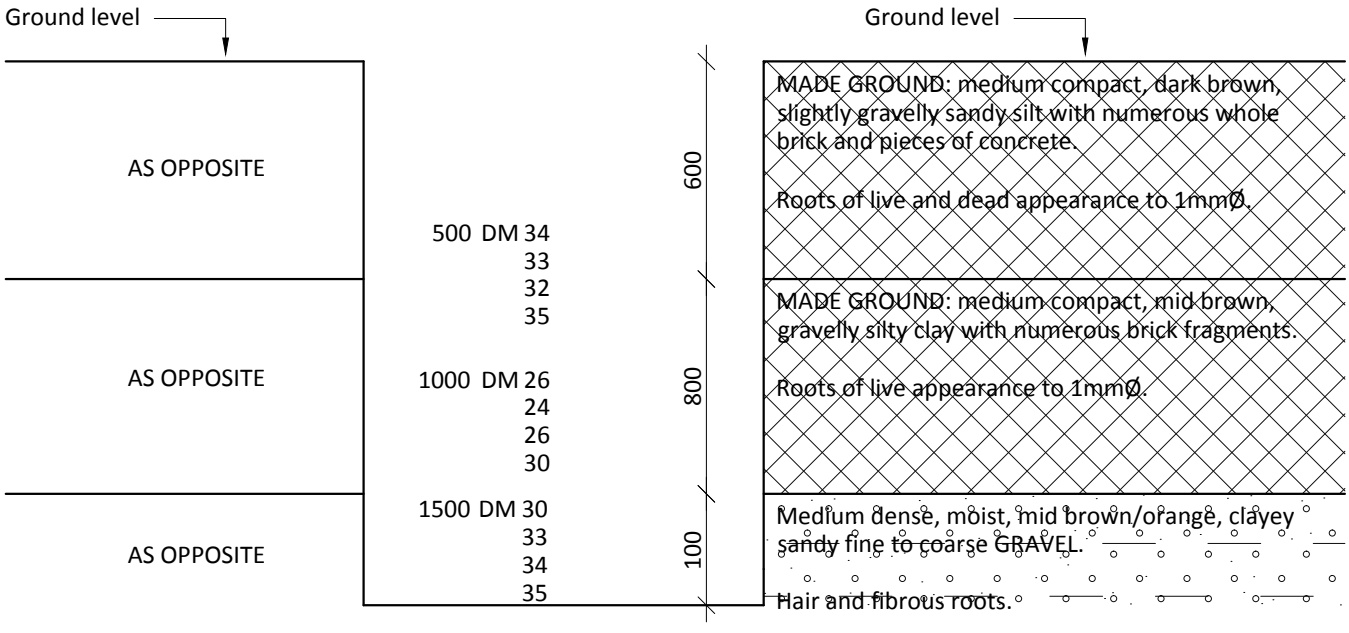


Notes: *On site tree identification for guidance only. Not authenticated.*

Key:

Tree/Shrub | Borehole | Trial Pit | G Gully | Tree Stump | Rain Water/ Soil Pipe | MH Manhole

Client: Burd Haward Architects Ltd	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 12.03.15
Location: Wolsey Mews, London, NW5 2DX	**Job No:** 5158	**Trial Pit No:** 1	**Weather:** Fine
Excavation Method: Hand tools		**Drawn by:** MM	**Checked by:** JH



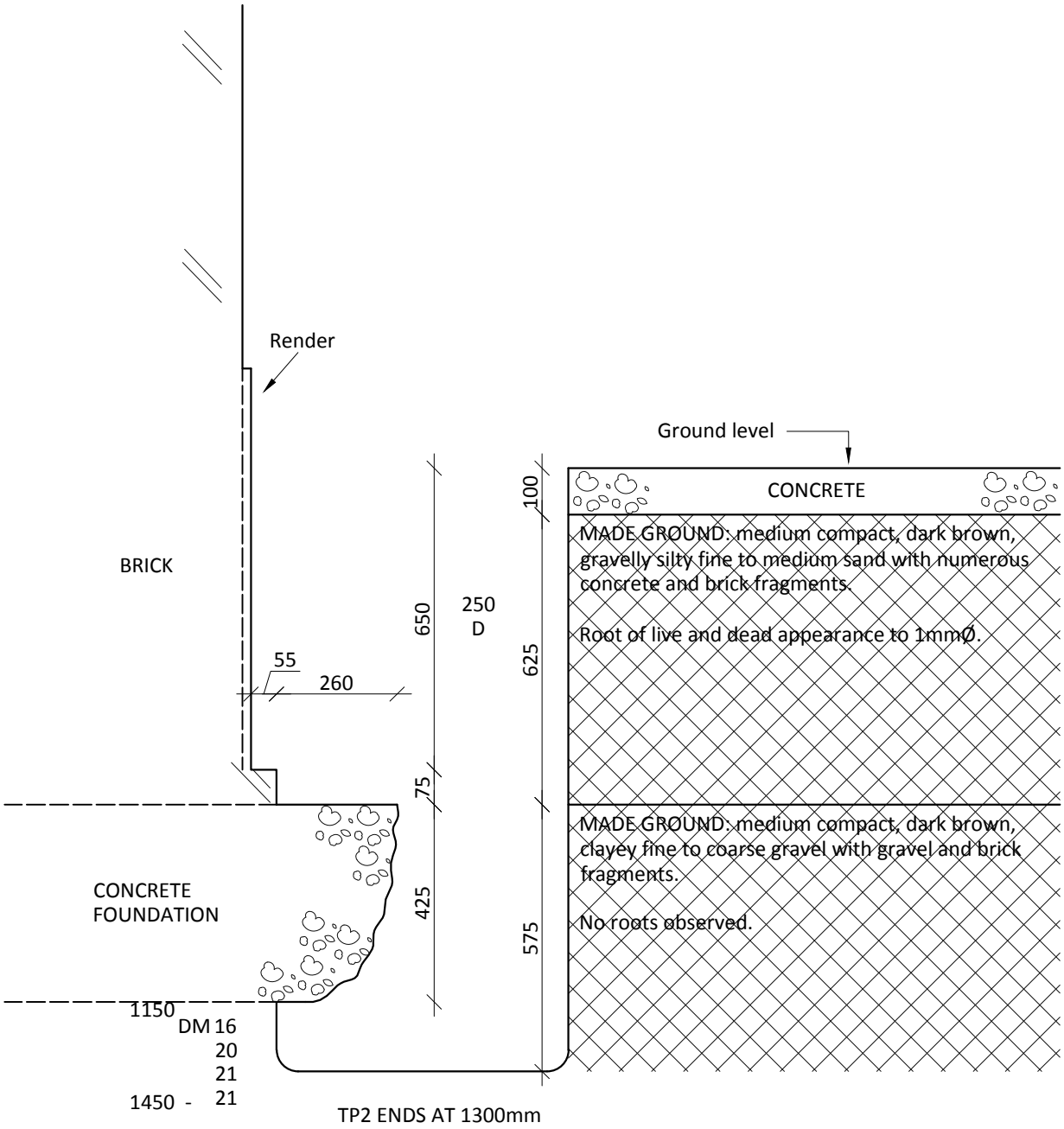
TP1 ENDS AT 1500mm

Remarks:

Key:

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Client: Burd Haward Architects Ltd	**Scale:** N.T.S.	**Sheet No:** 1 of 1	**Date:** 12.03.15
Location: Wolsey Mews, London, NW5 2DX	**Job No:** 5158	**Trial Pit No:** 2	**Weather:** Fine
Excavation Method: Hand tools		**Drawn by:** MM	**Checked by:** JH



Remarks:

Key:

D Small disturbed sample
B Bulk disturbed sample
U Undisturbed sample (U100)
N Standard Penetration Test Blow Count
J Jar sample
V Pilcon Vane (kPa)
M Mackintosh Probe
W Water Sample

Chelmer Site Investigations 'Groundbreaking Services'

Client:	Burd Haward Architects Ltd	Scale:	N.T.S.	Sheet No:	1 of 1	Weather:	Fine	Date:	12.03.15
Site:	Wolsey Mews, London, NW5 2DX	Job No:	5158	WS No:	1	Boring method:	Archway		

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	TOPSOIL	0.5		U			Roots of live appearance to 2mmØ to 0.4m.		G.L.
0.5	MADE GROUND: medium compact to compact, dark brown silty gravelly fine to medium sand with numerous brick fragments.	0.3							
0.8	MADE GROUND: medium compact, mid to dark brown, gravelly silty clay with occasional brick fragments.	0.7		U	SPT	N = 12	No roots observed below 0.4m.		1.0
1.5	Firm, mid brown, gravelly silty CLAY.	0.6		U	SPT	N = 15			2.0
2.1	Stiff, moist, pungent, dark brown very silty CLAY.	0.6		U				*2.1*	
2.7	Dense, mid brown, clayey GRAVEL.	0.2							
2.9	Stiff, mid brown, grey veined silty CLAY with partings of brown silt and fine sand.	3.1		U	SPT	N = 18		*2.9*	3.0
				U	SPT	N = 20			4.0
				U	SPT	N = 21			5.0
6.0	WS ends at 6.0 m			U	SPT	N = 23			6.0

Drawn by: MM **Approved by:** JH

Remarks: *Groundwater seepage at 2.1m.*
Groundwater strike at 2.9m.
Borehole open and groundwater standing at 4.6m on completion.
Metal standpipe installed to 6.3m.

