

24 Lawn Road

Basement Impact Assessment

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Revision	Date	Status
1	11-12-2017	Planning Submission
–	08-12-2017	Comment
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Approved By:		Dave Rayment

Introduction

Morph Structures were instructed by con | form architects to consider the structural aspects of extending the lower ground floor at 24 Lawn Road, and to produce a Basement Impact Assessment in support of a planning application.

This report covers the work undertaken during the concept design of the project. A description of the main elements of the structure is given, plus the assumed sequence of construction which has influenced the structural design.

The report was prepared by Max Freeman MEng and Dave Heeley MEng, CEng, MIStructE.

Land Stability, Hydrogeology and Hydrology aspects of the report prepared in conjunction with James Morrice MSc BEng (Hons) MCSM GMICE and Adam Cadman MSc Bsc (Hons) CGeol FGS of CGL.

The Project

The existing property is a three-storey terrace house with a split level single storey dining room and garage space to the rear. The house is located in Camden, North West London.

The proposed works involve the demolition of the rear dining/garage space and replacement with an improved kitchen living space. In addition to this, it is proposed to extend the existing lower ground floor to create a new storage/ games room.

The Site

3.1

Site Location

The site is located at 24 Lawn Road, approximately 4 miles North of Central London within the borough of Camden. The site is bounded by Garnett Road to the North and Upper Park Road to the south.

The National Grid Reference for the site is TQ 527570 185231. The ground level is approximately 61m above sea level.

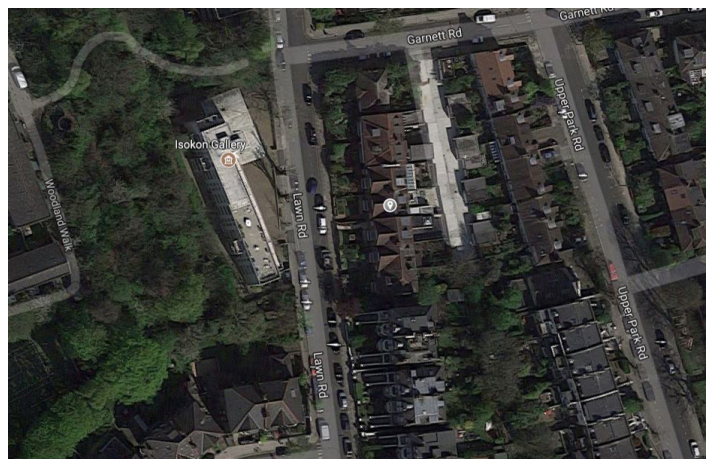
3.2

Site History

The earliest maps available for the area date back to 1850 when only a few adjacent roads were present, but no building development in or around the site.

The original building, along with several dwellings to the South, appear to have been built between 1876 and 1894. The street pattern to the immediate North was not developed until around 1934. Following this, the area appears largely unchanged apart from 'Lower Cross Road' to the North becoming 'Garnett Road' somewhere between 1938 and 1954.

From historic bomb map information, the general area appears to have been targeted for bomb attacks in the Second World War, with some properties on street suffering damage however no damage was recorded at 24 Lawn Road.



Site plan (copyright Google)



1894 Map (copyright Old Maps)



1996 Map (copyright Old Maps)

3.3

Geotechnical Data

Published geotechnical maps from the British Geological Survey indicate that the local geological strata comprise London Clay Formation with no recorded superficial deposits.

The nearest available borehole from the British Geological Survey is located on Cressy Road and shows approximately 2.9m of Made Ground above 1.85m of stiff brown clay with crystals and then 3.85m of stiff fissured brown silty clay with crystals. Other nearby boreholes indicate a similar soil formation.

Trial pits undertaken on site reveal the ground conditions to be Made ground / Head deposits over stiff London clay

3.3

Flooding / Watercourses

A formal flood risk assessment is outside the scope of this report. From the desk study of available environment agency / government food information however, there appears to be a very low risk from flooding from the sea or from reservoirs and a low risk of flooding from surface water. There is no evidence of current or historic watercourse in or around the site.



Flood risk from surface water (copyright Environment Agency)

Made Ground /
Head deposits

Firm Fissured
London Clay

Stiff Fissured
London Clay

Geotechnical Profile



3.5 Existing Structure

From a visual survey, the upper floors of the building appear to comprise timber joists supported by perimeter masonry walls and central timber spine walls.

The existing terrace structure appears to be a one-way RC concrete slab spanning onto steel beams to the rear and a masonry wall to the front. The existing kitchen floor is currently suspended over partial void to the rear of the building – this appears to be constructed in beam and block and supported by perimeter masonry walls and internal masonry piers. The lower ground floor slab appears to be a ground bearing concrete slab approximately 100mm thick.

The existing foundations appear to vary depending on the design condition. The garage walls appear to be founded on relatively deep mass concrete foundations whereas the perimeter utility room wall appears to be a deep masonry corbel. The perimeter void walls appear to be a hybrid of two – a masonry corbel founded on a mass concrete foundation.

The general condition of the structure appears very good with no evidence of significant movement to external walls.

3.6 Neighbouring Structures

To the north of the property is 25 Lawn Road and to the south is 23 Lawn Road, both of which appear of similar construction and age. The rear wing of 22 Lawn Road appears to have been reconstructed in recent years and there is a slight downward gradient from number 22 to 26. To the rear of the building is an unnamed road and beyond this a row of garages.

From a visual inspection, 26 Lawn Road and its neighbouring buildings appear to be in good condition with no evidence of movement or subsistence.

3.7 Underground Infrastructure / Features

A TfL Asset search shows the site is almost directly above the Belsize tunnel – a Victorian tunnel connecting Kentish Town to West Hampstead.

