Basement Impact Assessment (BIA) – Addendum

Project: Gloucester Lodge

Job No: 15060

Date: 21.09.2016

Introduction

This is a complementary design note to the BIA stages 1 and 2 report produced by Techniker titled Basement Impact Assessment (BIA) Screening and Scoping' reference: 15060/01/04, dated 12 august 2016. In particular, this report addressed stages 3 and 4 of the BIA, namely Site investigations and Impact assessment.

Some of the items originally identified as requiring additional investigation have now been clarified in light of the recent site investigations, the results of which are appended to this note.

Site investigations

As described in the documents submitted to LBC, a site investigation was carried out to determine ground conditions, groundwater levels and potential environmental hazards on site.

This work was undertaken by GRM on 18-19 August 2016 and the results were supplied to Techniker in a report which is appended to this note.

The investigatory works and their results can be summarised as follows:

- 6no. hand-dug trial holes were excavated inside the property as well as externally in the courtyard.
- A single percussive borehole was formed in the forecourt.
- Ground conditions are shown to be a shallow layer of made ground over London Clay which becomes stiffer with an increase in depth.
- No groundwater was encountered during the works.
- Monitoring suggests pore water at 1m above the bottom of the well.
- Minimum allowable bearing pressure of 110kN/m^2 at 2.5m below ground level can be assumed in the design of the foundations.
- Spread foundations are considered suitable for the ground conditions.
- The ground has high volume change potential.

The investigations have clarified a number of items which had been nominated in the scoping section of the BIA report referenced above. In particular:

- Question 1b under Subterranean flow;

  Will the proposed basement extend beneath the water table surface?

  No. No groundwater was encountered during the investigative works. Groundwater monitoring regime indicates pore water at a metre head from the bottom of the well, which is far below the proposed basement formation level.

- Question 5 under Slope stability;

  Is the London Clay the shallowest strata at the site?

  No. London Clay is overlain by a relatively shallow layer (circa 1m thick) Made ground.

Impact assessment

The effects of the proposed basement construction are outlined in this section. The following paragraphs specifically address the construction impact on the following:

- Subterranean flow
- Stability
- Surface flow and flooding

Subterranean flow

The basement construction is to extend circa 4m below ground level measured from the courtyard or the Gloucester Gate Mews level.

The site investigation has revealed the founding strata as London Clay with no groundwater present (refer to Appendix 1). The formation level would fall within the London Clay layer which is overlain by a shallow (circa1m thick) layer of Made Ground. The London Clay stratum has been verified to be at least 11.5m deep.

The proposed basement will be waterproofed to Grade 3 standard in accordance with BS 8102:2009.

As such, the works are not expected to adversely affect groundwater flow and the water environment in general.

Stability

The soil is understood to be highly shrinkable (volume change potential) and the proposed basement construction works are expected to be affected by this. In particular, the excavation is expected to result in ground heave.

The works would be designed to minimise ground movement during and after construction. The outline construction methodology is appended to this report (Appendix 2).

The excavation and the construction of the basement walls will be carried out in a 'hit and miss' sequence with all faces of the excavation fully propped during the works and until the permanent structure has been installed and cured.

The site investigation report recommends that spread foundations be adopted for the proposed scheme. As such, a reinforced concrete raft, cast monolithically with the basement walls, is proposed. The raft will be designed to sustain ground heave resulting from the excavation.

By employing such construction methods and minimising ground movement, the potential risk of damaging the adjacent structures can be minimised and as shown in the Ground Movement Assessment (GMA) appended to the BIA report dated 12 August 2016, such damage is expected to be within the Category 1 damage on the Burland scale.

The site investigation report (Appendix 1) recommends a minimum allowable bearing pressure at 2.5m below ground level at 110kN/m^2. This is in line with the assumption made in the GMA for the safe bearing pressure of 150kN/m^2 at the depth of 4m below ground level. Furthermore, the groundwater had been conservatively assumed at the depth of 1m below ground. It was confirmed during the site investigations that no groundwater was present. The preliminary design calculations supplied in the GMA supplementary document predict the maximum anticipated lateral ground movement to be in the order of 5mm.

A movement monitoring regime would be adhered to during and after construction. The strategy is outlined in Appendix 3.

On the basis of the above, the works are not expected to adversely affect the stability of the ground or the adjacent structures and their foundations.

Surface flow and flooding

The proposal involves forming an undercroft to the courtyard between the main residence and the mews buildings. In addition to this, a glass extension to the main residence is proposed in the courtyard to replace the structure which had previously been there.

The remodelling of the mews buildings would involve extending the roof and incorporating a single-storey basement under the development, while retaining the façade.

The existing courtyard is paved, with two strips of planting to the north and the south adjacent to the garden walls on each side.

The proposed scheme does not materially increase the area of hardstanding and as such is not expected to increase the surface water runoff. The new arrangement in the courtyard would also incorporate soft landscaping over the courtyard slab.

A dedicated foul and surface water drainage system would be incorporated in the proposed scheme which would connect to the existing network.

Furthermore, the proposed basement will be waterproofed to Grade 3 standard in accordance with BS 8102:2009. The waterproofing strategy - which would be designed and detailed by a specialist- is likely to incorporated a drained cavity system as well as another form of tanking by either using waterproof concrete or employing an internal / external waterproof membrane.

It is, therefore, believed that the proposed works would not pose any risk of flooding to the development or its surroundings.

Signatures

This report is produced by the following qualified signatories, in line with the requirements set out in the LBC documents CGHSS and DP27.

Names: Fardad Ghaffari

Role: Associate

Company: Techniker

Qualifications: MSc CEng MIStructE

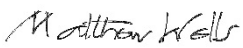
Signature: 

Name: Matthew Wells

Role: Director

Company: Techniker

Qualifications: RIBA CEng FICE FIStructE

Signature: 

Name: Christopher Jerram

Role: Director

Company: GRM Development Solutions Ltd

Qualifications: FGS CGeol

Signature: 

Appendices

Appendix 1 – Site investigation report (GRM)

Appendix 2 – Outline construction methodology

Appendix 3 – Movement monitoring strategy

Appendix 1 – Site Investigation Report

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Our Ref: P7589/LR/001
Date: 13th September 2016

Mr Matthew Wells
Techniker Consulting Structural Engineers
13-19
Vine Hill
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EC1R 5DW

Dear Matthew,

Re: 12 Gloucester Gate, Foundation Inspection

Scope of Works

Further to your instruction, GRM have attended the above site to conduct a number of foundation inspection pits in order to determine the thickness of the existing foundations and to determine the nature of the bearing stratum.

GRM are given to understand that development proposals include the excavation of a substantial basement beneath the existing house, court yard and extending beneath the garages located in the north of the site.

A meeting was held between the Client, the Property Owner and one of GRMs Senior Engineers on the 17th August 2016 and the site works were undertaken between the 18th and 19th August 2016.

The works comprised six trial holes excavated internal to the existing site structures and a single cable percussive borehole external to the structures situated within the centre of the driveway.

Site Description

The site is located within Central London, to the east of Regents Park, located off the Outer Circle Road, near Camden Town. The approximate centre of the site can be centred on National Grid Reference (NGR) TQ 285 834. The site is approximately 570m^2.

The site comprises of a mature front garden situated at the western end of the site, a large multi-storey residential dwelling, with a central courtyard covered with block paving and a garage located off Gloucester Gate Mews at the eastern portion of the site. In addition, the presence of mature trees and hedges was noted.

A Site Location and Boundary Plan is appended to this Letter Report.

Trial Pits

A total of six manually excavated trial holes were excavated as part of the investigation. Two of the pits (HD1 & HD2) were situated within the existing court yard and adjacent to the southern and northern walls respectively, HD3 and HD5 were located within a building to the east of the court yard and adjacent to the northern wall, HD4 was situated within the double garage and adjacent to the southern wall and HD6 was excavated within a storeroom and adjacent to the southern wall.

On completion of each excavation an inspection was undertaken by the Client and subsequent reinstatement was undertaken to the satisfaction of the owner.

The Exploratory Hole Location Plan together with the associated trial hole logs and photographs are appended to this Letter Report.

A summary of the findings is presented below:

Hand Excavated Pit 1 (HD1)
Encountered 1030mm of topsoil overlying a sandstone footing, the sandstone footing had a maximum thickness of 150mm. London Clay was encountered at 1.03m begl.

Hand Excavated Pit 2 (HD2)
Encountered 620mm of topsoil over London Clay overlying a sandstone footing, the sandstone footing recorded a maximum thickness of 400mm. London Clay was encountered at 0.62m begl.

Hand Excavated Pit 3 (HD3)
The footing for the wall at the above location was bearing on to 250mm of concrete with two courses of bricks stepping out at the base of the wall. London Clay was encountered at 0.30m begl.

Hand Excavated Pit 4 (HD4)
Encountered 150mm thick unreinforced concrete floor slab comprising, 30mm of screed, over 70mm of concrete with 50mm of sub base. The floor slab was underlain by 470mm of London Clay sitting on a sandstone pad with a maximum thickness of 110mm.

Hand Excavated Pit 5 (HD5)
Not fully excavated due to a drain obstructing progression.

Hand Excavated Pit 6 (HD6)
Encountered a 50mm thick concrete slab sitting on a 50-60mm wide brick footing this was underlain by 630mm of London Clay

Cable Percussive Borehole

The single cable percussive borehole (BH1) was drilled to a depth of 15m begl for the purposes of establishing the depth of the groundwater and acquiring samples for geotechnical testing.

An initial 0.1m thick horizon of tarmacadam was observed to overlie a clayey gravel sub-base to a depth of 0.25m begl. This was underlain by Made Ground recorded to be firm to stiff (medium to high strength), gravelly, slightly sandy clay containing brick fragments to a depth of 1m begl.

The Made Ground was underlain by London Clay comprising firm to stiff (medium to high strength), light brown, laminated clay containing occasional sand pockets grading into weathered mudstone to a depth of 11.5m begl.

Standard Penetration Test (SPT) N values showed a general increase with depth and ranged from 8 to 25 (firm to very stiff); however, the N value of 25 at 8m begl is considered likely to be due to the presence of a sandstone boulder recorded during the drilling. In general, the SPTs suggest stiff (high strength) strata, or better, below 4m.

Groundwater Conditions

Groundwater was not encountered during the drilling works. Subsequent monitoring by the data logger, installed within the CP borehole, records that groundwater, assumed to be pore water has filled the base of the well to an approximate head of 1m. Accordingly, groundwater is not considered to pose a risk to the proposed basement development and allowances for dewatering are unlikely to be required.

Geotechnical Testing

Geotechnical soils testing has been undertaken as part of the ground investigation comprising the following:

- Two samples of the London Clay underwent Atterberg Limits (PI) classification.
- Two samples of the London Clay underwent pH and water soluble sulphate testing.

Geotechnical tests were selected to provide the parameters necessary for the budgetary design of the development including foundations and infrastructure. The geotechnical test results are appended to this Letter Report.

Geotechnical Results

Two samples of the London Clay were sampled and tested for their volume change potential (VCP). The results indicate a high volume change potential. Therefore, a high VCP should be adopted for foundation design. Accordingly, a minimum construction depth of 1m begl should be adopted for foundations within cohesive strata.

It should be noted that the effect of potentially locally desiccated clay (within the court yard – due to the influence of trees) has not been assessed during this investigation and it is assumed that the designer will take this in to account during the design process and make appropriate allowances.

Buried Concrete

Two samples of the London Clay were tested for water soluble sulphate and pH.

Based on the recorded water soluble sulphate and pH levels in the soils below the site and assuming mobile groundwater conditions, in accordance with requirements of BRE Special Digest 1 (2005), ‘Concrete in Aggressive Ground’, the Design Sulphate Class for buried concrete at the site should be assumed as DS-4 and the ACEC Class as AC-3s.

The results of the water soluble sulphate and pH testing are appended to this report.

Foundations

Foundations must not be founded in Made Ground, buried topsoil or soft natural strata, all of which should be fully penetrated by all new foundations.