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

CHELMER SITE INVESTIGATION LABORATORIES LIMITED	FALLING HEAD PERMEABILITY TEST	Chelmer Site Investigation Laboratories Limited Tel : 01245 400 930 Fax : 01245 400 933

Project Name : 25 Wolsey Mews, London, NW5 2DX

SOAKAWAY TEST (TP1)

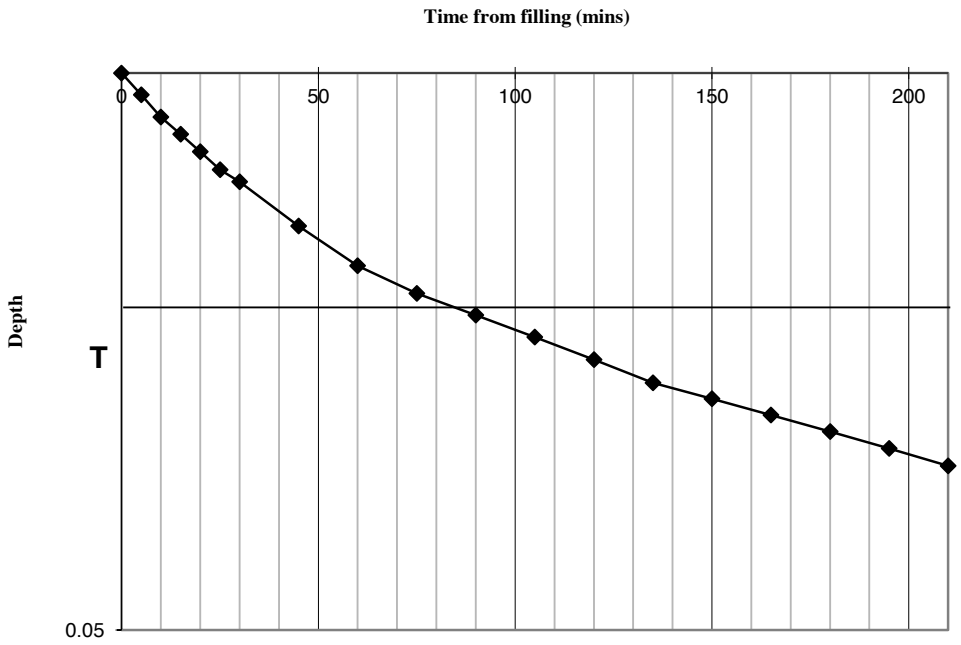
Job No. 5158

Date : 12 March 2015

Test Depth	H_0 =
1.35	1.50

(m)	Time (mins)	H	H/H_0
1.350	0	0.150	0.10
1.354	5	0.146	0.10
1.358	10	0.142	0.09
1.361	15	0.139	0.09
1.364	20	0.136	0.09
1.367	25	0.133	0.09
1.369	30	0.131	0.09
1.376	45	0.124	0.08
1.382	60	0.118	0.08
1.386	75	0.114	0.08
1.389	90	0.111	0.07
1.392	105	0.108	0.07
1.395	120	0.105	0.07
1.398	135	0.102	0.07
1.400	150	0.100	0.07
1.402	165	0.098	0.07
1.404	180	0.096	0.06
1.406	195	0.094	0.06
1.408	210	0.092	0.06

Dimention of trial pit =	0.250	(m)
Area (A) =	0.06	(m^2)
Intake factor (F) =		
Basic Time Factor (T) =		(min)
Permeability (k) =	#DIV/0!	m/sec



UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
'Groundbreaking Services'

Laboratory Report

Site	**Wolsey Mews, London, NW5 2DX**
Client	**Burd Haward Architects Ltd**
Date	**17-Apr-15**
Our Ref	**CSI5158**
CGL Ref	**CGL04825**

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 6409136 |info@siteinvestigations.co.uk | www.siteinvestigations.com

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Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference : CGL04825

Client Reference : CSI5158

For the attention of : Burd Haward Architects Ltd

This report comprises of the following :

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Chelmer Site Investigations

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number : CGL04825
Client : Burd Haward Architects Ltd
Client Reference : CSI5158
Site Name : Wolsey Mews, London, NW5 2DX

Date Received : 10/04/2015
Date Testing Started : 10/04/2015
Date Testing Completed : 17/04/2015
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
WS1	1.5	61909	D	21	<5	52	20	31	0.02	31	CH								
WS1	2.0	61910	D		<5											6.1	0.11	0.13	DS-1
WS1	2.5	61911	D	23	<5	62	24	37	-0.04	37	CH								
WS1	3.5	61913	D	32	<5	69	23	46	0.18	46	CH								
WS1	4.5	61915	D	33	<5	76	25	51	0.16	51	CV								
WS1	6.0	61918	D	34	<5	71	25	46	0.19	46	CV					7.8	1.60	1.92	DS-2

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

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Comments :-

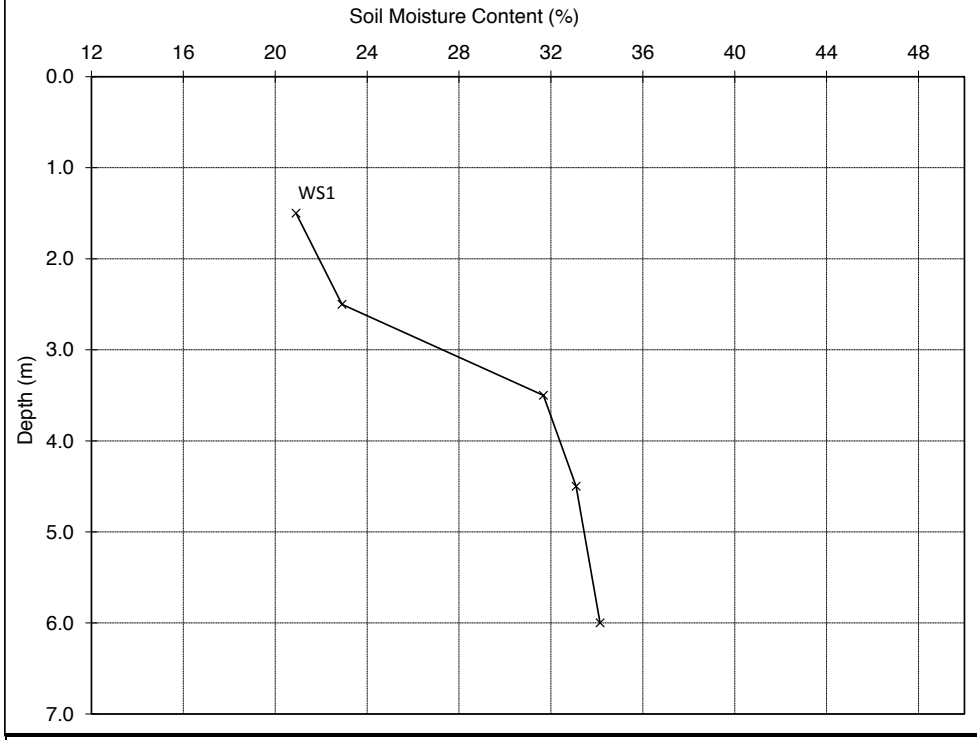
Technician :- HS/LE/MT
Checked By :- MC
Date Checked :- 17-Apr-15