TfL and Network rail have been contacted regarding this matter with a view to obtaining the required approvals to proceed with the project. TfL have since responded to confirm that they have no requirements regarding the ground works. Network rail are still to formally respond, however it is understood that issues are not likely to be raised given the depth to crown.

A manhole was visible to the rear of the building however there was no evidence of other services or utilities across the site.

3.8 Investigations/ Further Investigations

An initial site investigation was completed in November 2017 and comprised two foundation inspection pits dug along the northern and southern party walls with 25 and 23 Lawn Road. A visual record of these inspection pits is presented in Appendix D.

No groundwater was encountered during the site works of the geotechnical investigation and two formation soils samples were reviewed by CGL who identified the samples as Made Ground and Head Deposits or reworked London Clay.

Due to site constraints, trial pits were limited to the garage and utility areas, adjacent to the position of the proposed ground lowering. These, and conservative assumptions have been used to develop the design to this stage and in the Basement Impact Assessment.

At the next stage of design, additional investigative works are proposed to confirm the foundations in all areas, as well as fabric investigation works to confirm the composition of the superstructure.



Street View of 24, 26 & 22 Lawn Road



Photo of existing first floor soffit and supporting steel



Manhole to rear of 24 Lawn Road



Manhole to rear of 24 Lawn Road



Void from utility room. Beam and block floor with internal masonry pier

The Proposed Development

4.1

Substructure

4.1.1 LOWER GROUND FLOOR EXTENSION

The proposed redevelopment will be approximately 2m below the existing ground level at its lowest point.

This results in a number of different design conditions:

1) Along the party walls:

The existing walls will be underpinned in mass concrete to transfer the foundation loads down to the new lower level. A new reinforced concrete upstand will be constructed in front of the underpinning and designed as propped by the proposed RC lower slab and the proposed ground floor timber joists. This results in a wall that is propped top and bottom to resist earth pressures.

2) Along the front and back walls:

Perimeter walls that do not site along a boundary line will be formed with reinforced concrete underpinning and are designed as propped by the proposed RC lower basement slab and the existing RC ground floor / upper basement slabs. This also results in a wall that is propped top and bottom to resist earth pressures.

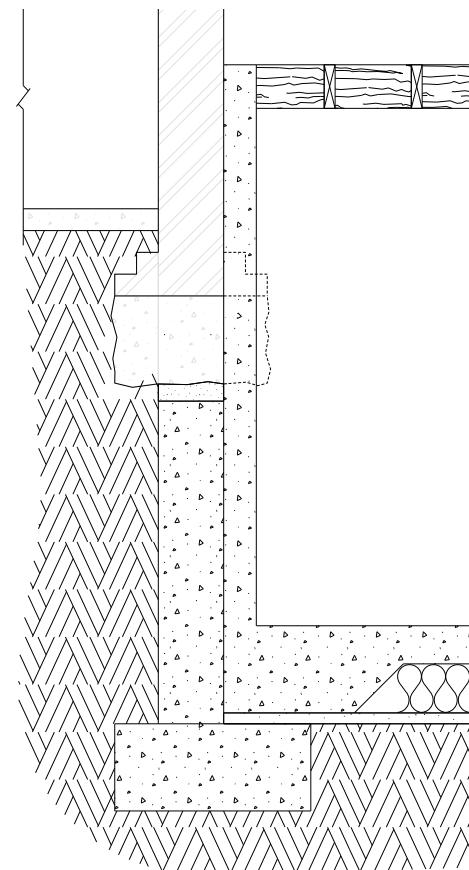
All perimeter walls will be constructed using an underpinning style hit and miss strategy to avoid undermining the ground locally during construction works.

3) Floor slab:

The floor slab is designed as suspended between perimeter wall foundations, with proprietary compressible formwork to mitigate the potential for ground heave.

4) Internal Walls and Columns

Proposed load bearing walls away from the site boundary which will not form part of the new retaining structure, will be supported on mass concrete strip footings.



Party Wall Detail



Underslab Heave Protection

4.2

Superstructure

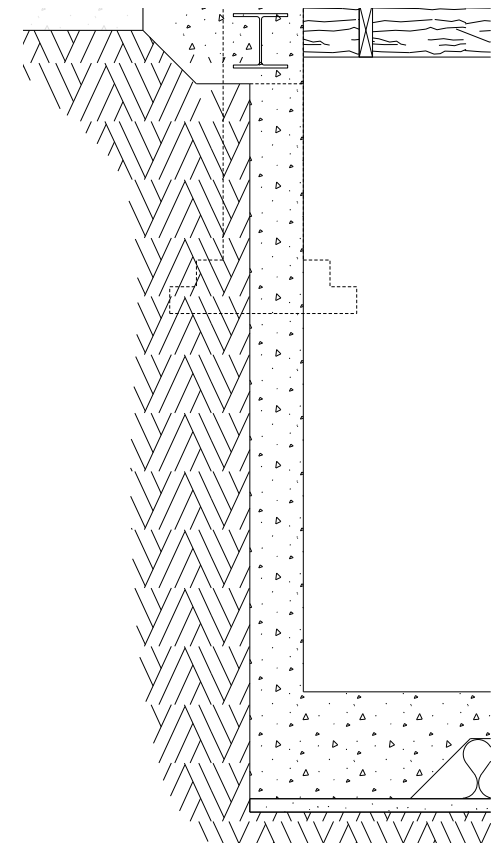
4.2.1 REAR EXTENSION

The existing rear extension will be demolished to facilitate the basement extension works and rebuilt in a reconfigured structure to better suit the new architectural intent.