The shallow natural cohesive strata noted during the investigation are considered suitable in their current condition for the proposed structure to found on.

It is anticipated that the depth of excavation to accommodate the basement will be approximately 2.5m begl placing it within the firm (medium strength) London Clay.

Construction of the basement is considered likely to require excavation of the natural cohesive soils to circa 2.5m begl. The natural cohesive soils noted during the investigation at this depth are considered suitable in their current condition for the proposed structures to found on.

The cohesive soils encountered, at anticipated foundation depths, were generally at least firm. It is anticipated that a nett allowable bearing pressure of at least 110kN/m^2 should be available for conventional strip / trench fill or reinforced raft footings.

Once the development plan and levels have been finalised, consideration should be given to the most appropriate foundation solution, taking into account removal of existing structures, stability of the strata and proximity to boundaries/services/roads/existing structures

Trees and hedges were observed within influencing distance to the proposed building, therefore deepening of foundations in accordance with a recognised standard, such as NHBC Chapter 4.2, are considered to be required as foundations are likely to bear onto, or cut into, the observed cohesive strata. Accordingly, an arboricultural survey is recommended to better determine the depth of influence of the trees.

Floor Slabs

The basement will have a ground bearing floor slab.

Shallow strata are likely to become heavily disturbed by construction activities (especially during inclement weather) and care must be taken not to make them unsuitable as a bearing stratum as this could result in an increased requirement for a suspended slab

The basement will need to be fully-tanked and waterproofed to BS8102:2009 Grade 2 specification (the use of a geosynthetic clay liner is not permitted); such a construction method will be sufficient to mitigate against any potential gas risk. The basement walls will need to act as retaining walls.

Summary

It is considered that the site is suitable for the proposed development, assuming compliance with all the recommendations contained within this letter report.

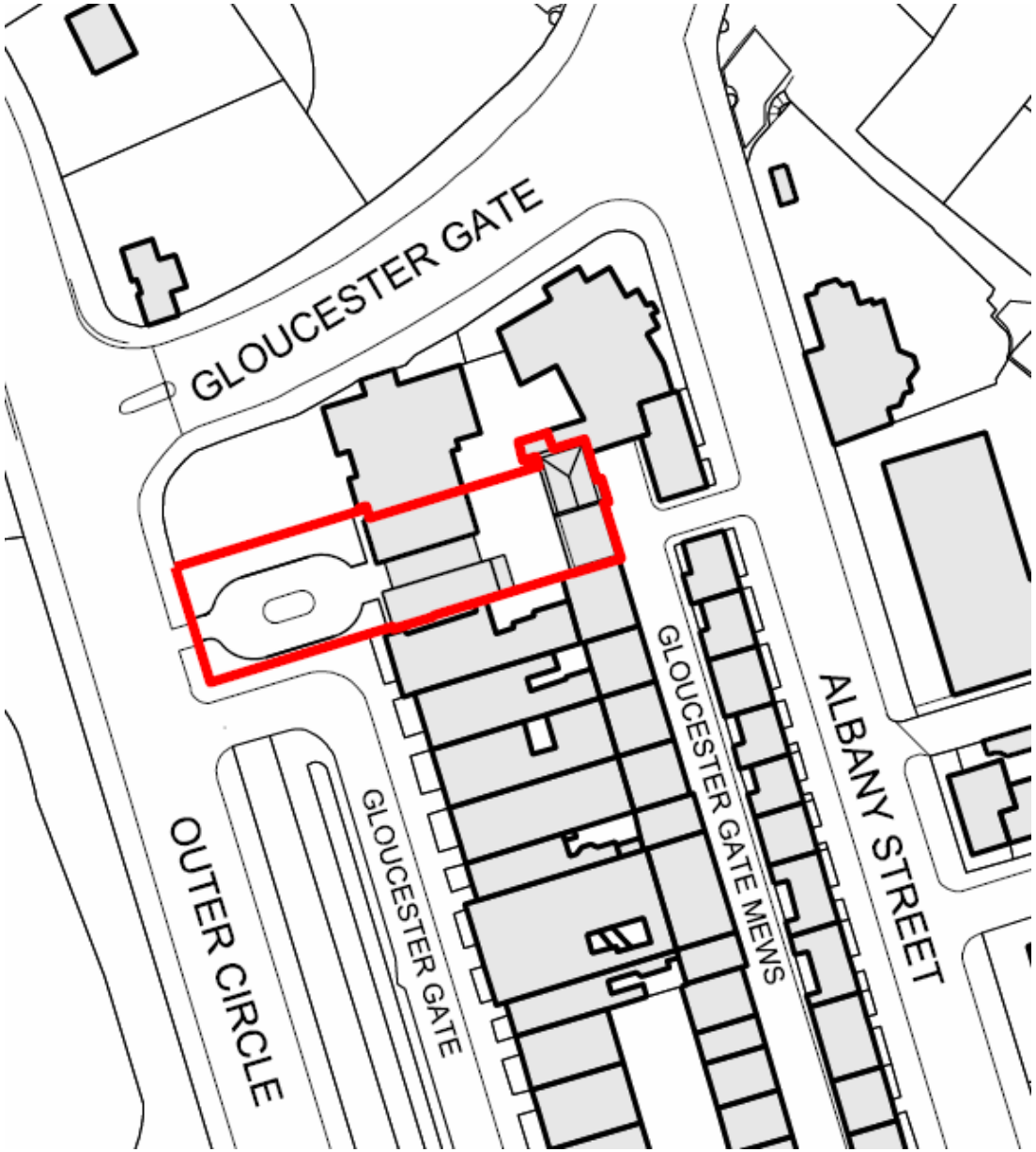
We trust that the above is sufficient for your current purposes, however if you have any queries please do not hesitate to contact us.

Yours Sincerely,

Keith Mottram
Senior Geotechnical Engineer

Enc:

- Site Location and Boundary Plan
- Exploratory Hole Location Plan
- Trial Pit Logs and Associated Photographs
- Geotechnical Results



DO NOT SCALE

NOTES:

Approximate Site Boundary

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Techniker Consulting

PROJECT:
12 Gloucester Lodge, London

TITLE:
Site Boundary Plan

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AW	August 2016
PROJECT No:	DRAWING No:
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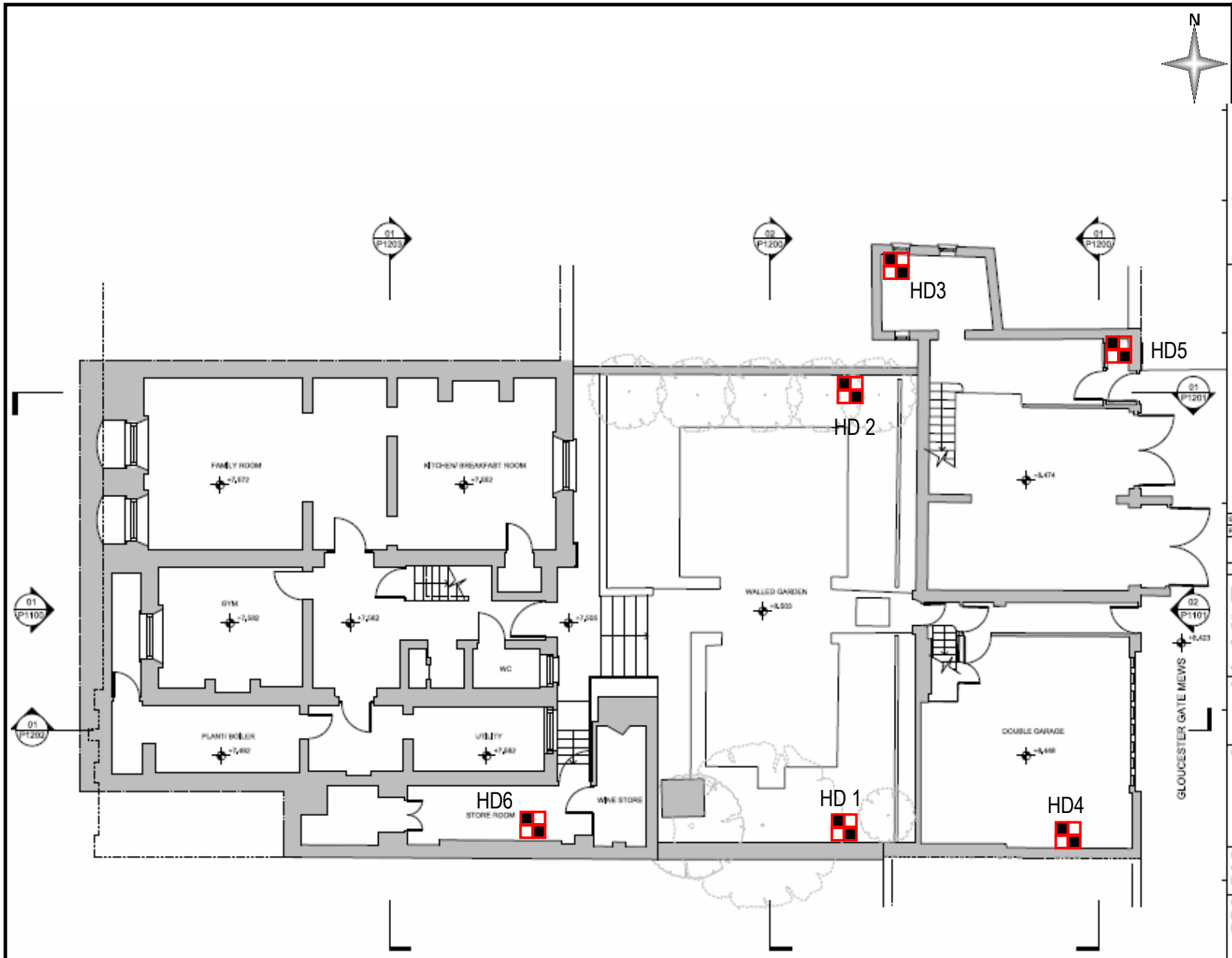

01 Existing lower ground floor plan

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NOTES:

HD1 Hand Dug Pit

N.B. All positions approximate only

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TITLE:
Exploratory Hole Location Plan