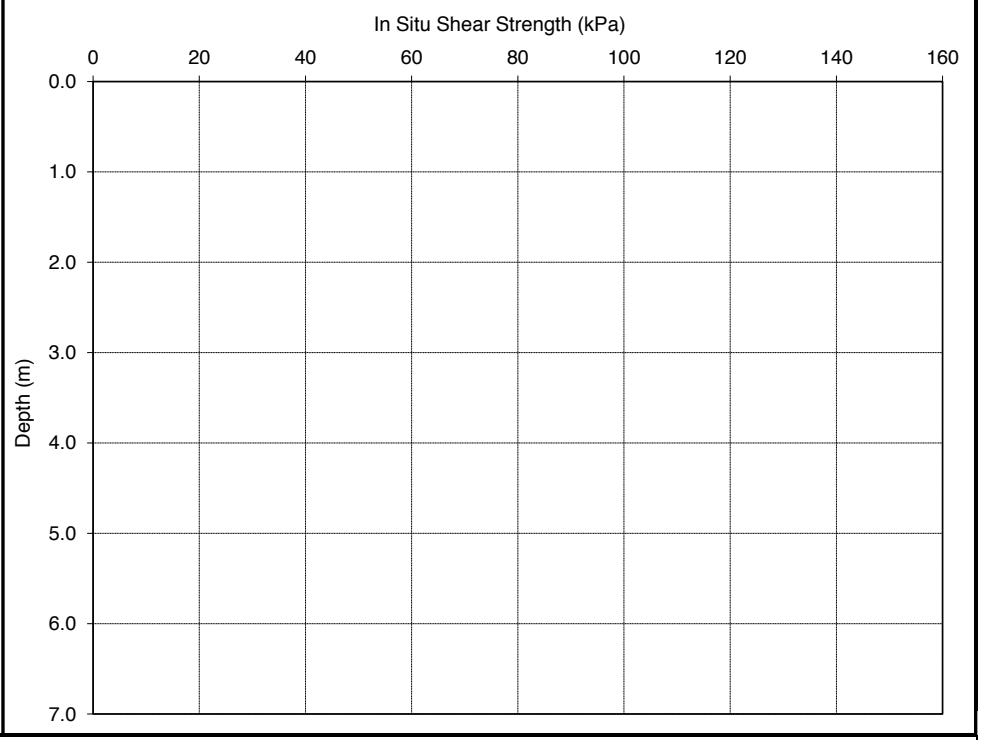
Laboratory Testing Results

Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL04825	Date Received :	10/04/2015
Client :	Burd Haward Architects Ltd	Date Testing Started :	10/04/2015
Client Reference :	CSI5158	Date Testing Completed :	17/04/2015
Site Name :	Wolsey Mews, London, NW5 2DX	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Site Investigations using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa. (Not UKAS accredited)

UKAS TESTING 8284

Comments :-

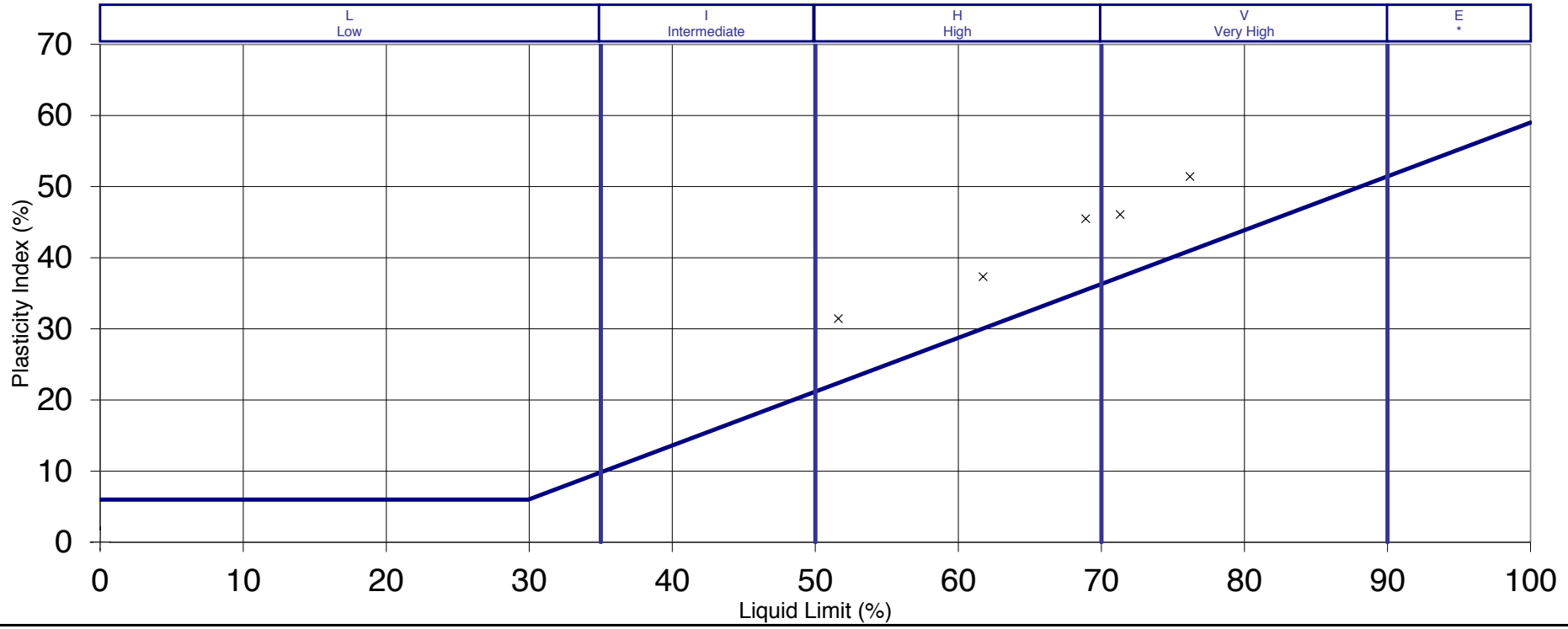
Checked By :- MC Date Checked :- 17-Apr-15

Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL04825	Date Received :	10/04/2015
Client :	Burd Haward Architects Ltd	Date Testing Started :	10/04/2015
Client Reference :	CSI5158	Date Testing Completed :	17/04/2015
Site Name :	Wolsey Mews, London, NW5 2DX	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB