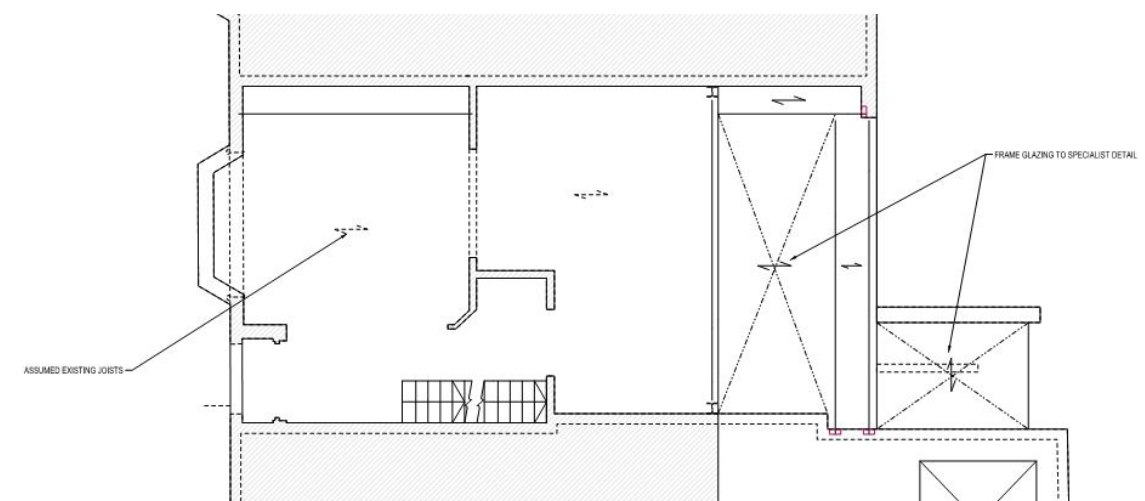
The proposed rear extension roof will be formed using a mixture of softwood timber joists and engineered glass joists spanning onto steel beams that are in turn supported on perimeter masonry walls.

The ground floor structure is stepped across the internal / external threshold. The external terrace area at high-level will be formed using an RC slab that spans on to RC beams and an RC spine wall. A large RC upstand will also be formed to the rear of the building. The proposed kitchen area at low level will comprises timber joists spanning onto RC walls that form the new basement box.

To accommodate an open plan kitchen diner area, a large opening to the rear of the existing property is proposed. To achieve this, a steel box frame is introduced along the rear line of the existing house. This supports vertical loads from rear wall as well as lateral forces apparent from wind loading.



Rear Wall Detail



First Floor Plan

Subterranean (Groundwater) Flow

5.1

Screening and Scoping

A screening exercise was undertaken by CGL Ltd, and no further actions were deemed to be necessary.

Please refer to appendix C for their detailed report.

5.2

Impact Assessment / Summary

The following is an extract from the CGL report non technical summary:

The proposed development is underlain by the London Clay Formation, designated an 'unproductive stratum' by the Environment Agency. Although perched water may be encountered within Made Ground (if present) this is not expected to be laterally persistent.

The proposed basement and replacement garage will not increase the proportion of hard-standing across the site and there will be no increase in surface water runoff.

Slope / Land Stability

6.1

Screening

A screening exercise was undertaken by CGL, with three questions identified as requiring further investigation:

- Q5 - London Clay has been identified as the likely shallowest strata on site.
- Q13 - The new games room will likely cause a step in foundations locally in the party walls.
- Q14 - The site is close to the Belsize tunnels, a Network rail asset. Inferred Crown level is anticipated to be well below (10.7m) the level of our works however.

Please refer to appendix C for their detailed report.

6.2

Scoping / Investigations

- Q14 - Network rail have been contacted for formal confirmation of the position of their assets and that no additional safeguarding measures will need to be undertaken.
- Q5 /13 - Due to site constraints, trial pits were limited to the garage and utility areas, adjacent to the position of the proposed ground lowering. A visual record of these inspection pits is presented in Appendix D.

No groundwater was encountered during the investigations and two formation soils samples were reviewed by CGL who visually identified the samples as Made Ground and Head Deposits or reworked London Clay.

Additional investigations will be undertaken at the next stage of design to confirm the ground conditions and foundation details in all areas of the site.

6.3

Impact Assessment / Summary

- **Q14** - It is expected that there will be no significant impact on Network Rail's assets. This is due to the reasons identified below. Network rail have been contacted to confirm this approach:
 - The proposed depth of new foundations will be approximately the the current lowest level of foundations.
 - The depth of the tunnels relative to the development (approximately 11m lower)
 - It is understood that there are similar developments;
- **Q5** - London Clay was visually identified, with potential for Made ground and/or Head deposits locally at higher levels. This creates the potential for higher retaining pressures on retaining structures and heave pressures on the underside of the new lower ground slab.
 - The design has been progressed to date based on the ground found in the trial pits and conservative assumptions.
 - Heave board has been included in stage 3 design to mitigate the potential for heave.
- **Q13** - The design has developed based on the position of foundations found in the trial pits and conservative assumptions. The potential for damage due to movement has been mitigated at this stage of design through:
 - Design of a robust permanent basement retaining wall scheme using conservative parameters for soil pressures and highly conservative assumptions regarding the degree of propping and discounting the beneficial retaining properties of the underpinning.
 - Outlining of a robust envisaged temporary works construction methodology, to provide propping
 - Outlining a construction monitoring scheme to identify, assess and mitigate any movements on site straight away.

Surface Flow and Flooding

7.1

Screening and Scoping

A screening exercise was undertaken by CGL Ltd, and no further actions were deemed to be necessary.

Please refer to appendix C for their detailed report.

7.2

Impact Assessment / Summary

The following is an extract from the CGL report non technical summary:

The proposed development includes the deepening of the existing garage/utility room. There will therefore be no change to the proportion of hard landscaping at the property and the proposed development will not affect surface flow.