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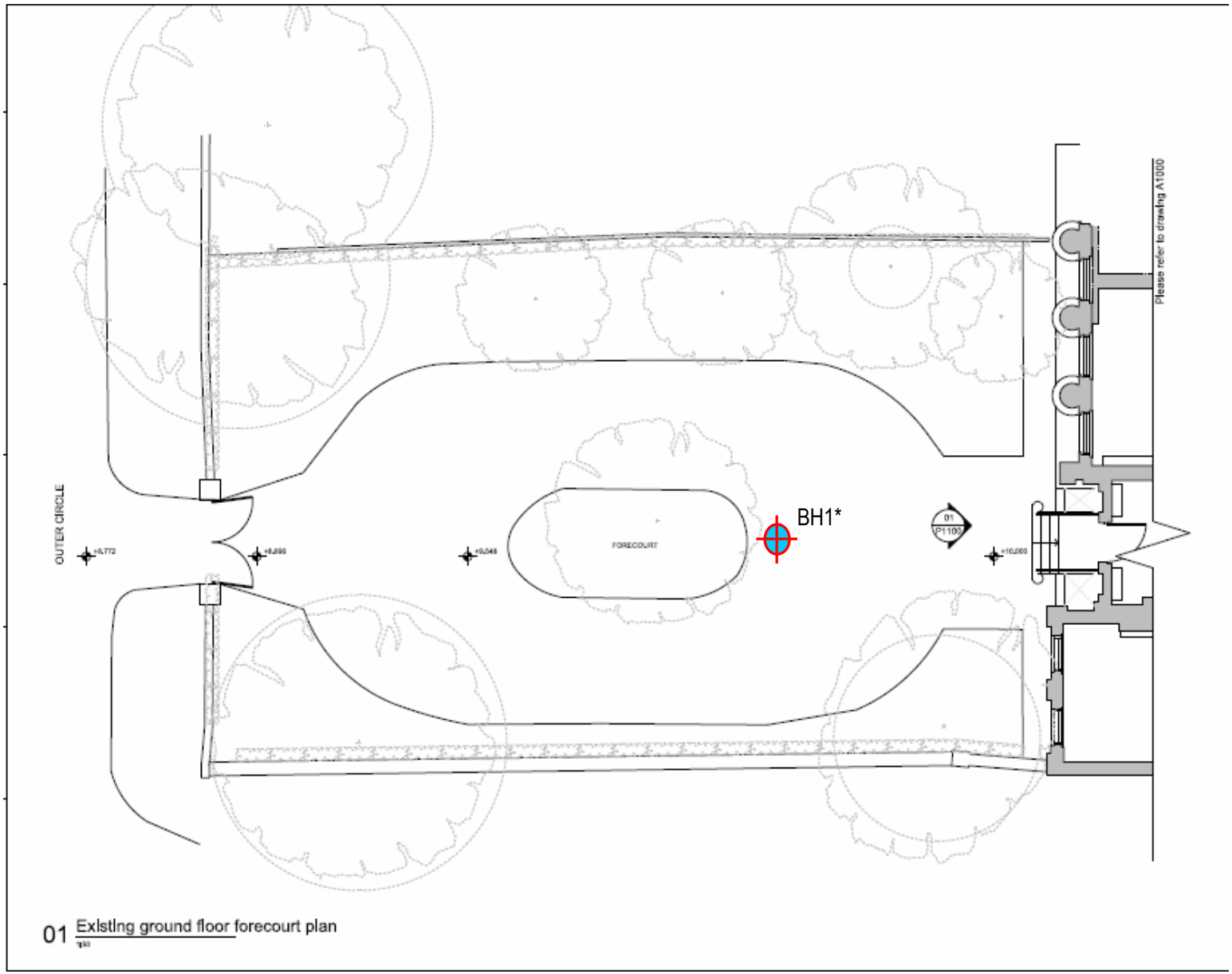

01 Exlstlng ground floor forecourt plan

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NOTES:

BH1* CP Borehole (with gas and water monitoring standpipe)

N.B. All positions approximate only

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TITLE:
Exploratory Hole Location Plan

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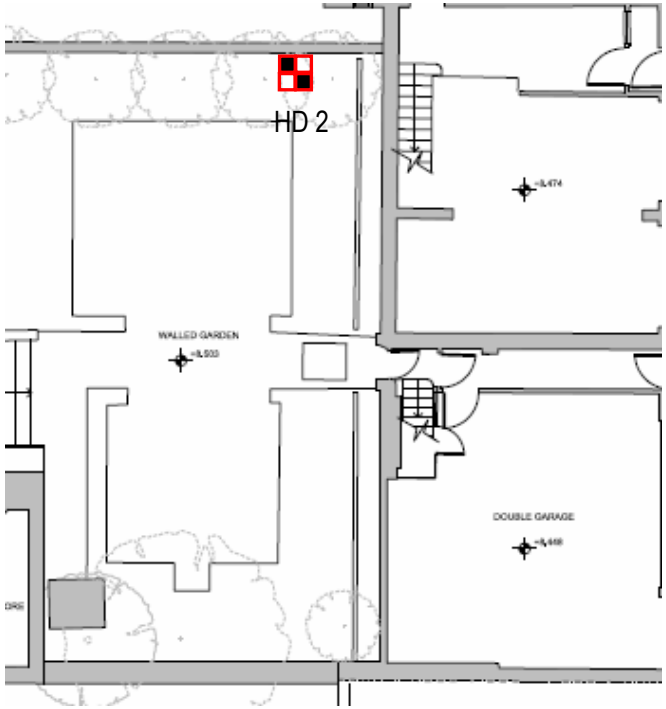

Hole Location Plan

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NOTES:

HD1 Hand Dug Pit

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Hand Dug Pit 2 Location and Photographs

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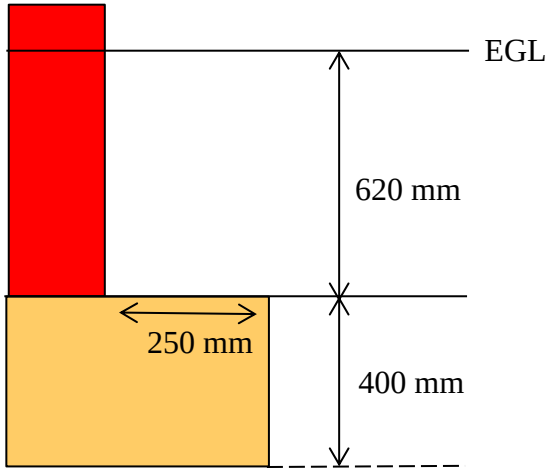

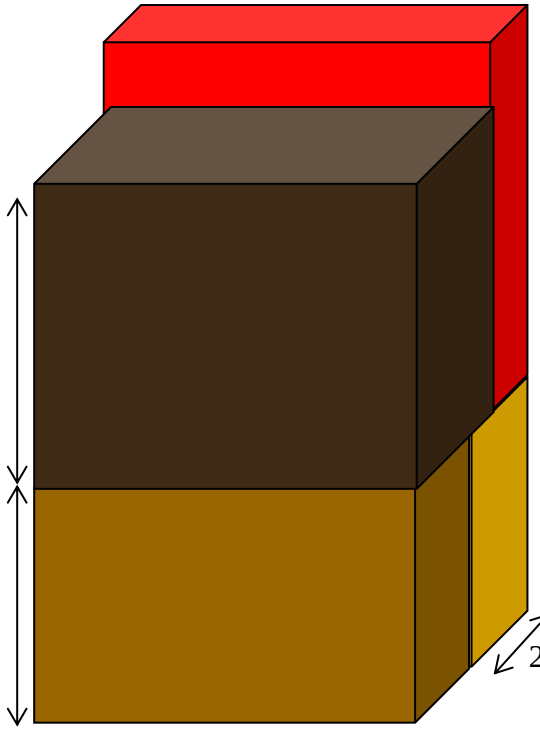

Loose dark brown clayey TOPSOIL. 620 mm

Stiff locally firm light brown CLAY. (LONDON CLAY). 400 mm

DO NOT SCALE

NOTES:

Approximate postcode –

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TITLE:
Hand Dug Pit 2 Foundation cross section

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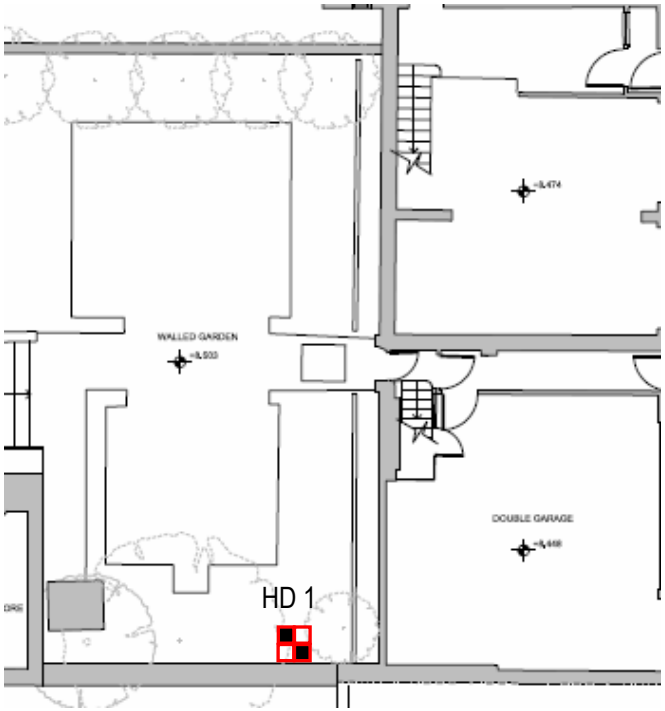

Hole Location Plan

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NOTES:

HD1 Hand Dug Pit

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PROJECT:

12 Gloucester Lodge, London

TITLE:

Hand Dug Pit 1 Location and Photographs

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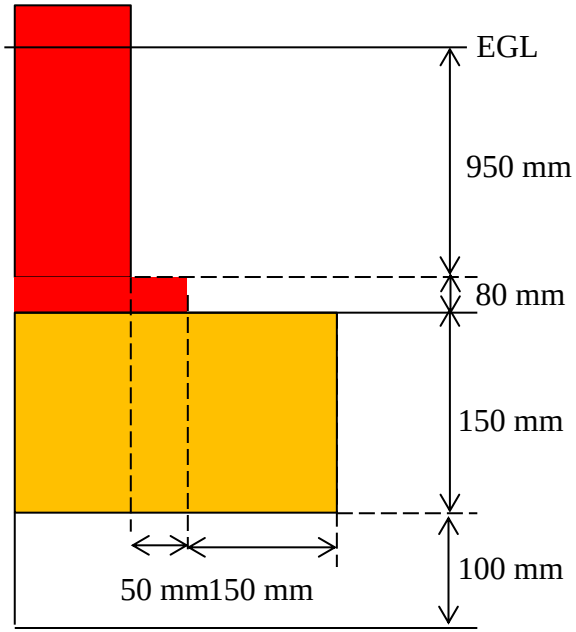

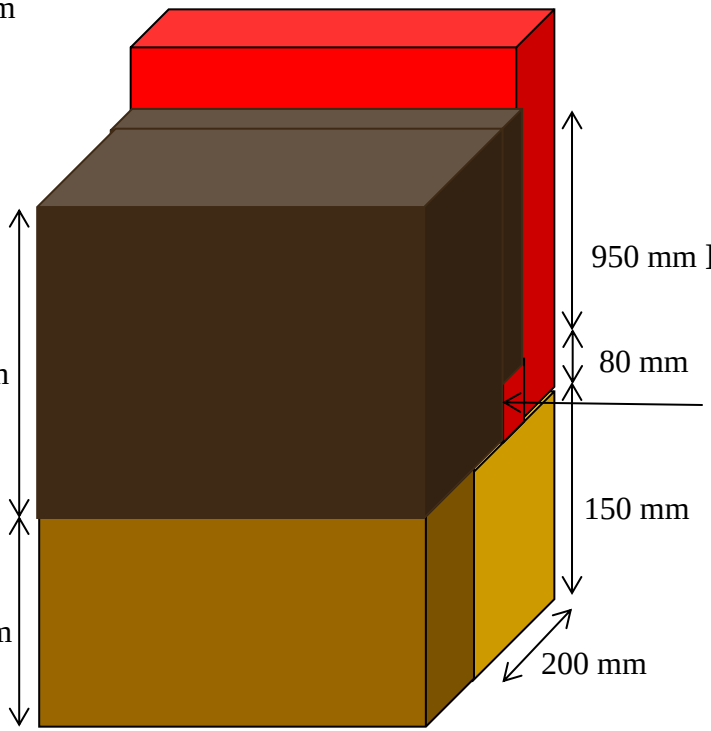

Loose dark brown clayey TOPSOIL.