Notes :-

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

Key :- WS1

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Comments :-

Checked By :- MC Date Checked :- 17-Apr-15

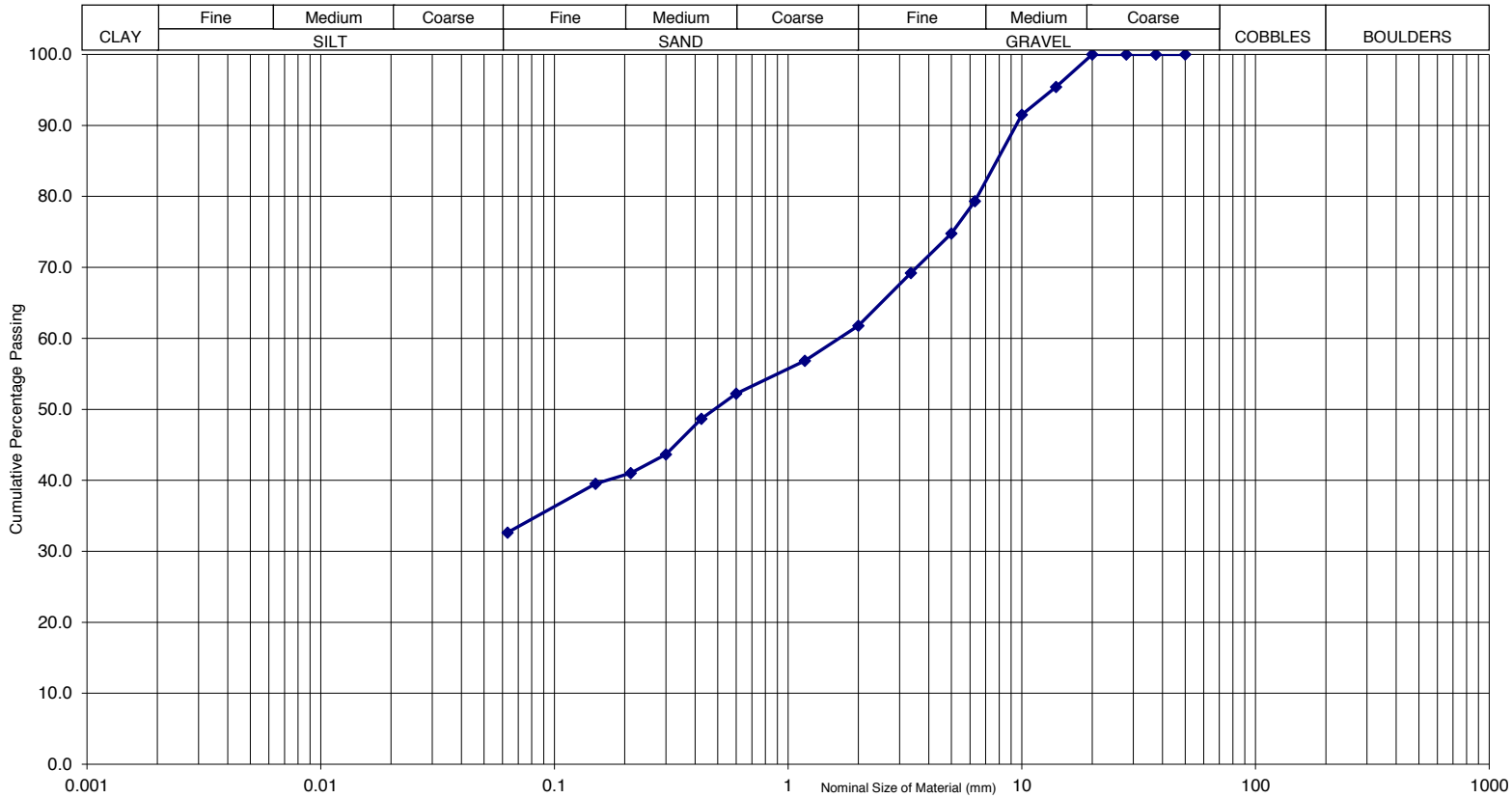
PARTICLE SIZE DISTRIBUTION

BS 1377-2:1990

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL04825	Site Name :	Wolsey Mews, London, NW5 2DX
Sample Number :	TP1	Soil Description :	Mid brown/orange, very clayey, very sandy fine to medium GRAVEL.
Depth (m) :	1.50		
Sample UID :	61904		

Type of Sieving :	Washed
Date :	10-Apr-15
Tested By :	LE
Laboratory :	Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100.0
75.0	100.0
63.0	100.0
50.0	100.0
37.5	100.0
28.0	100.0
20.0	100.0
14.0	95.4
10.0	91.5
6.3	79.3
5.0	74.8
3.35	69.2
2.00	61.8
1.18	56.9
0.600	52.2
0.425	48.7
0.300	43.7
0.212	41.0
0.150	39.5
0.063	32.6

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Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-

Checked By :- MC

Date Checked :- 20-Apr-15

UKAS TESTING
8284

Chelmer Geotechnical Laboratories
'Groundbreaking Services'

This report is personal to the client, confidential and non assignable. It is issued with no admission of liability to any third party.

This report shall not be reproduced, except in full, without the written approval of Chelmer Site Investigations Laboratories Ltd.

Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

Mark Collyer
Chelmer Site Investigation Laboratories Ltd
Unit 15
East Hanningfield Industrial Estate
Old Church Road
East Hanningfield
Essex
CM3 8AB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-29832

Site Reference:	Wolsey Mews, London
Project / Job Ref:	CSI5158 CGL04762
Order No:	PO/4050/5158/MC
Sample Receipt Date:	19/03/2015
Sample Scheduled Date:	19/03/2015
Report Issue Number:	1
Reporting Date:	25/03/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 15-29832	**Date Sampled**	12/03/15	12/03/15				
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied				
Site Reference: Wolsey Mews, London	**TP / BH No**	61345	61347				
Project / Job Ref: CSI5158 CGL04762	**Additional Refs**	BH1	TP1				
Order No: PO/4050/5158/MC	**Depth (m)**	0.50 - 0.70	0.50				
Reporting Date: 25/03/2015	**QTSE Sample No**	141237	141239				

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	MCERTS	8.8	7.5			
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2			
Total Sulphate as SO_4	mg/kg	< 200	NONE	3341	1118			
W/S Sulphate as SO4 (2:1)	g/l	< 0.01	MCERTS	0.14	0.11			
Elemental Sulphur	mg/kg	< 10	NONE	< 10	< 10			
Sulphide	mg/kg	< 5	NONE	< 5	< 5			
Arsenic (As)	mg/kg	< 2	MCERTS	23	10			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1.2	0.5			
Chromium (Cr)	mg/kg	< 2	MCERTS	41	19			
Copper (Cu)	mg/kg	< 4	MCERTS	169	46			
Lead (Pb)	mg/kg	< 3	MCERTS	1310	351			
Mercury (Hg)	mg/kg	< 1	NONE	2.1	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	33	15			
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	1090	162			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 15-29832	**Date Sampled**	12/03/15	12/03/15			
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Wolsey Mews, London	**TP / BH No**	61345	61347			
Project / Job Ref: CSI5158 CGL04762	**Additional Refs**	BH1	TP1			
Order No: PO/4050/5158/MC	**Depth (m)**	0.50 - 0.70	0.50			
Reporting Date: 25/03/2015	**QTSE Sample No**	141237	141239			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	0.14			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	0.86	1.78			
Anthracene	mg/kg	< 0.1	MCERTS	0.15	0.39			
Fluoranthene	mg/kg	< 0.1	MCERTS	2.04	5.39			
Pyrene	mg/kg	< 0.1	MCERTS	1.63	4.36			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.84	2.31			
Chrysene	mg/kg	< 0.1	MCERTS	0.79	2.09			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.96	2.55			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.39	1.01			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.62	1.90			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.48	1.42			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	0.19			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.36	1.03			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	9.1	24.6			

Analytical results are expressed on a dry weight basis where samples are dried at less than $30^{O}C$

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Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 15-29832	Date Sampled	12/03/15	12/03/15				
Chelmer Site Investigation Laboratories Ltd	Time Sampled	None Supplied	None Supplied				
Site Reference: Wolsey Mews, London	TP / BH No	61345	61347				
Project / Job Ref: CSI5158 CGL04762	Additional Refs	BH1	TP1				
Order No: PO/4050/5158/MC	Depth (m)	0.50 - 0.70	0.50				
Reporting Date: 25/03/2015	QTSE Sample No	141237	141239				

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3			
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3			
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	16	< 10			
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	3	9			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	20			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	29			
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C

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Soil Analysis Certificate - BTEX / MTBE							
QTS Environmental Report No: 15-29832	**Date Sampled**	12/03/15	12/03/15			
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Wolsey Mews, London	**TP / BH No**	61345	61347			
Project / Job Ref: CSI5158 CGL04762	**Additional Refs**	BH1	TP1			
Order No: PO/4050/5158/MC	**Depth (m)**	0.50 - 0.70	0.50			
Reporting Date: 25/03/2015	**QTSE Sample No**	141237	141239			

Determinand	**Unit**	**RL**	**Accreditation**					
Benzene	ug/kg	< 2	**MCERTS**	< 2	< 2			
Toluene	ug/kg	< 5	**MCERTS**	< 5	< 5			
Ethylbenzene	ug/kg	< 2	**MCERTS**	< 2	< 2			
p & m-xylene	ug/kg	< 2	**MCERTS**	< 2	< 2			
o-xylene	ug/kg	< 2	**MCERTS**	< 2	< 2			
MTBE	ug/kg	< 5	**MCERTS**	< 5	< 5			

Analytical results are expressed on a dry weight basis where samples are dried at less than 30^{O}C

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 15-29832		**Date Sampled**	12/03/15				**Landfill Waste Acceptance Criteria Limits**		
Chelmer Site Investigation Laboratories Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Wolsey Mews, London		**TP / BH No**	61346						
Project / Job Ref: CSI5158 CGL04762		**Additional Refs**	BH1						
Order No: PO/4050/5158/MC		**Depth (m)**	0.70 - 1.00						
Reporting Date: 25/03/2015		**QTSE Sample No**	141238						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	1.8				3%	5%	6%
Loss on Ignition	%	< 0.01	5.70				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.7	< 0.7				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	< 1.7				100	--	--
pH[MU]	pH Units	N/a	7.7				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	< 1				--	To be evaluated	To be evaluated
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**		**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium[U]			0.06	0.05		0.5	20	100	300
Cadmium[U]			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium[U]			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper[U]			< 0.01	< 0.01		< 0.5	2	50	100
Mercury[U]			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum[U]			0.030	0.011		0.1	0.5	10	30
Nickel[U]			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead[U]			< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony[U]			0.063	0.031		0.33	**0.06**	0.7	5
Selenium[U]			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc[U]			0.011	0.008		< 0.2	4	50	200
Chloride[U]			2	1		15	800	15000	25000
Fluoride[U]			0.7	0.5		5.2	10	150	500
Sulphate[U]			26	4		60	1000	20000	50000
TDS			131	74		790	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			22.9	8.3		95.9	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.21						
Dry Matter (%)			84.4						
Moisture (%)			18.6						
Stage 1									
Volume Eluate L2 (litres)			0.32						
Filtered Eluate VE1 (litres)			0.15						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 15-29832	
Chelmer Site Investigation Laboratories Ltd	
Site Reference: Wolsey Mews, London	
Project / Job Ref: CSI5158 CGL04762	
Order No: PO/4050/5158/MC	
Reporting Date: 25/03/2015	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
141237	61345	BH1	0.50 - 0.70	16.8	Black clay with rubble
141238	61346	BH1	0.70 - 1.00	15.6	Black clay with rubble
141239	61347	TP1	0.50	14.4	Black loamy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 15-29832
Chelmer Site Investigation Laboratories Ltd
Site Reference: Wolsey Mews, London
Project / Job Ref: CSI5158 CGL04762
Order No: PO/4050/5158/MC
Reporting Date: 25/03/2015