Construction Methodology

The methodology set out below has been assumed for the purposes of undertaking the planning stage structural design and is provided to demonstrate that the works can be executed with due consideration of the surrounding buildings.

SITE SET UP

- There is access to the front of the property from Lawn Road and to the rear from Garnett Road. A banksman will be present during deliveries and removals to ensure that there is no risk to pedestrians from these activities.
- Construct site hoarding, entrance gates to provide protection to pedestrians from site activities.
- Provide a site survey of all Party Walls to record the condition prior to construction and monitor any movement occurring during the works.
- Terminate, protect or temporarily redirect services and drainage.

DEMOLITION OF REAR EXTENSION

- Carefully demolish the existing rear extension down to lowest level.

FORM PARTIAL HEIGHT REAR RETAINING WALL (PARALLEL TO GARNETT ROAD)

- Remove slab locally and batter back ground towards Garnett road
- Form concrete retaining wall insitu, including buttress wall.
- Repair lower ground slab , tie into retaining wall to ensure propping.

FORM FRONT RETAINING WALL (UNDER REAR WALL OF BUILDING)

- Install needling beams to resupport rear wall of main house., including temporary foundations in kitchen area
- Demolish rear wall to first, including top of foundations, to form 300mm trench
- From concrete top beam in 300mm trench
- Form retaining wall by underpinning trench beam in hit and miss sequence. wall to be doveled into adjacent pins and into trench beam.
- Wall designed as simply supported and propped by trench beam.

FORM RETAINING WALLS UNDERNEATH PARTY WALLS

- Mass concrete underpin under main building
- Excavate 300mm x 300mm trench along party walls.
- Install temporary waling beam spanning between front and rear retaining walls.
- Form reinforced concrete underpinning in existing lower ground level by excavating holes in 1m widths and in agreed ‘hit and miss’ sequence
- Pins to be approximately 75mm underneath wall base. Dowel bars to be added in the side to tie pins together.
- Dry pack tight between pin and base of wall above at least 24 hours after casting.
- Use proprietary side shutters to provide protection for operatives working at depth.
- Underpinning is designed as stable in temporary condition with mesh reinfortment centrally and boot at base.
- Once the underpin is complete to all walls, the bulk excavation can be completed.
- Install permanent retaining walls in front of underpins.
- Replace waling beam adjacent to top of permanent

retaining wall.

- Install ground floor structre to act as permanent prop.
- Remove waling.

INSTALL REAR TRANSFER STRUCTURE

- Install full width first floor transfer beam, ground floor columns and ground floor transfer beam.
- Remove temporary props.

CONSTRUCTION OF REAR EXTENSION

- Construct load bearing walls.
- Construct ground floor slab and upstand in traditional manner with formwork propped from lower ground slab.
- Install ground floor timber joists.
- Install padstones and first floor steelwork and associated timber roof joists.

FOLLOW ON TRADES

The principal structural works and now complete and weather proofing the building and finishing trades can start.

CONSTRUCTION GENERALLY

The works are required to be undertaken in accordance with all statutory legislation relating to construction works.

The Contractor will be required to demonstrate a positive attitude and commitment toward minimising environmental disturbance to local residents and will be required to be registered with the Considerate Contractors Scheme.

Noise, dust and vibration will be controlled by employing Best Practicable Means (BPM) as prescribed in the following legislative documents and the approved code of practice BS 5228:

- The Control of Pollution Act 1972
- The Health & Safety at Work Act 1974
- The Environmental Protection Act 1990
- Construction (Design and Management) Regulations 2015
- The Clean Air Act 1993

General measures to be adopted by the Contractor to reduce noise, dust and vibration include:

- Erection of site hoarding to act as minor acoustic screen.
- Use of super silenced plant where feasible.
- Use of well-maintained modern plant.
- Site operatives to be well trained to ensure that noise minimisation and BPM’s are implemented.
- Effective noise and vibration monitoring to be implemented.
- Reducing the need to adopt percussive and vibrating machinery..
- Vehicles not to be left idling.
- Vehicles to be washed and cleaned effectively before leaving site.

Construction Monitoring

The adjacent properties are of traditional load bearing masonry construction.

Post-planning, as part of the party wall process, a more detailed structural inspection of the adjacent properties including internal inspections will be undertaken prior to completing any detailed designs.

PARTY WALL CONSIDERATIONS

The works comprise the excavation for a single storey basement within close proximity of adjacent properties on Lawn Road These works will fall under The Party Wall etc. Act 1996.

The structural scheme adopted has been designed with due regard to maintaining the structural stability and integrity of neighbouring buildings & structures and surrounding land. The structural form of the basement and the method of construction have been developed to ensure that lateral deflections, and associated ground movements, are kept within acceptable limits during and post construction.

MONITORING OF NEIGHBOURING PROPERTIES

The category of damage to adjacent buildings, as classified under Burland et al, anticipated from the proposed construction of the new basement is expected to be category 2 - slight. The Contractor will be required to monitor ground movements during the works to check the validity of the ground movement analysis and the performance of the temporary works and working methods. A ‘traffic light’ system of green, amber, red trigger values will be set with specific Contractor actions set against each trigger values.

The monitoring method is to be developed further during detailed design but may take the form of precise levelling, geospatial surveying, crack width gauges, strain gauges, inclinometers, or extensometers or a combination of these methods. The monitoring will be undertaken prior to demolition and continue through to completion of the structure.

SUPERVISION OF WORKS

The construction of the basement will be monitored at key stages by a suitably qualified engineering professional.

Detailed contractor temporary works methodologies and calculations for all major elements of the works will be produced by the contractor and reviewed by this qualified person prior to any works taking place.