Stiff locally firm light brown CLAY. (LONDON CLAY)

DO NOT SCALE

NOTES:

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TITLE: **Hand Dug Pit 1 Foundation Cross Section**

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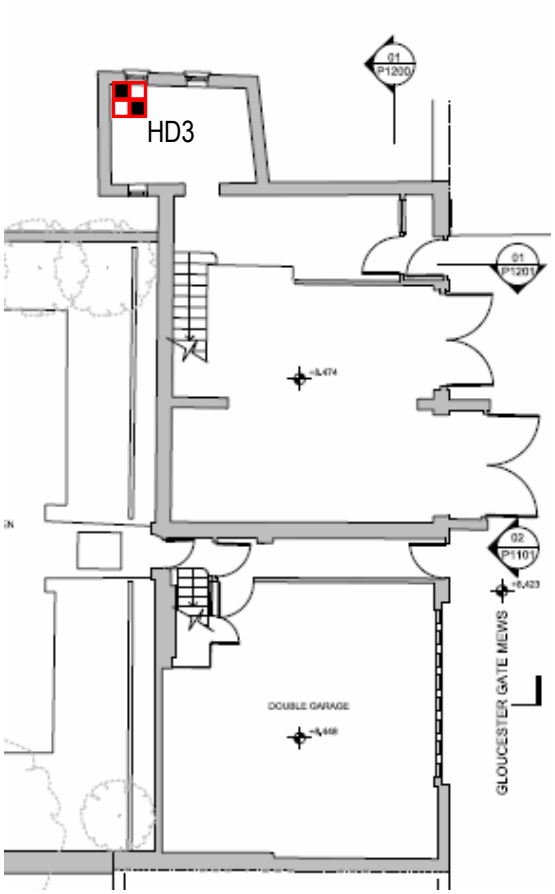

Hole Location Plan

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NOTES:

HD1 Hand Dug Pit

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Hand Dug Pit 3 Location and Photographs

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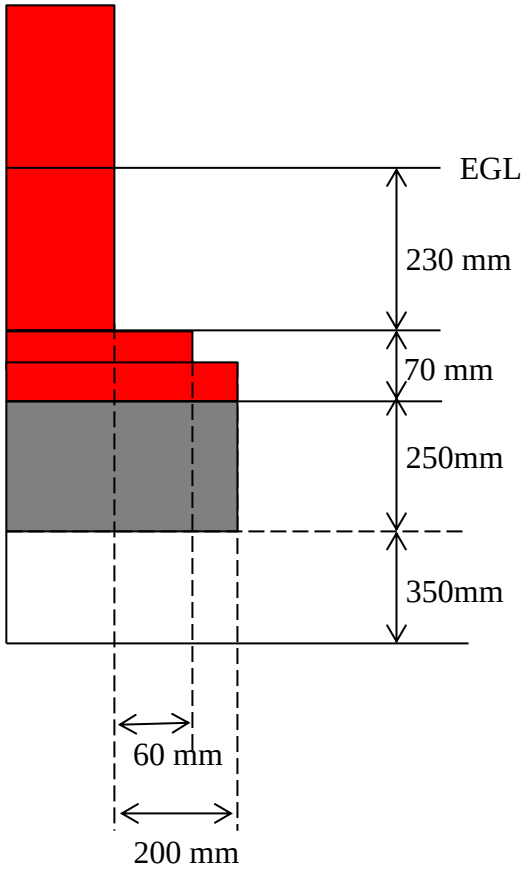
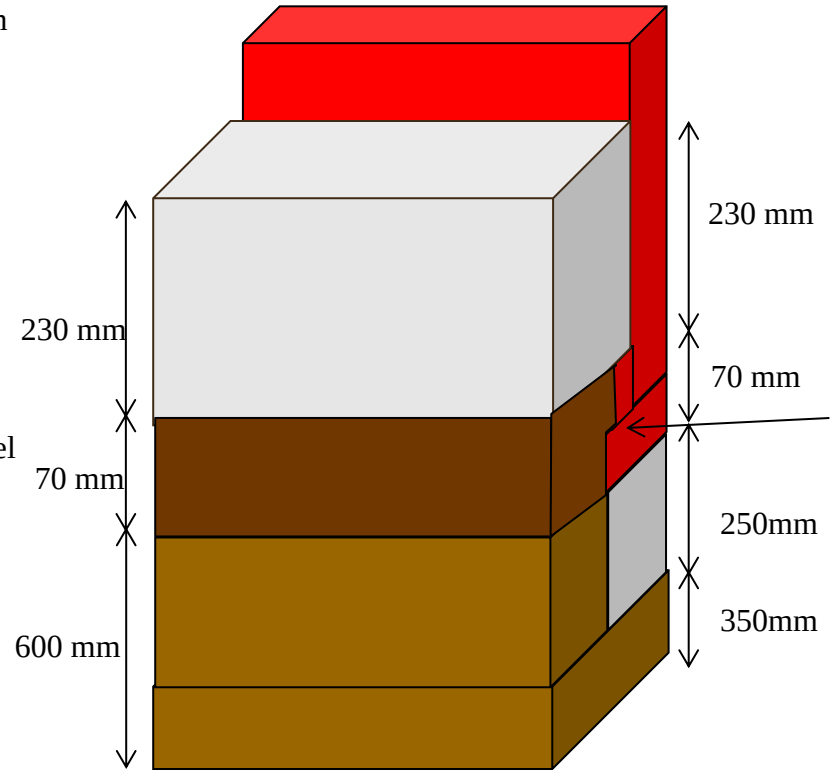


15mm Screed over concrete floor.

Stiff dark brown gravelly CLAY. Gravel is fine to course angular to subangular brick, sandstone and quartzite.

Stiff locally firm light brown CLAY. (LONDON CLAY)



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PROJECT: **12 Gloucester Lodge, London**

TITLE: **Hand Dug Pit 3 Foundation Cross Section**

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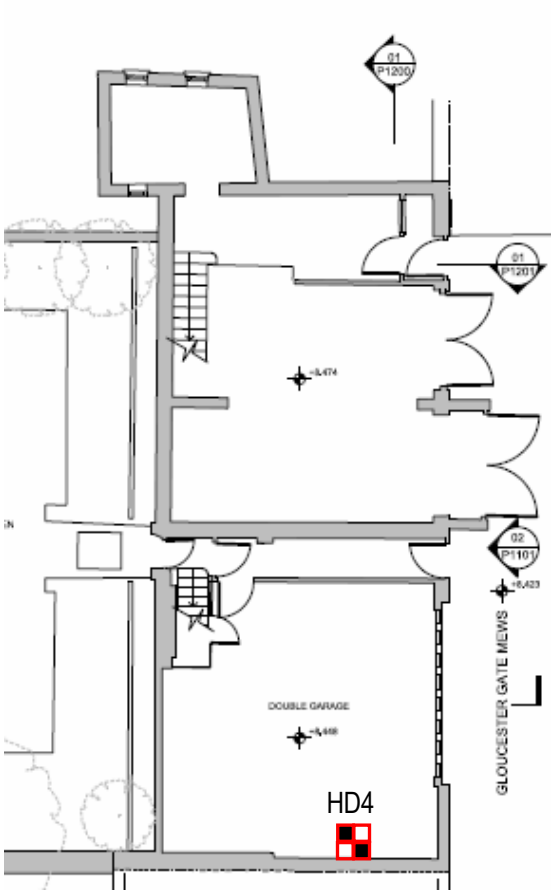

Hole Location Plan

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NOTES:

HD1 Hand Dug Pit

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Hand Dug 4 Location and Photographs

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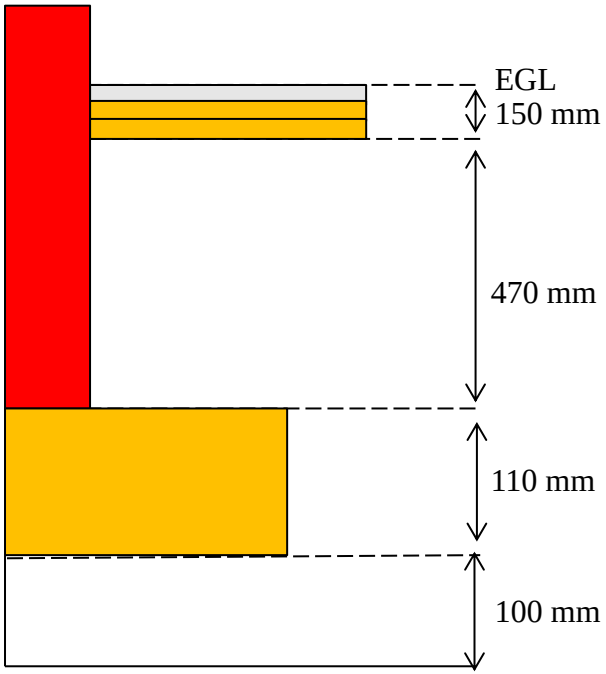
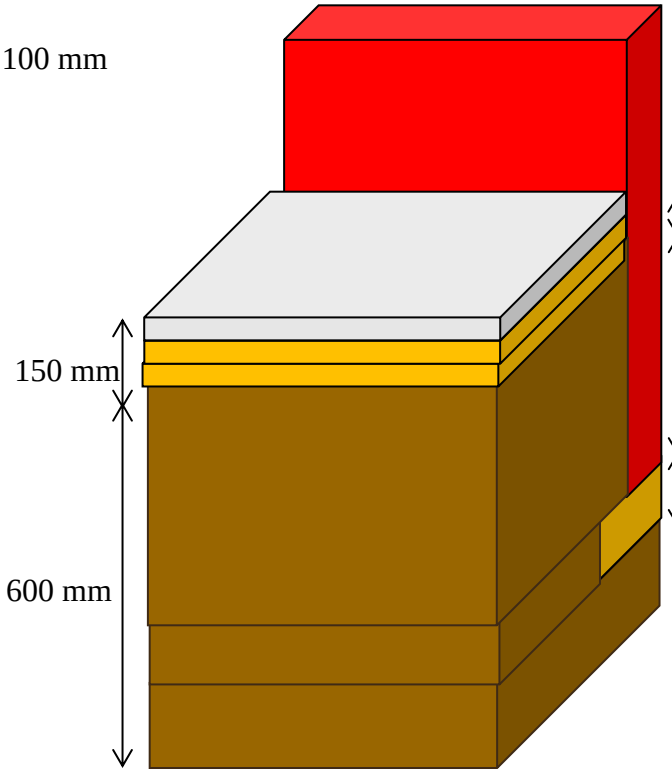


Concrete floor with 30mm of screed over 70mm of concrete and 50mm of sub base.

Stiff locally firm light brown CLAY. (LONDON CLAY)



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Techniker Consulting

PROJECT:
12 Gloucester Lodge, London

TITLE:
Hand Dug Pit 4 Foundation Cross Section

SCALE@SIZE :	ISSUE:
NTS	
DESIGN/DRAWN by :	DATE:
AW	August 2016
PROJECT No:	DRAWING No:
P7589	010

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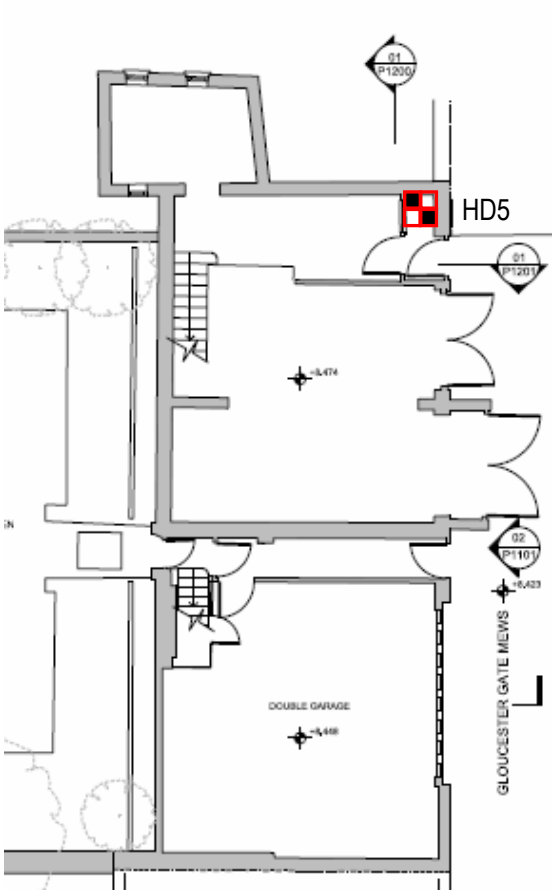

Hole Location Plan

DO NOT SCALE

NOTES:

HD1 Hand Dug Pit

Did not excavate due to drain obstruction in accordance with client instructions .