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Chelmer
Site Investigations
'Groundbreaking Services'

REPORT NOTES

Equipment Used

Hand tools, Mechanical Concrete Breaker and Spade, Hand Augers, 100mm/150mm diameter Mechanical Flight Auger Rig, GEO205 Flight Auger Rig, Window Sampling Rig, and Large or Limited Access Shell & Auger Rig upon request and/or access permitting.

On Site Tests

By Pilcon Shear-Vane Tester (Kn/m^2) in clay soils, and/or Mackintosh Probe in granular soils or made ground and/or upon request Continuous Dynamic Probe Testing and Standard Penetration Testing.

Note:

Details reported in trial-pits and boreholes relate to positions investigated only as instructed by the client or engineer on the date shown.

We are therefore unable to accept any responsibility for changes in soil conditions not investigated i.e. variations due to climate, season, vegetation and varying ground water levels.

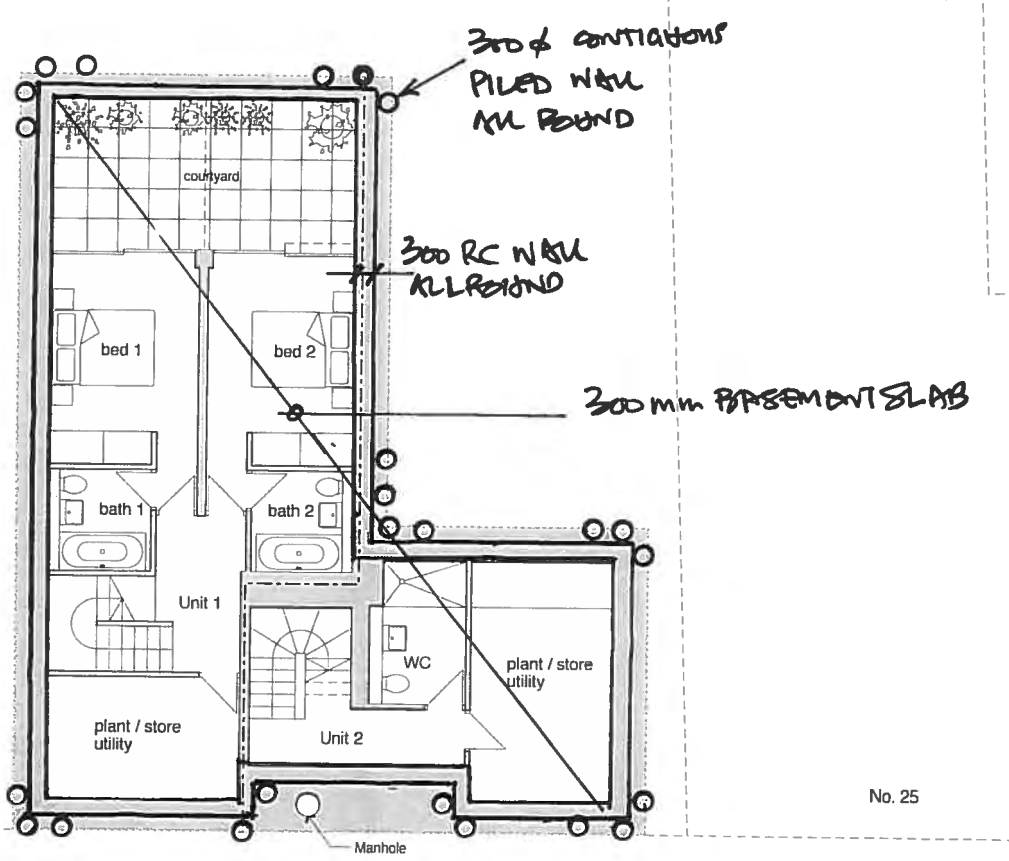
Full terms and conditions are available upon request.

APPENDIX 2

STRUCTURAL SCHEME DRAWINGS

BY

ELLIS AND MOORE CONSULTING ENGINEERS LTD.



No.s 3-7 Islip Street

No. 25

WOLSEY MEWS

Revision	Date	By	Checked
B Stair & bin store amended	19.05.15	CB	BH
A Internal layout amended		CB	BH

Preliminary

Proposed Basement Plan

Wolsey Mews Garages
London NW5 2DX

1590_P01B

Scale: 1:100 at A3
Date: 24/03/15
Drawn: BH

MARKED UP TO INDICATE THE EXCAVATION PROPOSALS JUNE 2015

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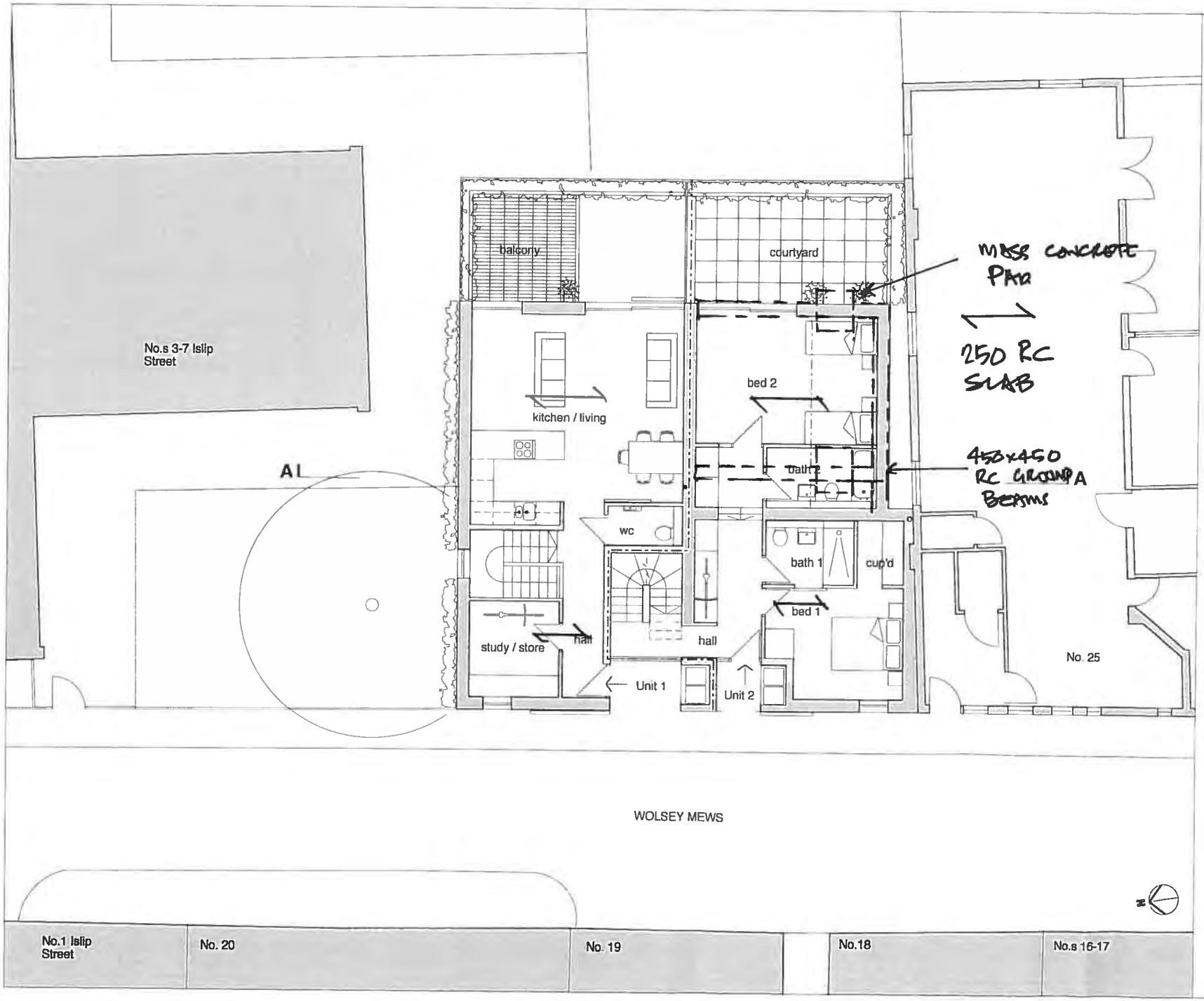