TRAFFIC LIGHT	TRIGGER VALUE (mm)	CONTRACTOR ACTION
Green	<8	No action required
Amber	8-12	Notify the CA and Party Wall Surveyor(s). Increase frequency of monitoring. Implement contingency measures if movement continues.
Red	>12	Notify the CA and the Party Wall Surveyor(s). Implement measures to cease movement and stop work.

Indicative Ground Movement Trigger Values

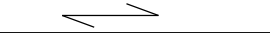
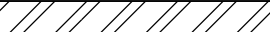
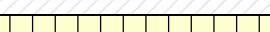
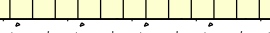
Appendix A

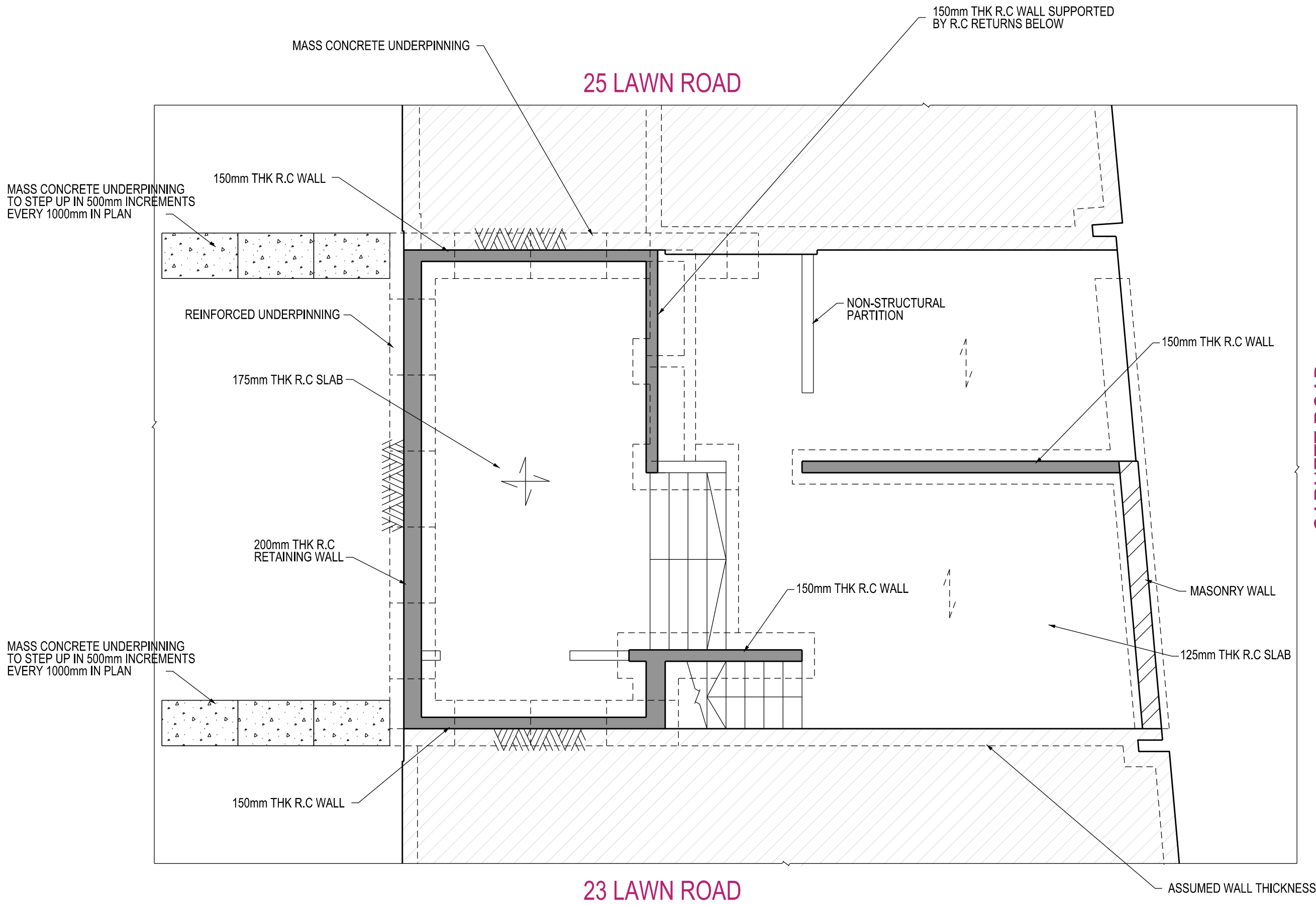
Structural Drawings

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. FOR MOVEMENTS AND TOLERANCES REFER TO DRAWING No. 2513-MORPH-ZZ-ZZ-DR-S-0005.
3. DO NOT SCALE FROM THIS DRAWING

MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 3
REINFORCED CONCRETE	RC 28 / 35
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SPAN DIRECTION OF FLOOR	
PROPOSED BRICKWORK	
PROPOSED R.C CONCRETE	
EXISTING SOIL / GROUND BUILD UP	
EXISTING STRUCTURE	
TIMBER STUDWALL (PLAN)	
PROPOSED MASS CONCRETE	