GRM Development Solutions Ltd
Laurus House, First Ave, Centrum 100,
Burton-on-Trent, Staffordshire
Tel: 01283 551 249 Fax: 01283 211 968
mail@grm-uk.com www.grm-uk.com

CLIENT:
Techniker Consulting

PROJECT:
12 Gloucester Lodge, London

TITLE:
Hand Dug Pit 5 Location and Photographs

SCALE@SIZE :	ISSUE:
NTS	
DESIGN/DRAWN by :	DATE:
AW	August 2016
PROJECT No:	DRAWING No:
P7589	011

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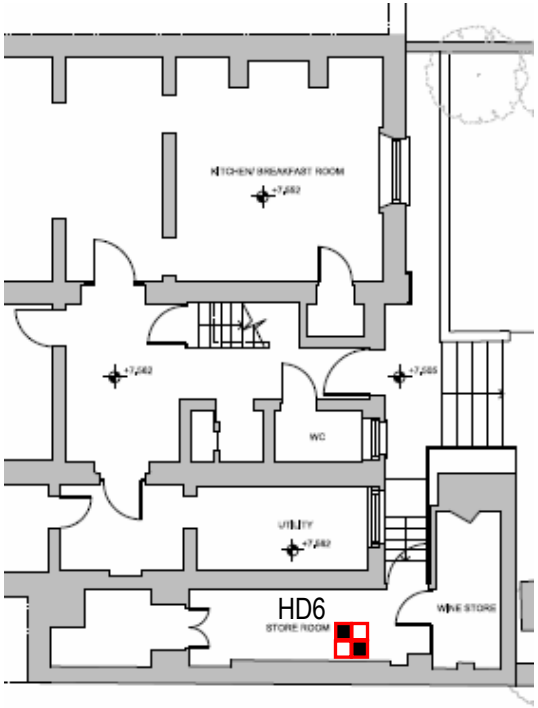

Hole Location Plan

DO NOT SCALE

NOTES:

HD1 Hand Dug Pit

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Burton-on-Trent, Staffordshire
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CLIENT:

Techniker Consulting

PROJECT:

12 Gloucester Lodge, London

TITLE:

Hand Dug Pit 6 Location and Photographs

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PROJECT No:	DRAWING No:
P7589	012

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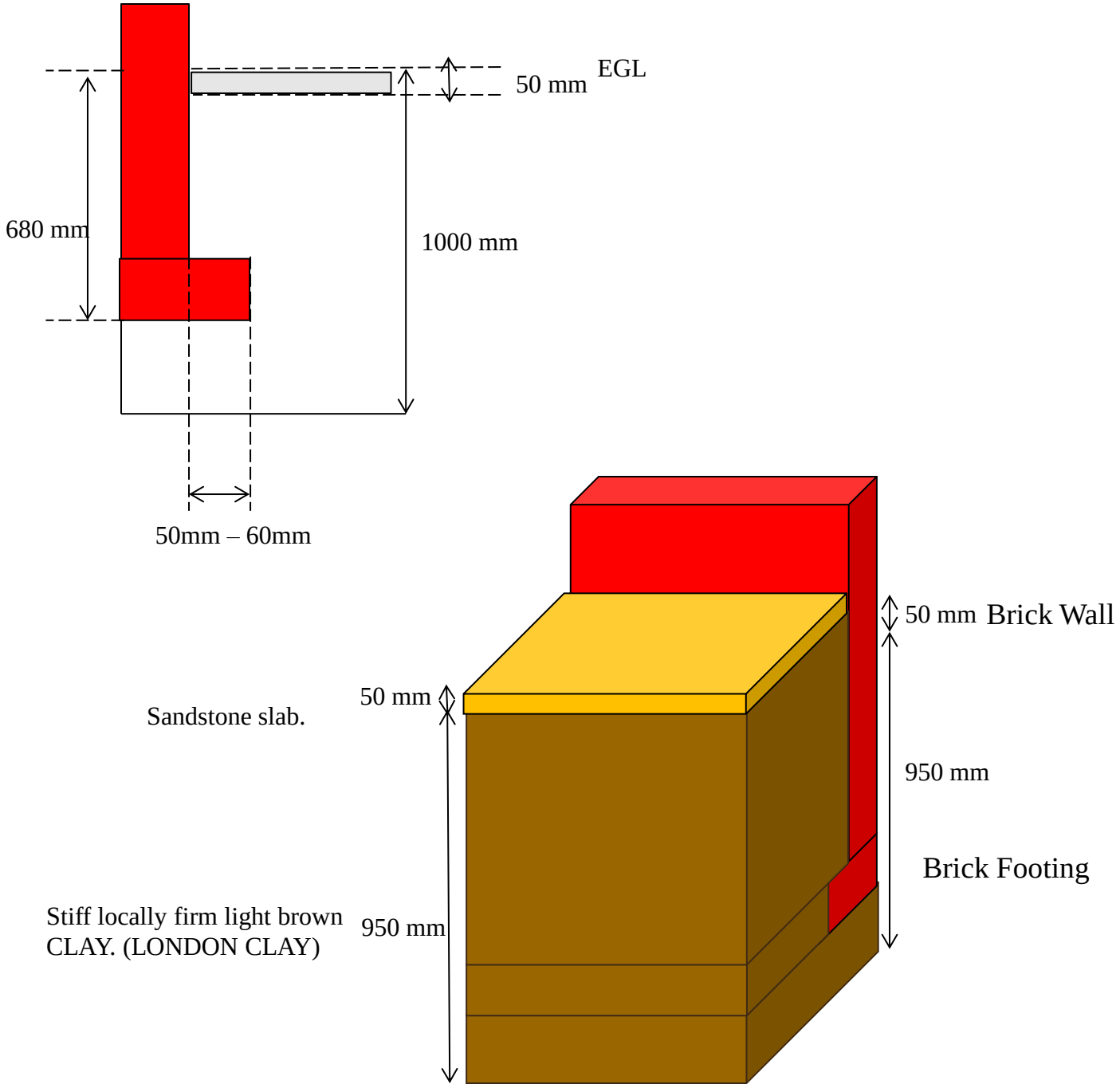

DO NOT SCALE

NOTES:

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CLIENT:
Techniker Consulting

PROJECT:
12 Gloucester Lodge, London

TITLE:
Hand Dug Pit 6 Foundation Cross Section

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NTS	
DESIGN/DRAWN by :	DATE:
AW	August 2016
PROJECT No:	DRAWING No:
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Nicholls Colton Analytical
7 - 11 Harding Street
Leicester
LE1 4DH

GRM Development Solutions
Laurus House
First Avenue
Centrum 100
Burton Upon Trent
Staffs
DE14 2WH

Analytical Test Report: L16/1926/GRM/001

Your Project Reference:	**12 Gloucester Gate, London**	Samples Received on:	25.08.2016
Your Order Number:	P7589	Testing Instruction Received:	25.08.2016
Report Issue Number:	1	Sample Tested:	25.08 to 08.09.2016
Samples Analysed:	2 Soils	Report issued:	08.09.2016

Signed

James Gane
Manager - Data Logistics
Nicholls Colton Analytical

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

With the exception of Sulphate and Sulpur, which are crushed over the 2mm test sieve, concentrations are reported as a percentage mass of the dry soil passing the 10mm BS test sieve. As received samples have been corrected for moisture content but not stone content.

Samples were supplied by customer.

Deviant Samples

Samples were received in suitable containers	**Yes**
A date and time of sampling was provided	**Yes**
Some sample handling times were exceeded prior to analysis of determinants	**Yes**

Where samples do not meet one or more of the above criteria they will be classed as deviant, this means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

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Nicholls Colton Analytical
7 - 11 Harding Street
Leicester
LE1 4DH

L16/1926/GRM/001

Project Reference - 12 Gloucester Gate, London

Analytical Test Results - BRE Suite

NCA Reference			16-27005	16-27006
Client Sample Reference			BH1	BH1
Client Sample Location			BH1	BH1
Depth (m)			1.20-1.65	3.00
Date of Sampling			19.08.2016	19.08.2016
Time of Sampling			Not provided	Not provided
Sample Matrix			Clay	Clay
Determinant	**Units**	**Accreditation**		
Water soluble sulphate	(mg/l)	u	290	3200
Acid Soluble Sulphate	(%)	u	0.12	1.09
Total Sulphur	(%)	u	0.04	0.32
pH Value	pH Units	MCERTS	8.3	7.8

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Leicester
LE1 4DH

L16/1926/GRM/001

Project Reference - 12 Gloucester Gate, London

Sample Descriptions

NCA Reference	Client Sample Reference	Sample Depth (m)	Description	% Passing 2mm BS test sieve
16-27005	BH1	1.20-1.65	Brown slightly sandy slightly gravelly clay.	98
16-27006	BH1	3.00	Brown clay.	100

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LE1 4DH

L16/1926/GRM/001

Project Reference - 12 Gloucester Gate, London

Analysis Methodologies

Matrix	Determinant	Sample condition for analysis	Test Method used
Soil	pH	As Received	In house method statement - MS - CL - pH (Soil) using a 1:3 soil to water extraction
Soil	Sulphate	Air Dried	In house method statement - MS - CL - Anions (Aquakem)
Soil	Acid Sulphate	Air Dried	In house method statement - MS - CL - BRE
Soil	Total Sulphur	Air Dried	In house method statement - MS - CL - BRE

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0320

NICHOLLS COLTON ANALYTICAL

Nicholls Colton Analytical
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e-mail: testing@nicholls-colton.co.uk
website: www.nicholls-colton.co.uk

TEST REPORT

BS 1377 PLASTICITY INDEX AND MOISTURE CONTENT

12 Gloucester Gate, London

Report no. L16/1926/GRM/002			
Order reference: P7589	Date of receipt: 25/08/2016	Date of testing: 30/08 to 01/09/2016	Date of issue: 08/09/2016

NCA Sample reference	Client sample reference	Sample type	Depth (m)	Sample description	Fines passing 425µm (%)	**Liquid limit (%)**	**Plastic limit (%)**	**Plasticity index (%)**	**Moisture content (%)**
16-27007	BH1	Disturbed	3.0	Brown clay.	100	**77**	**31**	**46**	**35**
16-27397	BH1	Disturbed	2.0	Brown slightly silty clay.	100	**74**	**25**	**49**	**33**

NOTES:
1. Sample preparation was in accordance with BS 1377 : Part 1 : 1990.
2. Plasticity index testing was in accordance with BS 1377 : Part 2 : 1990 Clauses 3, 4.4 (one-point) & 5.
3. Moisture content testing was in accordance with BS 1377 : Part 2 : 1990 Clause 3.2.3.1 .
4. The material was prepared from its natural state.
5. Some information required by BS 1377 : Part 1 : 1990 Clause 9 is not included in the report. The information will be provided if requested.

.....
J. Gane
Manager – Data Logistics
Nicholls Colton Analytical

GRM Development Solutions Ltd
Laurus House
First Avenue
Centrum 100
Burton Upon Trent
Staffordshire
DE14 2WH

Cable-Percussion Borehole

Borehole No. **BH 1**

Sheet 1 of 2

Site Name: 12 Gloucester Lodge, London

Ground Level (mAOD)

Client: Technica Consulting

GRM Project Ref: P7589

Coordinates E N

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.20	D		0.10			Tarmac
		0.20	ES		0.25			MADE GROUND
		0.50	ES					Medium dense orange brown slightly clayey GRAVEL. Gravel is medium subrounded to rounded quartzite. (sub base)
								MADE GROUND
		1.00	D		1.00			Stiff to firm gravelly slightly sandy CLAY. Gravel is fine to course angular to subrouded sandstone, quartzite and brick fragments.
		1.00	S	N=6 (1,1/1,1,2,2)				MADE GROUND
		1.20 - 1.65	D					Stiff to firm light brown laminated CLAY. With occasional grey reduction spots and occasional chalk cobbles. Grading into weathered mudstone.
								LONDON CLAY
		2.00	D					
		2.00	S	N=8 (1,1/2,2,2,2)				
		2.00 - 2.45	D					
		3.00	D					
		3.00	S	N=7 (6,4/1,2,2,2)				
		3.00 - 3.45	D					
		4.00	D					
		4.00	S	N=10 (1,2/2,2,3,3)				*Occasional orange brown sand pockets.*
		4.00 - 4.45	D					
		5.00	D					
		5.00	S	N=15 (2,3/3,4,4,4)				
		5.00 - 5.45	D					
		6.00	D					
		6.00 - 6.45	D					
		6.50	S	N=15 (2,2/3,4,4,4)				
		7.00	D					
		8.00	D					
		8.00	S	N=25 (10,5/6,6,6,7)				*Sandstone boulder at 8.0m.*
		8.00 - 8.45	D					
		9.00	D					

Continued on Next Sheet

Crew: Dave, Mike

Logger: AW

Equipment: Dando 2500

Groundwater Remarks:
No Ground Water encountered.