Revision	Date	By	Checked
B Stair & bin store amended	19 05 15	CB	BH
A Internal layout amended		CB	BH

Preliminary

Proposed Ground Floor Plan

Wolsey Mews Garages
London NW5 2DX

1590_P02B

Scale. 1.100 at A3
Date: 24/03/15
Drawn: BH

MARKED UP TO INDICATE THE STRUCTURAL PROPOSALS
JUNE 2015

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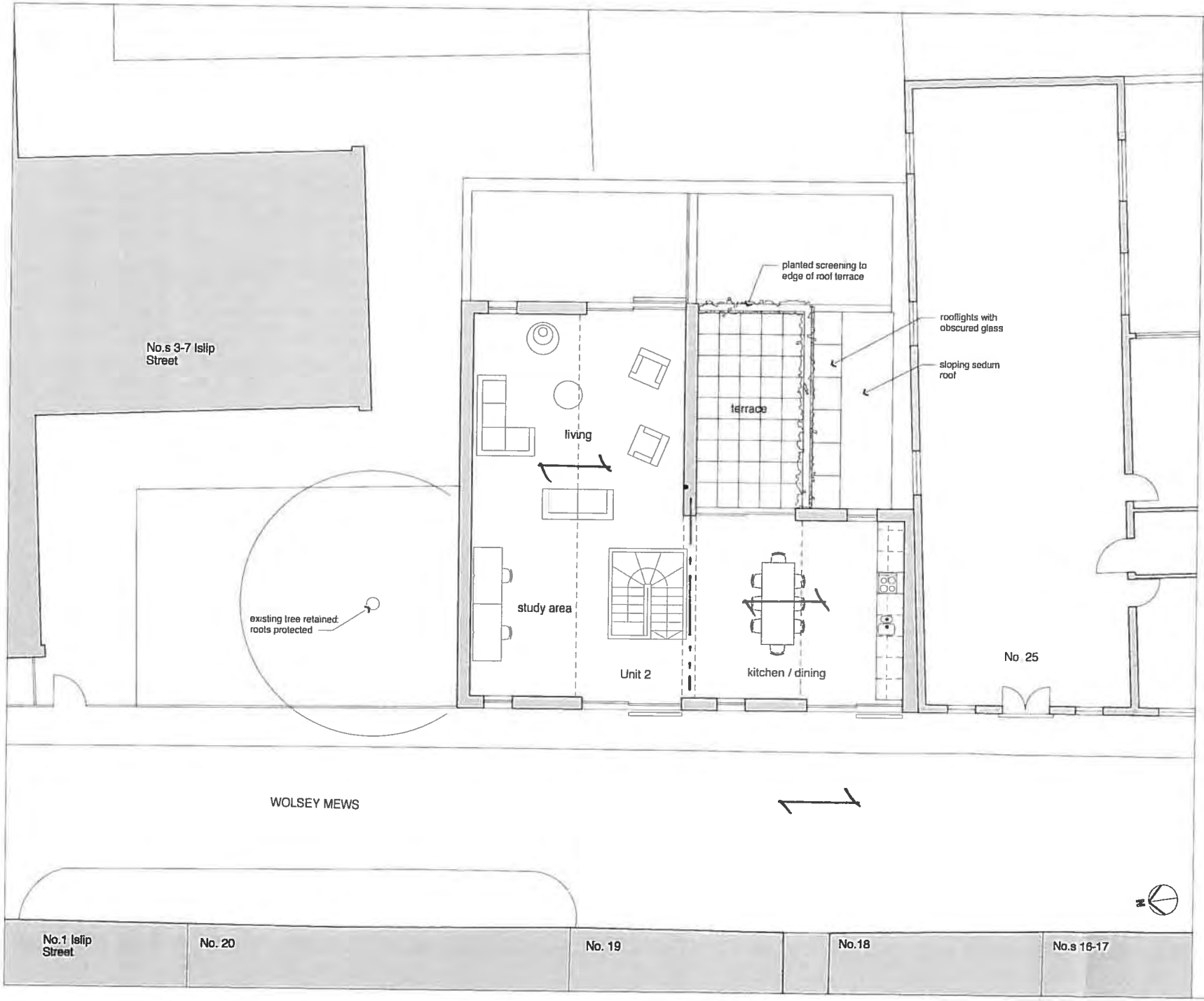

Revision	Date	By	Checked
B	19 05 15	CB	BH
Stair & bin store mended			
A		CB	BH
Internal layout amended			

Preliminary

Proposed First Floor Plan

Wolsey Mews Garages
London NW5 2DX

1590_P03B

Scale: 1:100 at A3
Date: 24/03/15
Drawn: BH

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JUNE 2015

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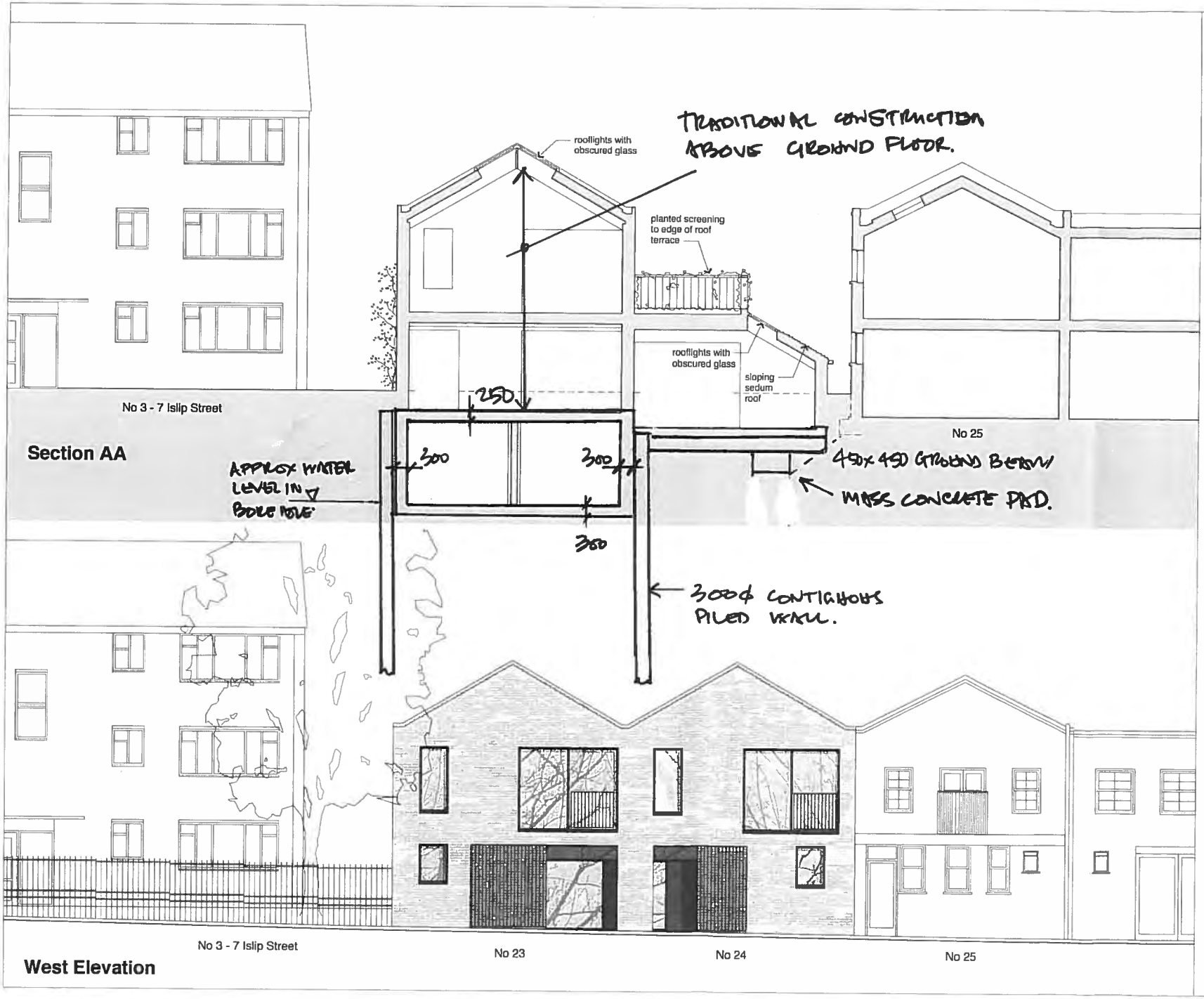