ISSUED FOR COMMENT

P2	08.12.17	ISSUED FOR COMMENT	MF	DH
P1	08.11.17	ISSUED FOR COMMENT	BB	DH
REV	DATE	DESCRIPTION	BY	CHECKED

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24 LAWN ROAD

PROPOSED
LOWER GROUND
FLOOR PLAN

SCALE	1:50 @ A2	DATE	NOV '17	DRAWN	BB	CHECKED	DH
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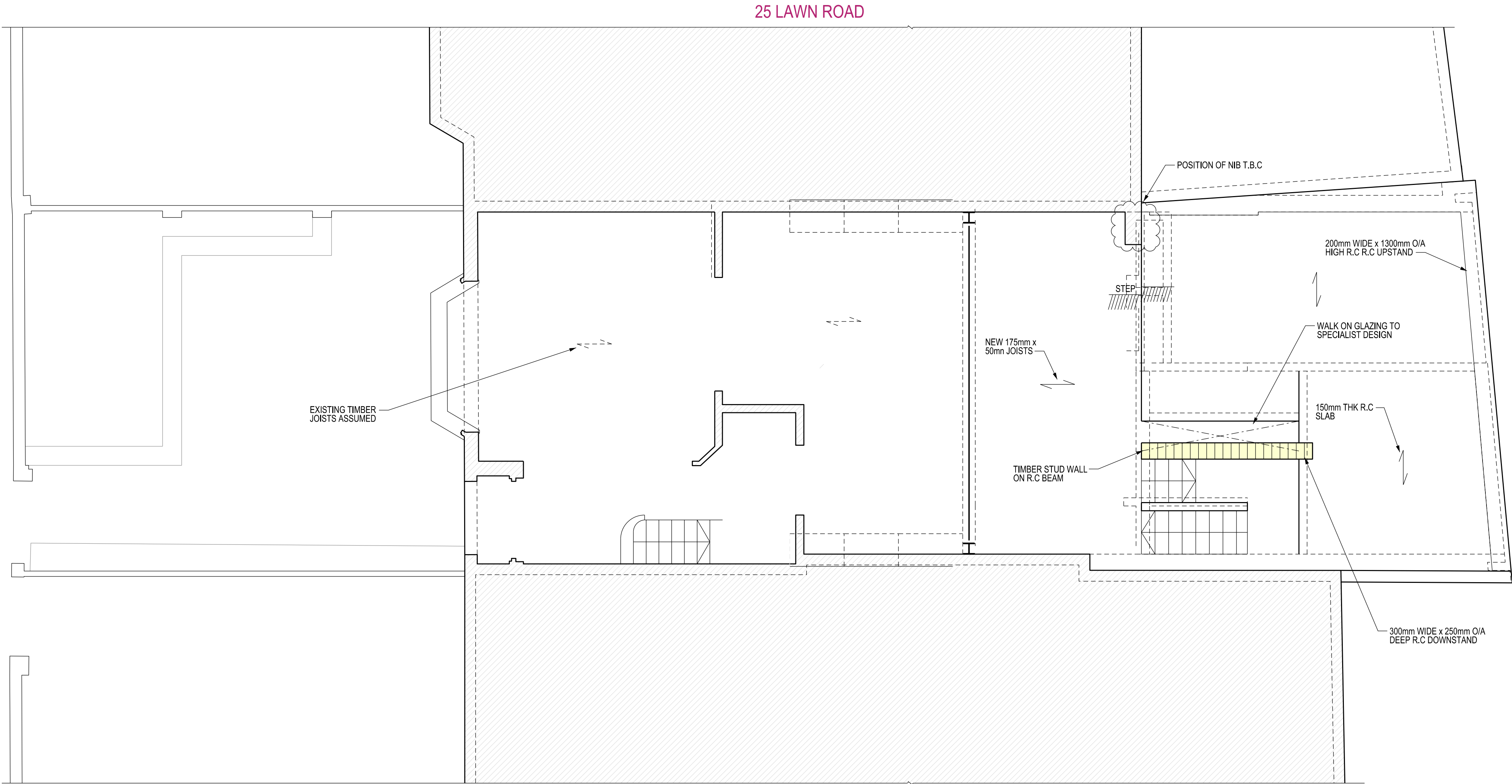
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MATERIAL GRADES	
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STRUCTURAL STEELWORK	S355

LEGEND	
SPAN DIRECTION OF FLOOR	
PROPOSED BRICKWORK	
PROPOSED R.C CONCRETE	
EXISTING SOIL / GROUND BUILD UP	
EXISTING STRUCTURE	
TIMBER STUDWALL (PLAN)	



ISSUED FOR COMMENT

23 LAWN ROAD

P2	08.12.17	ISSUED FOR COMMENT	BB	DH
P1	08.11.17	ISSUED FOR COMMENT	BB	DH
REV	DATE	DESCRIPTION	BY	CHECKED

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24 LAWN ROAD

PROPOSED
GROUND FLOOR
PLAN

SCALE	1:50 @ A2	DATE	NOV '17	DRAWN	BB	CHECKED	DH
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P2