General Remarks:
Data Logger installed in hole after completion.

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks

Hole Started: 18/08/2016 **Hole Complete:** 18/08/2016 **Version:** DRAFT **Scale:** 1:50

Cable-Percussion Borehole

Borehole No. **BH 1**

Sheet 2 of 2

Site Name: 12 Gloucester Lodge, London

Ground Level (mAOD)

Client: Technica Consulting

GRM Project Ref: P7589

Coordinates E N

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		9.00 - 9.45	D					*Becoming very firm with depth.*
		9.50	S	N=15 (3,3/3,3,4,5)				
		10.00	D					
		10.00	D					
		11.00	S	N=22 (4,4/4,4,7,7)				
		11.00 - 11.45	D					
					11.50			Very stiff light grey slightly gravelly CLAY. Containing a lithorelic structure. Gravel is fine subrounded lithorelic mudstone. LONDON CLAY
		12.00	D					
		13.00	D					
		14.00	D					
		15.00	D					
		15.00	S	N=21 (2,3/4,4,6,7)				
		15.00 - 15.45	D					
					15.45			End of Borehole at 15.45m

10 11 12 13 14 15 16 17 18

Crew: Dave, Mike

Logger: AW

Equipment: Dando 2500

Groundwater Remarks:
No Ground Water encountered.

General Remarks:
Data Logger installed in hole after completion.

Chiselling Details

Depth Top	Duration	Remarks

Casing Diameter by Depth

Depth Base	Diameter	Remarks

Hole Started: 18/08/2016 **Hole Complete:** 18/08/2016 **Version:** DRAFT **Scale:** 1:50

Appendix 2 – Outline Construction Methodology

Basement Construction Methodology

Project: Gloucester Lodge

Job No: 15060

Date: 21.09.2016

Basement design

In light of the findings from the site investigation report the basement will be designed as a rigid box with propped cantilevered side walls and a reinforced concrete raft slab at formation level. A reinforced concrete floor slab will restrain the tops of the basement walls.

Depending on the party wall agreement, a traditional underpin or special foundations approach may be taken. In either case, the following principles will be adhered to in the construction of the basement. In the traditional method, mass concrete pins will be installed under the Party Wall foundations prior to casting the reinforced concrete basement walls to the front of the pins. The lateral strength and stiffness will be provided by the RC basemen walls as not to load the unreinforced pins. If a special foundations agreement were to be pursued, reinforced concrete pins would be cast in sequence directly under the Party Wall foundations.

A traditional method of underpinning will be employed to form the basement walls with the wall segments formed in a ‘hit and miss’ sequence. Walls can then be formed either in a single or two lifts, depending on the groundworks contractor’s preference. It is likely that the excavation progress with perimeter trenches to allow the walls and bases be cast in advance of the basement raft. The raft would then be cast at a later date with its rebar lapping with the reinforcement from the wall bases, once the walls are complete.

All faces of the excavation will remain propped during construction. This involves the use of trench sheeting with props across the excavated faces.

The wall panels will be interlinked by employing full strength couplers to ensure full rebar continuity. All wall panels supporting masonry walls above will be dry packed (75mm) with a sand and cement mix to ensure full load transfer.

Once the wall panels have been cast, they will be restrained at the top and close to them bottom (approximately 1m above base) using cross props and waling beams at regular intervals (3-4m centres). The basement raft will then be cast to provide lateral restraint at the base, followed by the ground floor RC slab to restrain the top of the walls.

The props will then be removed, once the ground floor slab has reached adequate strength.

By employing this staged installation and removal of the stiff lateral system, lateral stability of the surrounding ground, the existing buildings and adjacent structures and their foundations can be ensured, until the rigid box construction is complete.

The results from the site investigation reveal that no groundwater is present on site and it is not anticipated that the basement construction would require dewatering.

A detailed method statement and temporary works design will be expected from the contractor, which will be reviewed to ensure adequate support has been provided and appropriate measures taken to minimise ground movement and potential damage to the neighbouring properties, prior to the works commencing on site.

As outlined in the Ground Movement Assessment (GMA) appended to the BIA report dated 12 August 2916, the basement rigid box structure has been designed for the following loading conditions:

- Lateral pressures from the retained earth
- Nominal surcharge to due imposed loads from adjacent structures and foundations
- Hydrostatic pressure from a rise (accidental) in water table to a depth of 1m below ground level
- Short-term and long-term ground heave

The basement construction will be waterproofed to Grade 3 standard in accordance with BS 8102:2009 requirements, employing a drained cavity system combined with a secondary means of waterproofing. Any groundwater captured by the system would be directed to a suitable number of sumps in the basement and discharged into the below ground drainage network.

Appendix 3 – Movement Monitoring Strategy

TECHNIKER

Gloucester Lodge

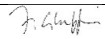
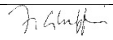
Movement Monitoring Strategy

Ref: 15060/07/01

Techniker Ltd
Consulting Structural Engineers
13-19 Vine Hill
London
EC1R 5DW
020 7360 4300
techniker.co.uk

Document verification

Project name	Gloucester Lodge
Document title	Movement Monitoring Strategy
Project number	15060
Ref	07

Revision	Date	Description	
01	20 September 2016		
	Prepared by	Checked by	Approved by
Name	AA	FG	FG
Signature			

Revision	Date	Description	
02			
	Prepared by	Checked by	Approved by
Name			
Signature			

Revision	Date	Description	
03			
	Prepared by	Checked by	Approved by
Name			
Signature			

Revision	Date	Description	
04			
	Prepared by	Checked by	Approved by
Name			
Signature			

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Contents

1. Introduction

1.1. Introduction

A single storey basement extension to an existing residential building is to be constructed and is situated adjacent to Gloucester Gate Mews, London. The building neighbours the Mews to the east and existing buildings to the remaining sides as can be seen in the aerial view in Figure 1 below.

This design note provides an assessment of the ground movement and damage classification onto the existing adjacent structures. The calculations of the structural behaviour of proposed basement structure in the temporary and permanent conditions are also presented.

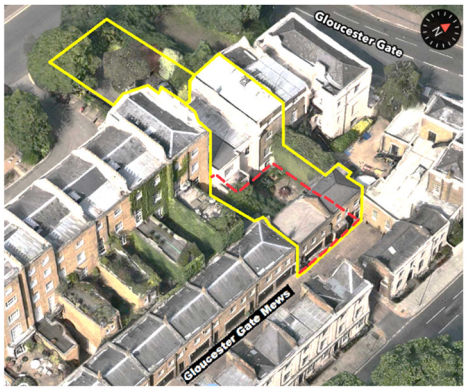


Fig. 1 Aerial view of Gloucester Lodge, dashed line represents extent of basement extension

1.2. Existing Structure

The existing buildings date to the late 19th century and are a Victorian house style of construction with traditional load bearing masonry with timber floors. The buildings have a lower ground level and vary in height between two to four storeys. Partially above the proposed basement the existing building is two storeys in height.

Monitoring is required to demonstrate that the proposed construction works do not adversely affect the existing and adjacent structures.

Prior to commencing construction of the basement, further survey information is required. This can be divided into two components.

i) Establishment of a monitoring regime to monitor movement of the existing party walls during the works. The monitoring requirements are detailed in this movement monitoring strategy.

ii) Surveys to confirm the existing ground levels.

2. Movement Monitoring Strategy

2.1. Monitoring requirements

Monitoring of the existing buildings will be carried out during the works to assess any movements which may occur. This will be carried out by a third party specialist surveyor and will comprise the following items:

- Three dimensional position monitoring at the locations shown on the mark ups found in Appendix A.
- Targets for monitoring will be securely fixed to the existing structure to achieve a design life of 2 years minimum.
- Monitoring will be undertaken to achieve an accuracy of +/- 0.6mm for measurement of displacements.
- Monitoring will be every 4 weeks prior to commencement of the works on site.
- During construction, weekly monitoring of vertical movements at the locations indicated the mark ups in this report along each existing wall using a precision level to an accuracy of +/0.6mm during the structural works.
- Fortnightly monitoring will be required from completion of the structural works to handover of the project.
- The results of the monitoring will be forwarded to all parties within 24 hours along with key plans and a summary of movements since previous reading and start of works.
- A traffic light warning system will be established to deal with any excessive movement. The set out trigger levels are defined as follows:

	Amber	Red
Overall horizontal and vertical movement	4.0 mm	8.0 mm
Rate of horizontal and vertical movement	1.0 mm/week	2.0 mm/week
Crack changes (incl. occurrence of new cracks)	1.0 mm	2.0 mm

A condition survey of the existing masonry walls will be carried out with cracks mapped onto elevation drawings. Any cracks greater than 1.0 mm in width will have tell-tales attached and monitored on a weekly basis.

The surveyor should submit proposals to the structural engineer to include:

- Proposed methodology for undertaking the survey work
- Proposed equipment
- Details of the proposed targets and fixing methods
- Proposed control stations and method of checking their stability

2.2. Methodology

Corner crack gauges will be used to determine relative movement between the elements. The crack gauges can be reliably read to +/- 1.0 mm.

2.3. Frequency of monitoring

The minimum period of monitoring to form an accurate picture is six months.

2.4. Remedial measures

From the measurements of the existing fabric the initial assumptions made in determining the threshold for instability can be checked. Having confirmed the point at which failure would occur, safe amber and red values can be determined for the monitoring. Depending on whether the movement is stabilising the need to remove the initial cause of the movement can be determined. The opening-up will determine whether repairs are required to existing connections and interfaces.

2.5. Reporting

- Provide a written report in pdf format for each monitoring visit.
- Results should be presented in both tabular and graphical format.
  - i) The tabular data should be presented as differences in Eastings and Northings and deflection out of plane from the base readings.
  - ii) The graphical format should show the variation in movement over time.