Section AA

West Elevation

Revision	Date	By	Checked
A Elevations revised	19.05.15	CB	BH

Preliminary

Proposed Section AA & West Elevation

Wolsey Mews

1590_P04A

Scale: 1:100 at A3
Date: 24/03/15
Drawn: BH

MARKED UP TO INDICATE THE STRUCTURAL PROPOSALS JUNE 2015

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15363 wol-c150622 mi-001

22 June 2015

CONSTRUCTION METHOD STATEMENT FOR WOLSEY MEWS
LONDON NW5 2DX
JUNE 2015

1. Demolish the existing lock up garages and remove the foundations.
2. Provide a piling mat if necessary if the existing hard standing is not satisfactory
3. Install the contiguous bored pile wall to form the perimeter of the basement commencing at the rear of the site.
4. Excavate the basement using the contiguous piled wall as temporary support.
5. Allow for pumping of the potential perched water table
6. Excavate down to underside of the basement slab and install the underground drainage
7. Cast the basement slab followed by the lining walls.
8. Construct the load bearing partitions at basement level.
9. Cast the ground floor slab on shuttering.
10. Excavate the pad foundations for the section of the building which is outside the basement
11. Cast the ground beams to the single storey section and the ground floor slab
12. Install the underground drainage to connect in with the mains.
13. Continue with the superstructure above ground floor level in traditional construction

APPENDIX 3

THAMES WATER SEWER RECORDS

Asset Location Search Sewer Map - ALS/ALS Standard/2015_2959406

The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529053,185004

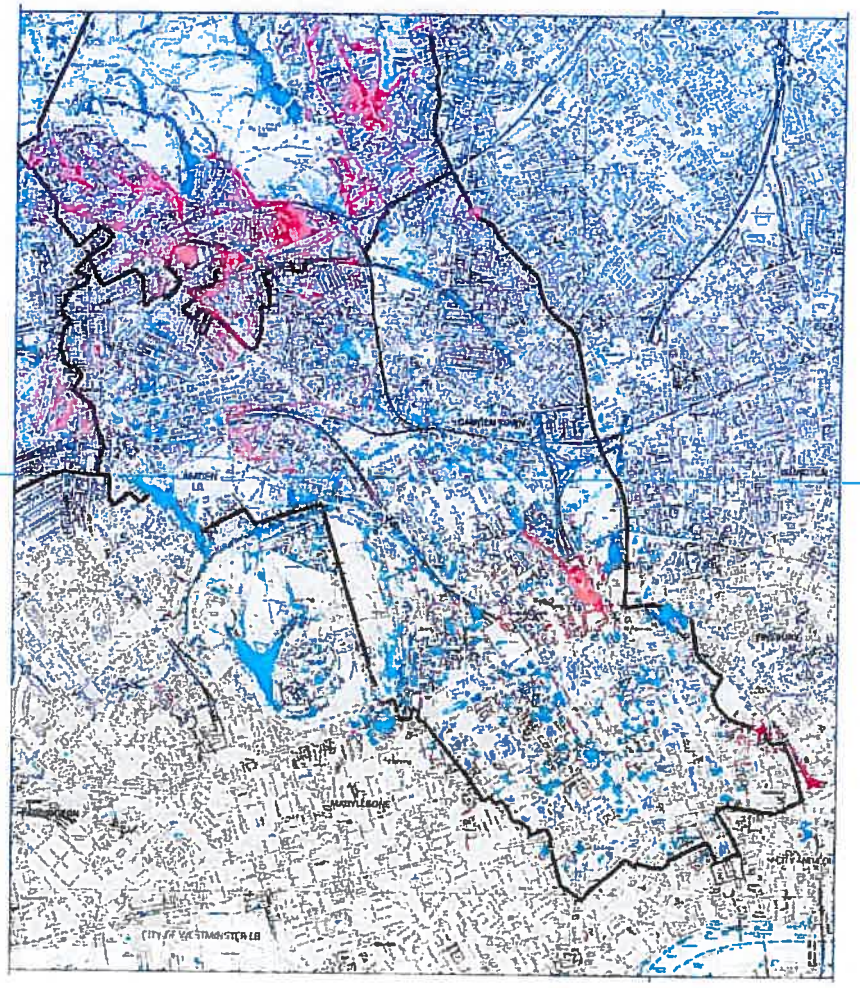
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