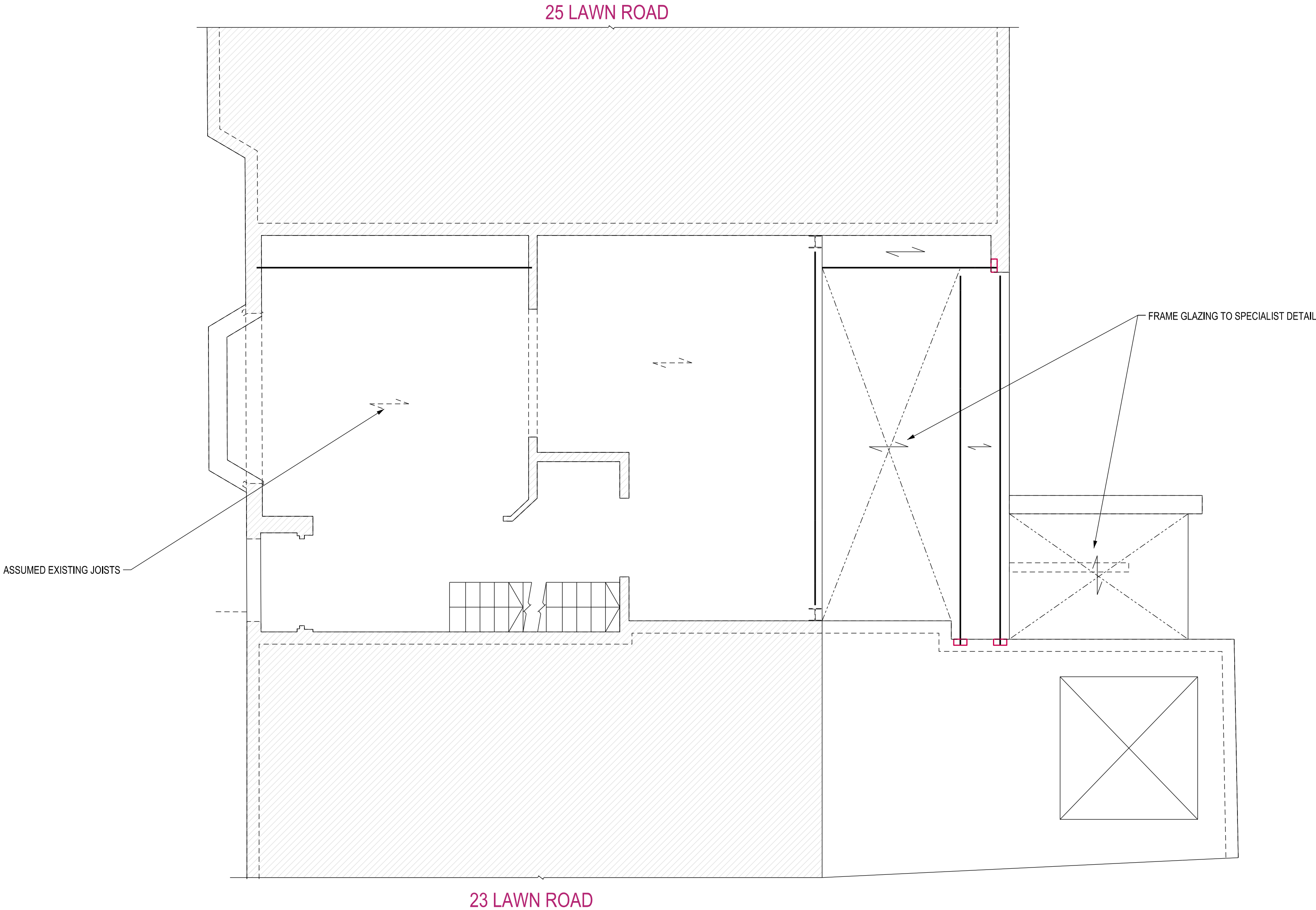
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2. FOR MOVEMENTS AND TOLERANCES REFER TO DRAWING No. 2513-MORPH-ZZ-ZZ-DR-0005.
3. DO NOT SCALE FROM THIS DRAWING
4. FIRST FLOOR STRUCTURE ASSUMED

MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 3
REINFORCED CONCRETE	RC 28 / 35
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SPAN DIRECTION OF FLOOR	
PROPOSED BRICKWORK	
PROPOSED R.C CONCRETE	
EXISTING SOIL / GROUND BUILD UP	
EXISTING STRUCTURE	
TIMBER STUDWALL (PLAN)	