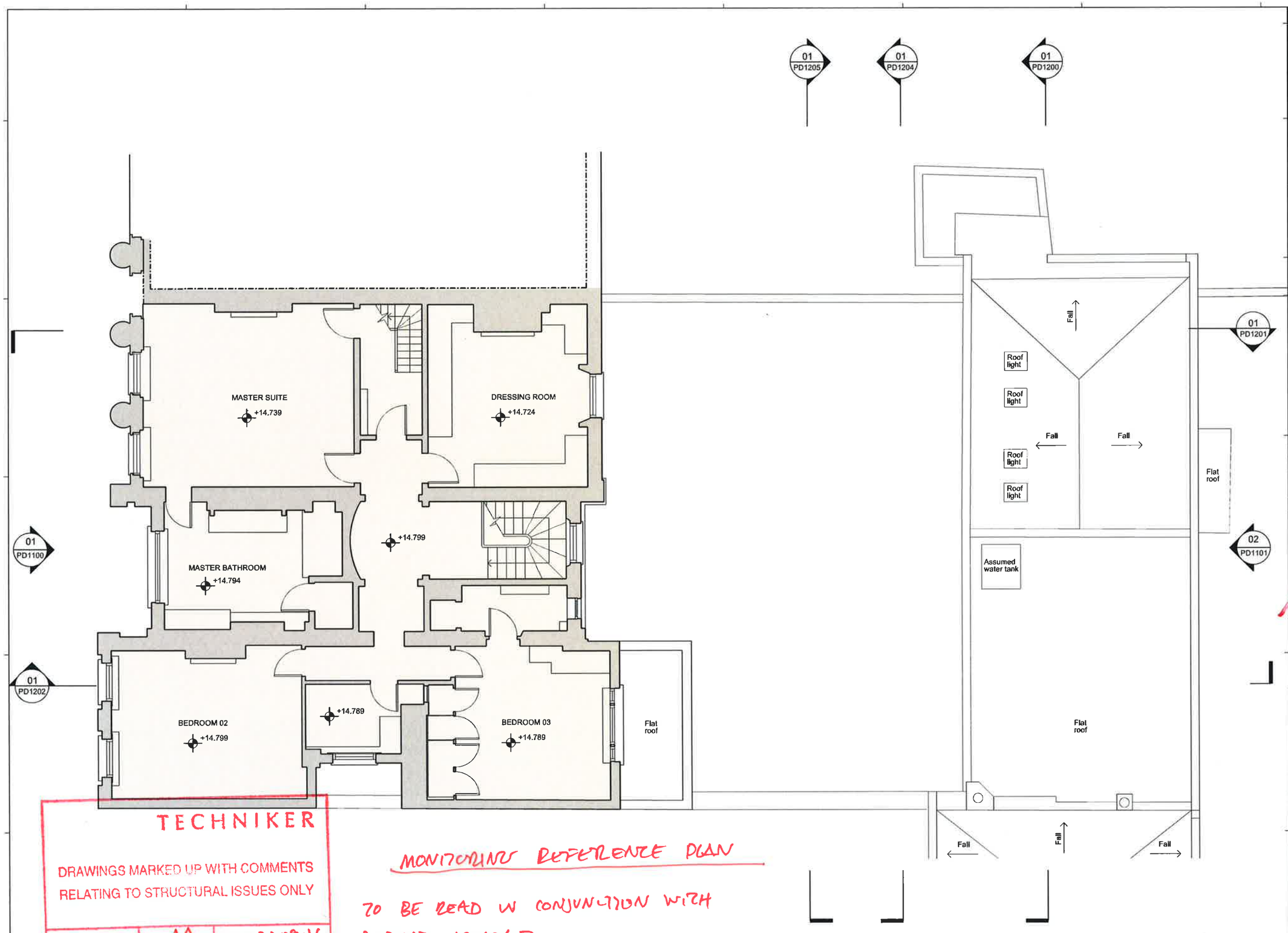
2.6. Report Requirements

Each report should include the following items

- The time of day the measurements were taken
- Date
- Temperature and weather conditions
- Any damage noted to any of the targets
- Diagrams locating the individual targets

Reports should be issued within 5 working days of the survey work being undertaken.

3. Appendix A – Proposed Monitoring Positions



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DRAWINGS MARKED UP WITH COMMENTS RELATING TO STRUCTURAL ISSUES ONLY

STATUS: | BY: AA | DATE: 20.09.16

MONITORING REFERENCE PLAN

TO BE READ IN CONJUNCTION WITH REPORT 15060/07

01 Existing first floor plan
1:50

General Notes

1. Dimensions are in millimetres unless stated otherwise.
2. Levels are in metres AOD unless stated otherwise.
3. Dimensions govern. Do not scale off drawing.
4. All dimensions to be verified on site before proceeding.
5. All discrepancies to be notified in writing to Make Limited.

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Rev	Date	Reason For Issue	Chk
01	12.08.16	Planning submission	KG
00	30.06.16	For Pre-application	JC

PLANNING

DRAWING STATUS

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info@makearchitects.com
www.makearchitects.com

Client
Mr M Namaki
56 Cumberland Terrace
London
NW1 4HJ

Keyplan

North

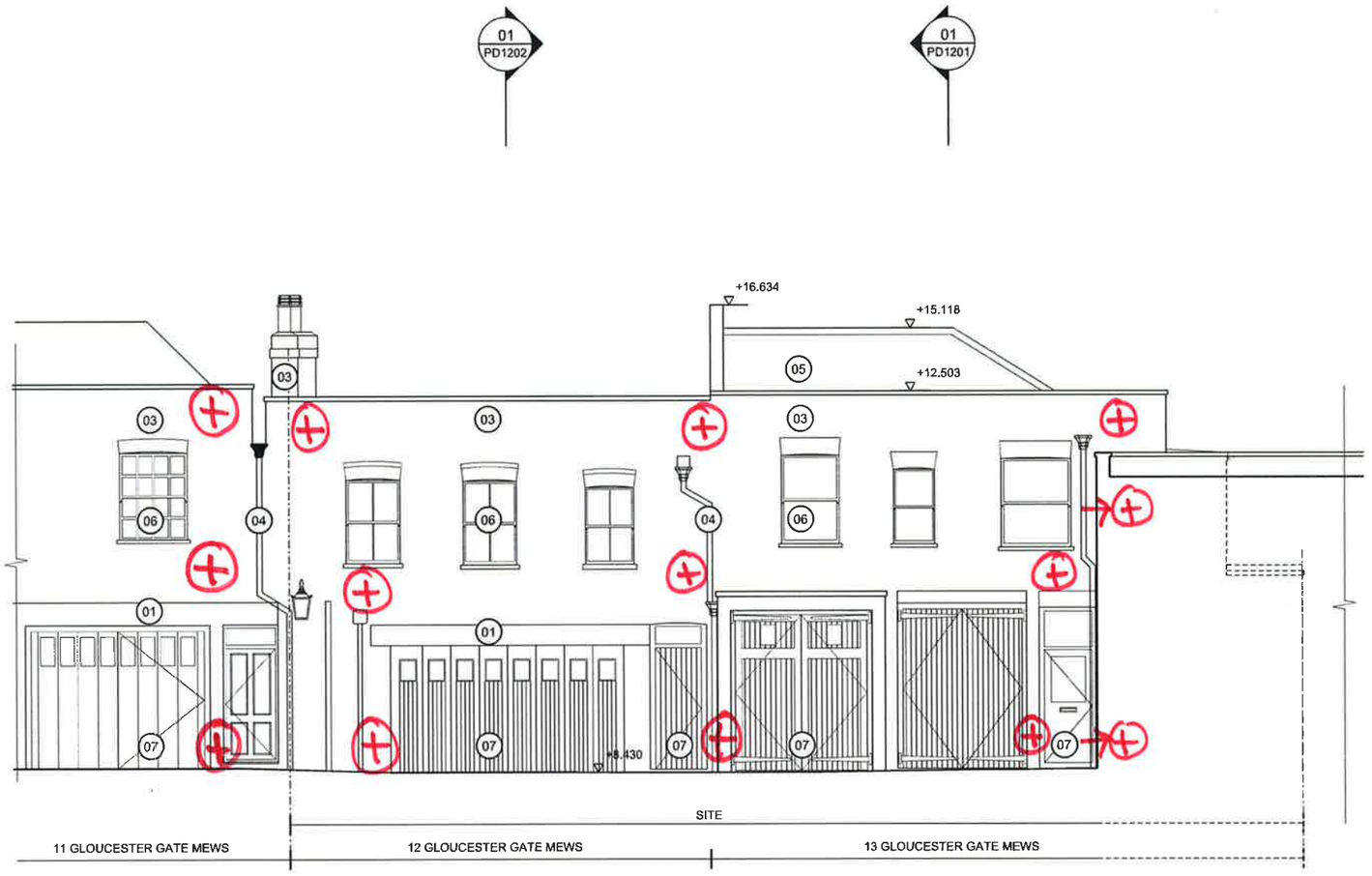
Project
Gloucester Lodge
Regents Park

Drawing Title
Existing
First Floor Plan

Scale	Paper Size	Date
1:50/ 100	@A1/ A3	10.07.15

Project No.	Draw No.	Rev No.
1202	PD1001	01

01 PAINTED PLASTER
02 PAINTED BRICKWORK
03 BRICK
04 METAL
05 TILED ROOF
06 TIMBER SASH WINDOW
07 TIMBER
08 GLASS



01 Existing elevation 02
1:50

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DRAWINGS MARKED UP WITH COMMENTS RELATING TO STRUCTURAL ISSUES ONLY
STATUS: | BY: AA | DATE: 20.09.16

⊕ PROPOSED MONITORING STATIONS
- MOVEMENT TO BE MONITORED IN X,Y/Z DIRECTIONS.
- MONITORING STATIONS TO BE INSTALLED PRIOR TO FOUNDATION WORKS
- TO BE READ IN CONJUNCTION WITH REPORT 15060/07

General Notes
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2. Levels are in metres AOD unless stated otherwise.
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01	12.08.16	Planning submission	KG
00	30.06.16	For Pre-application	JC

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make
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London, W1T 4JY
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info@makearchitects.com
www.makearchitects.com

Client
Mr M Namaki
56 Cumberland Terrace
London
NW1 4HJ

Keyplan
North

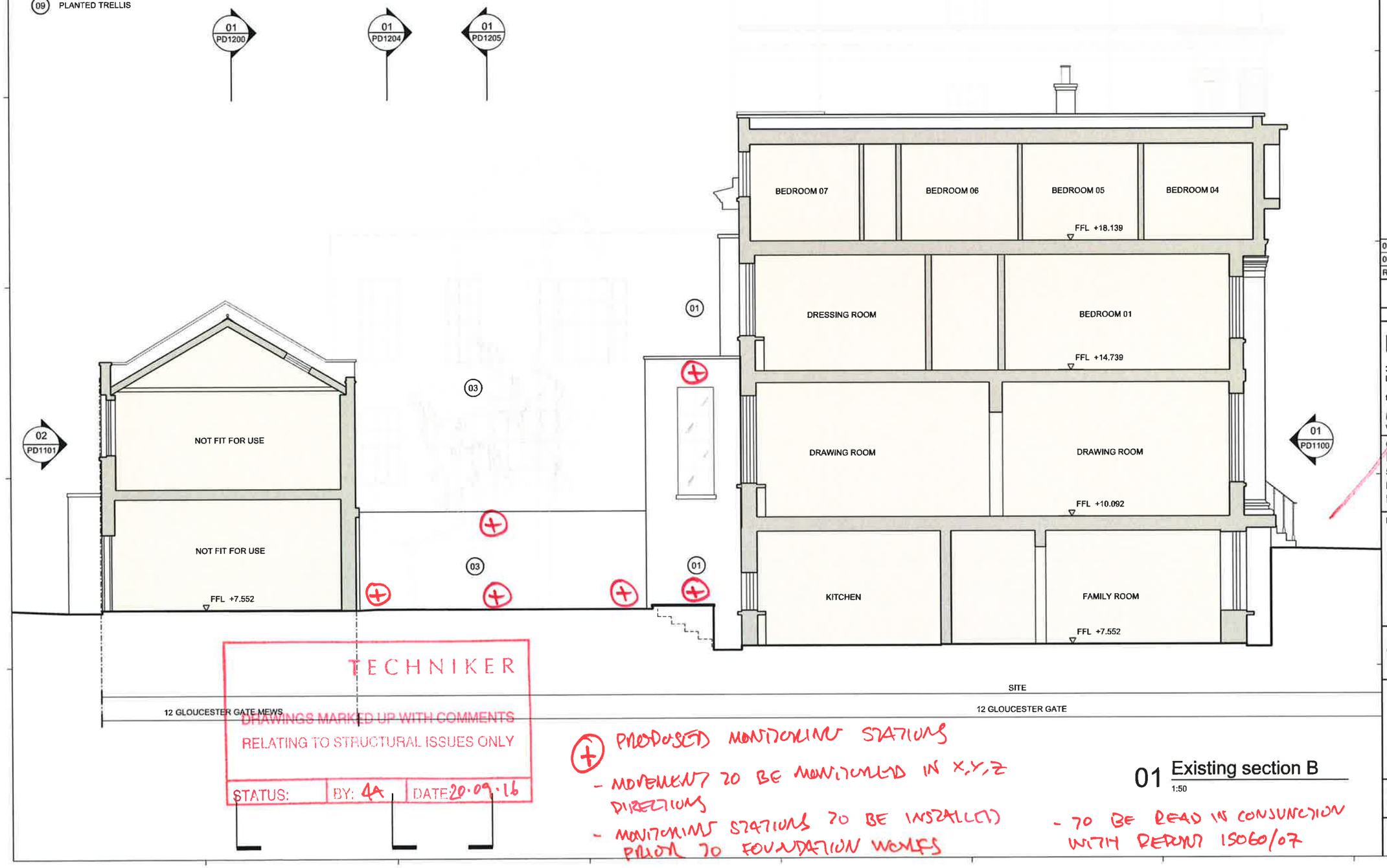
Project
Gloucester Lodge
Regents Park

Drawing Title
Existing
Elevation 02

Scale	Paper Size	Date
1:50/ 100	@A1/ A3	10.07.15

Project No.	Draw No.	Rev No.
1202	PD1101	01

01 PAINTED PLASTER
02 PAINTED BRICKWORK
03 BRICK
04 METAL
05 TILED ROOF
06 TIMBER SASH WINDOW
07 TIMBER
08 GLASS
09 PLANTED TRELLIS



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DRAWINGS MARKED UP WITH COMMENTS
RELATING TO STRUCTURAL ISSUES ONLY
STATUS: | BY: GA | DATE: 20.09.16

(+) PROPOSED MONITORING STATIONS
- MOVEMENT TO BE MONITORED IN X,Y,Z DIRECTIONS
- MONITORING STATIONS TO BE INSTALLED PRIOR TO FOUNDATION WORKS

- TO BE READ IN CONJUNCTION WITH REPORT 15060/07

01 Existing section B
1:50

General Notes
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5. All discrepancies to be notified in writing to Make Limited.