APPENDIX 4

CAMDEN GEOLOGICAL,

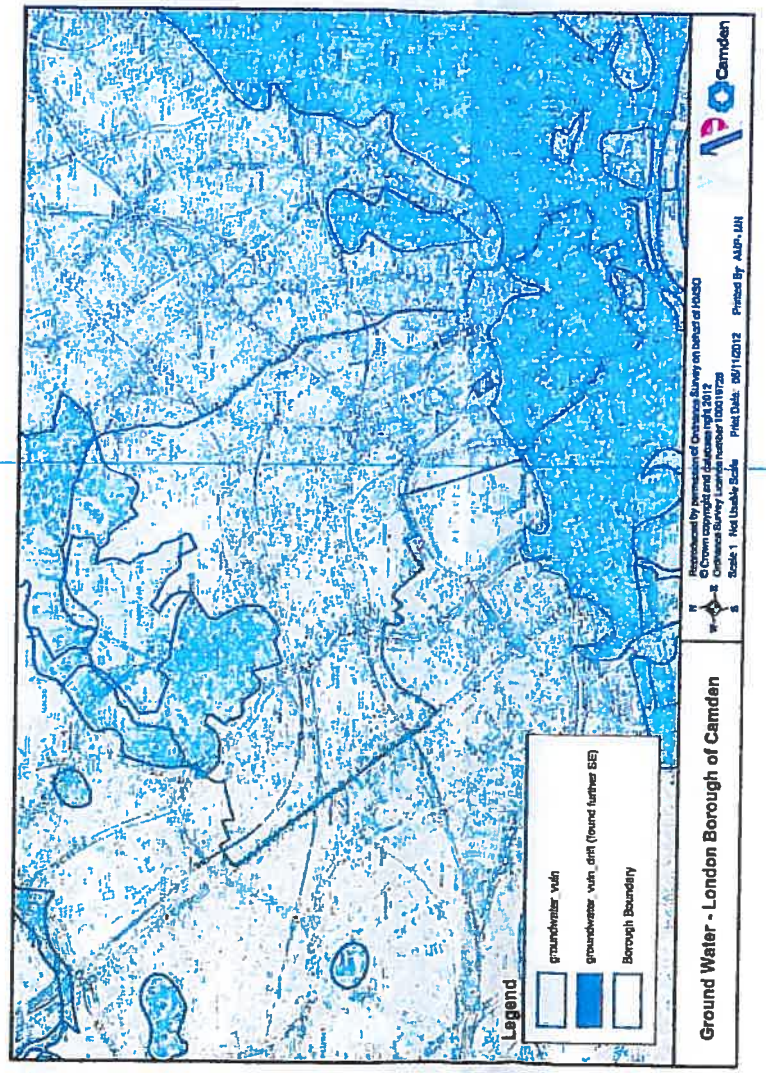
HYDROGEOLOGICAL AND HYDROLOGICAL MAPS

Map of surface water runoff in Camden South

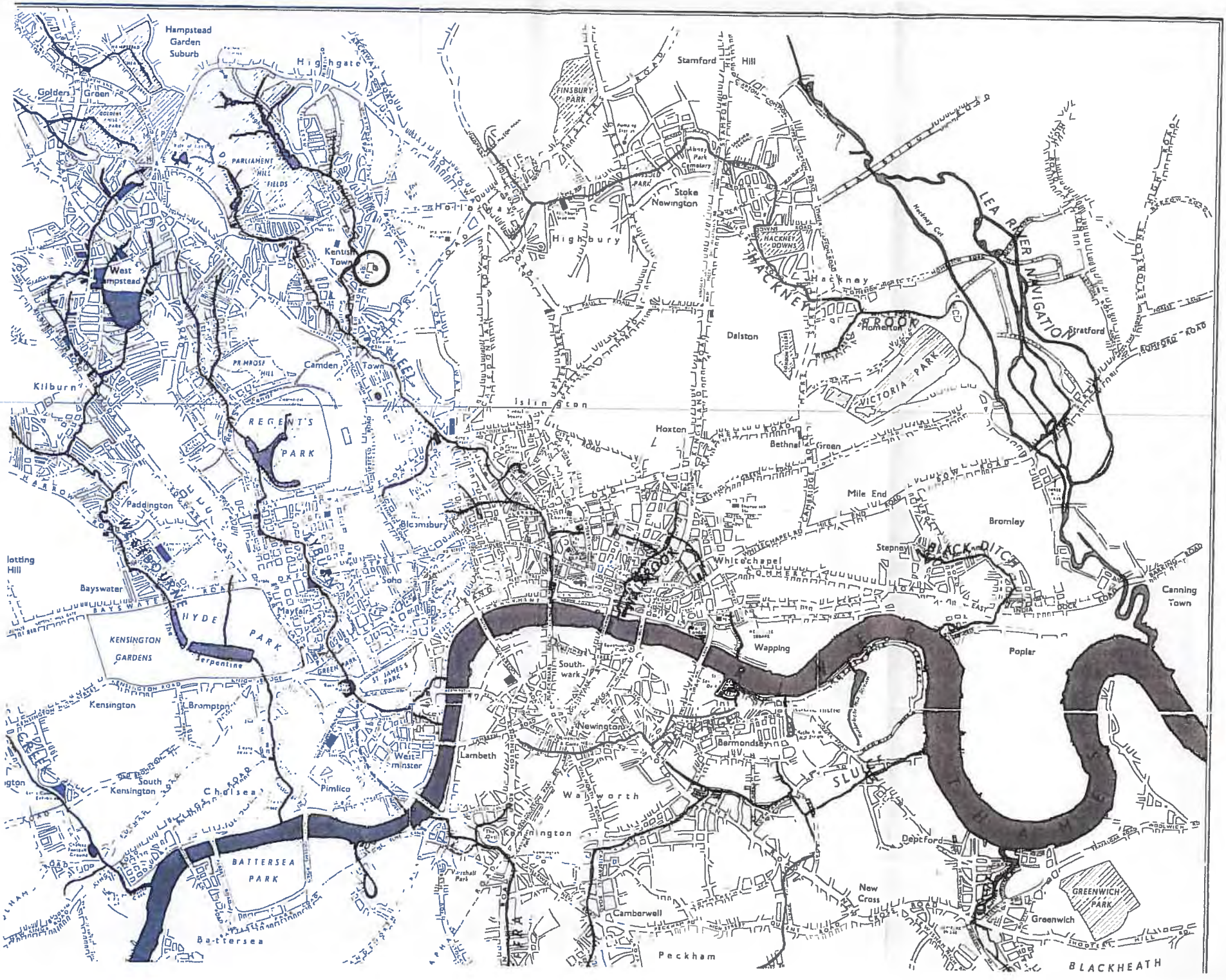


These are initial maps showing potential flows and areas of ponding for a flood event with a 1.33% chance of occurring in any one year (a 1 in 75 year return period). It is an indicative map and may be superseded by more area specific maps. It is not accurate to property level and is considered inaccurate for the King's Cross area.

4. Map of groundwater flood risk

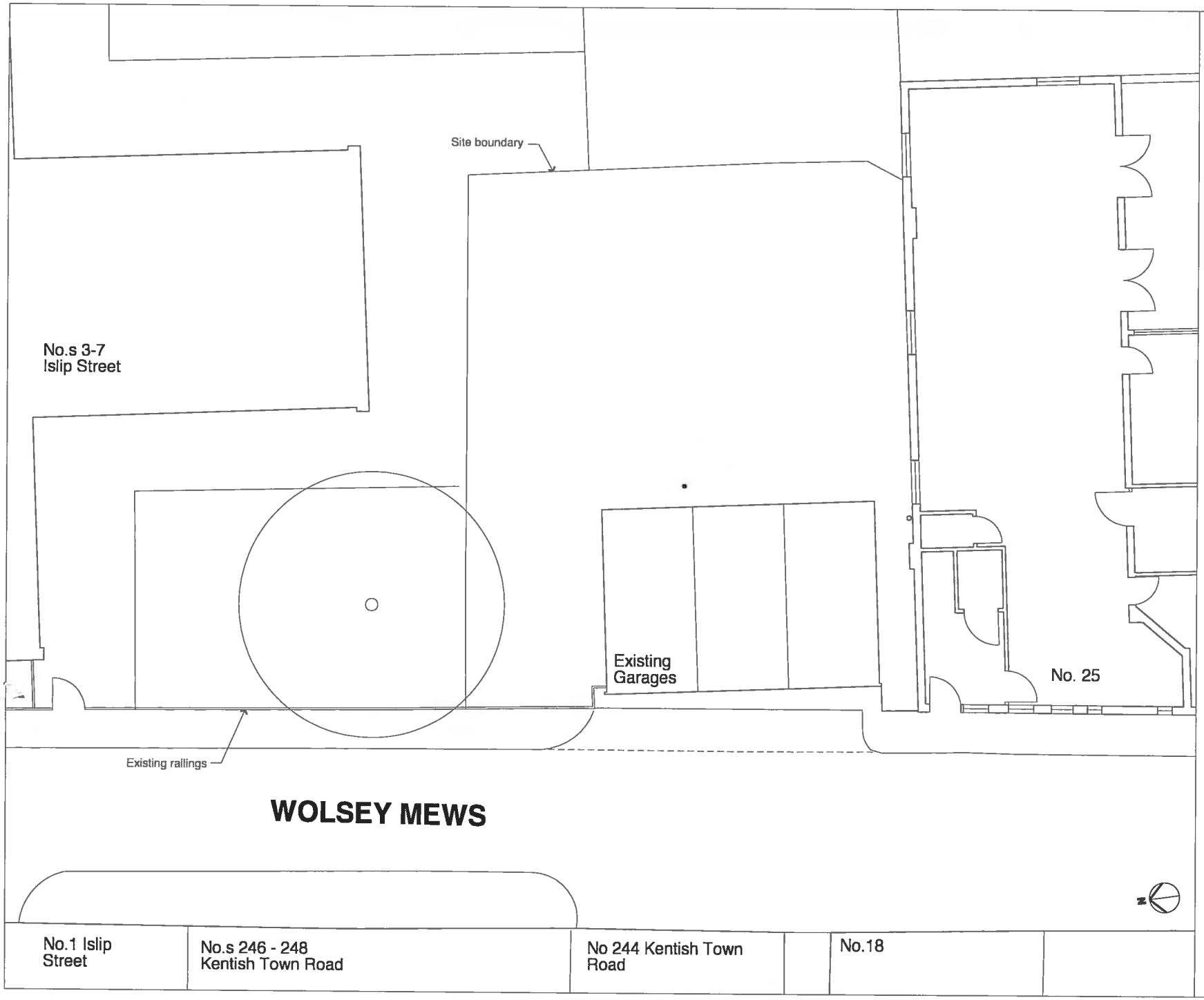


This is an Environment Agency map showing areas believed to be especially vulnerable to groundwater flooding. Records show that groundwater is not exclusive to these areas and surveys are recommended for anyone wishing to better understand the groundwater risk in their areas.


Hampstead Garden Suburb
Golders Green
Highgate
Stamford Hill
FINSBURY PARK
PARLIAMENT HILL FIELDS
Stoke Newington
Hackney
HACKNEY BROOK
LEA RIVER NAVIGATION
Stratford
West Hampstead
Kentish Town
Camden Town
Dalston
Homerton
VICTORIA PARK
Kilburn
Islington
REGENT'S PARK
Hoxton
Bethnal Green
Mile End
Paddington
Bloomsbury
Bromley
Stepney
BLACK DITCH
Whitechapel
Bayswater
Soho
Canning Town
HYDE PARK
KENSINGTON GARDENS
Mayfair
Wapping
Poplar
Kensington
Brompton
Southwark
Newington
Bermondsey
Lambeth
Westminster
Pimlico
Chelsea
South Kensington
Walworth
SLUICE
Deptford
BATTERSEA PARK
Vauxhall
Kennington
New Cross
GREENWICH PARK
Greenwich
Battersea
Camberwell
Peckham
BLACKHEATH

APPENDIX 5

SITE LOCATION PLAN



Revision Date By Checked

Preliminary

Existing Site Plan

Wolsey Mews

1590_E01

Scale: 1:100 at A3
Date: 24/03/15
Drawn: AM

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