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make
32 Cleveland Street,
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Client
Mr M Namaki
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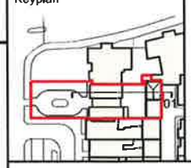
Keyplan



Project
Gloucester Lodge
Regents Park

Drawing Title
Existing
Section B

Scale	Paper Size	Date
1:50/ 100	@A1/ A3	10.07.15

Project No.	Draw No.	Rev No.
1202	PD1201	01

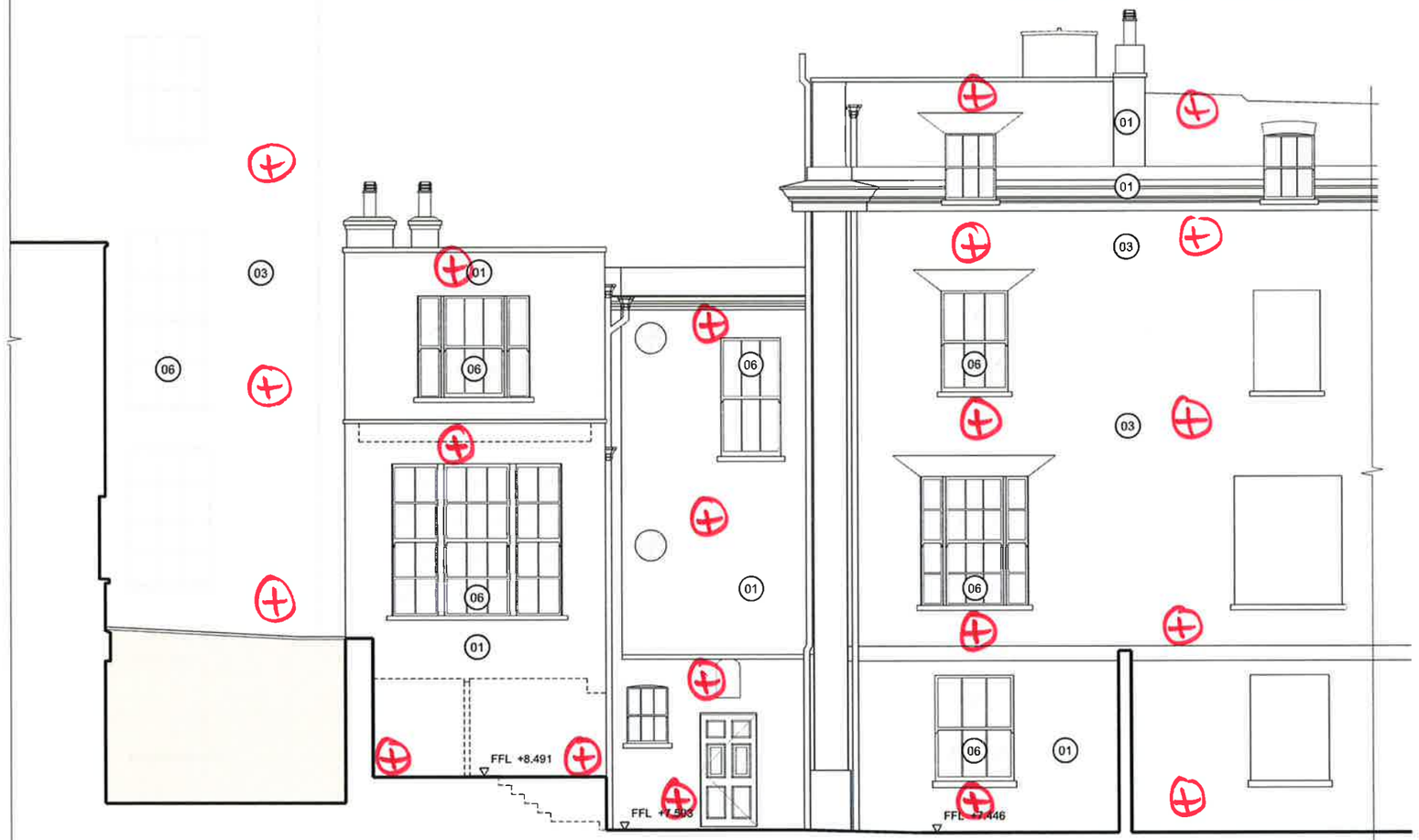
TECHNIKER

DRAWINGS MARKED UP WITH COMMENTS RELATING TO STRUCTURAL ISSUES ONLY

STATUS: 01 PD1202 AA DATE: 20.09.16

01 PD1201

- PROPOSED MONITORING STATIONS
- MOVEMENT TO BE MONITORED IN X,Y,Z DIRECTIONS
- MONITORING STATIONS TO BE INSTALLED PRIOR TO FOUNDATION WORKS
- TO BE READ IN CONJUNCTION WITH REPORT 15060/07



01 Existing section F
1:50

01 PAINTED PLASTER
02 PAINTED BRICKWORK
03 BRICK
04 METAL
05 TILED ROOF
06 TIMBER SASH WINDOW
07 TIMBER
08 GLASS

General Notes

1. Dimensions are in millimetres unless stated otherwise.
2. Levels are in metres AOD unless stated otherwise.
3. Dimensions govern. Do not scale off drawing.
4. All dimensions to be verified on site before proceeding.
5. All discrepancies to be notified in writing to Make Limited.

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Rev	Date	Reason For Issue	Chk
01	12.08.16	Planning submission	KG
00	30.06.16	For Pre-application	JC

PLANNING
DRAWING STATUS

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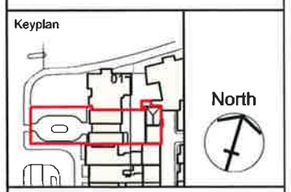


Project
Gloucester Lodge
Regents Park

Drawing Title
Existing
Section F

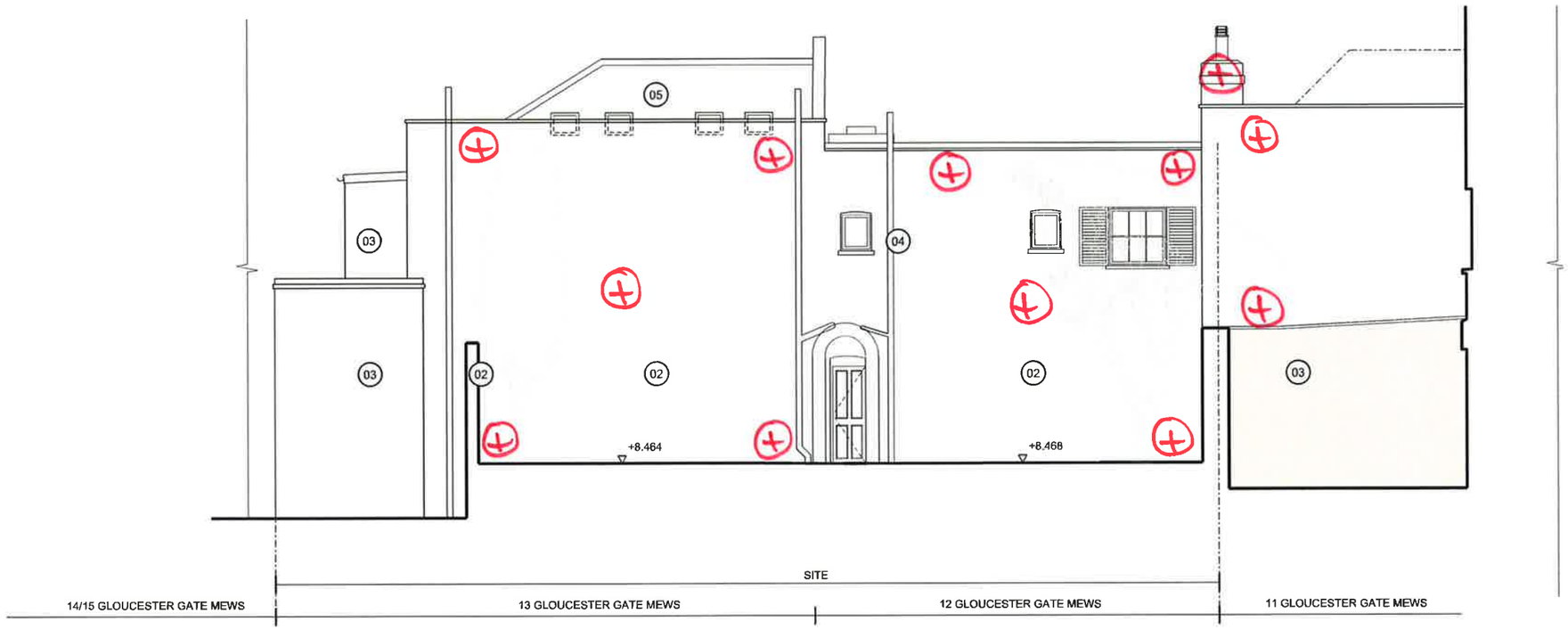
Scale	Paper Size	Date
1:50/ 100	@A1/ A3	10.07.15

Project No.	Draw No.	Rev No.
1202	PD1204	01

01 PAINTED PLASTER
02 PAINTED BRICKWORK
03 BRICK
04 METAL
05 TILED ROOF
06 TIMBER SASH WINDOW
07 TIMBER
08 GLASS

01 PD1201

01 PD1202



01 Existing section D
1:50

TECHNIKER
DRAWINGS MARKED UP WITH COMMENTS RELATING TO STRUCTURAL ISSUES ONLY
STATUS: | BY: AA | DATE: 20.09.16

⊕ PROPOSED MONITORING STATIONS
- MOVEMENT TO BE MONITORED IN X,Y,Z DIRECTIONS
- MONITORING STATIONS TO BE INSTALLED PRIOR TO FOUNDATION WORKS
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General Notes
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Rev	Date	Reason For Issue	Chk
01	12.08.16	Planning submission	KG
00	30.06.16	For Pre-application	JC

PLANNING
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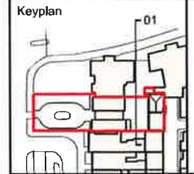

North

Project
Gloucester Lodge
Regents Park

Drawing Title
Existing
Section D

Scale	Paper Size	Date
1:50/ 100	@A1/ A3	10.07.15

Project No.	Draw No.	Rev No.
1202	PD1205	01