ISSUED FOR COMMENT

P1	08.11.17	ISSUED FOR COMMENT	BB	DH
REV	DATE	DESCRIPTION	BY	CHECKED

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24 LAWN ROAD

PROPOSED
FIRST FLOOR / ROOF
PLAN

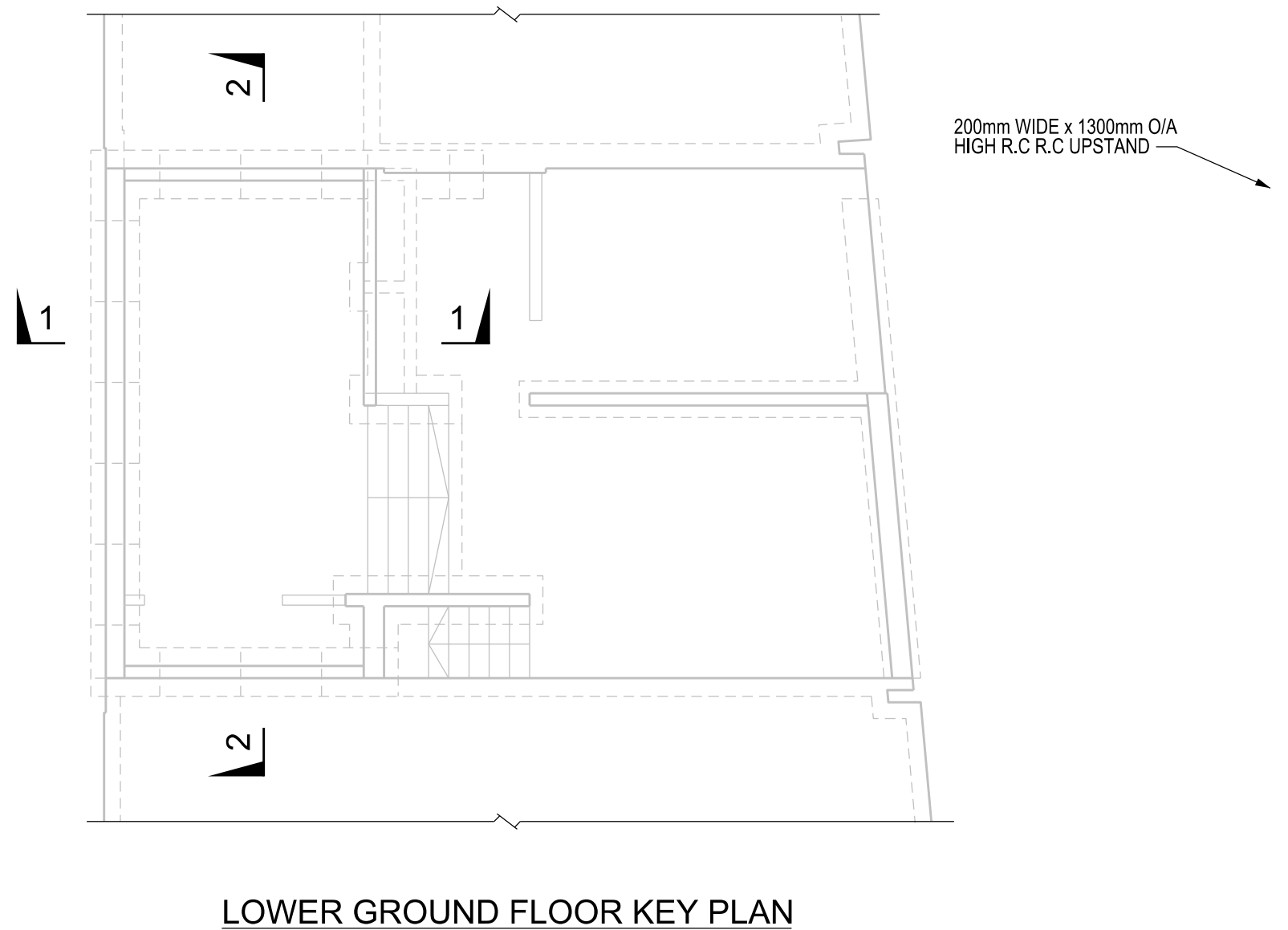
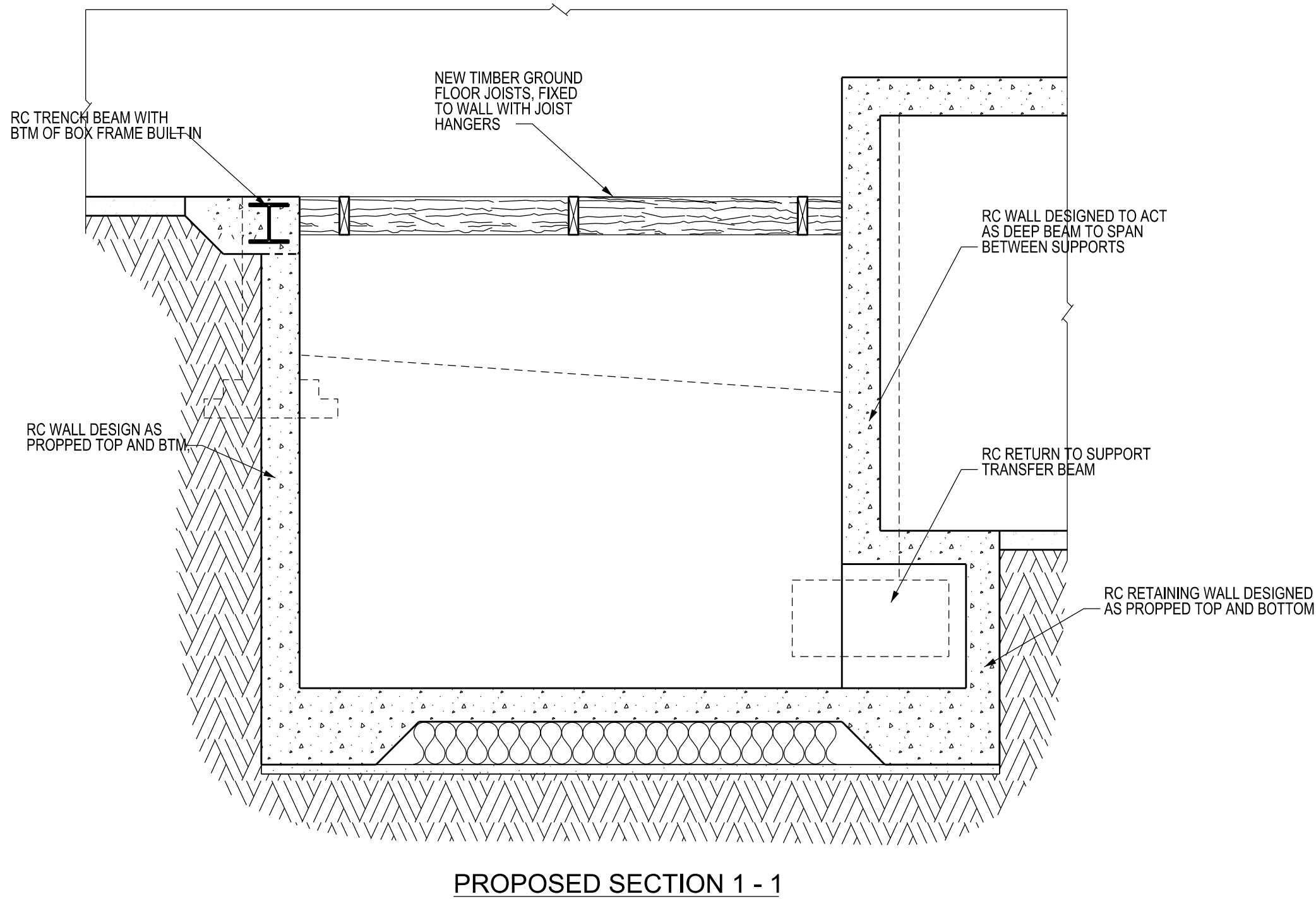
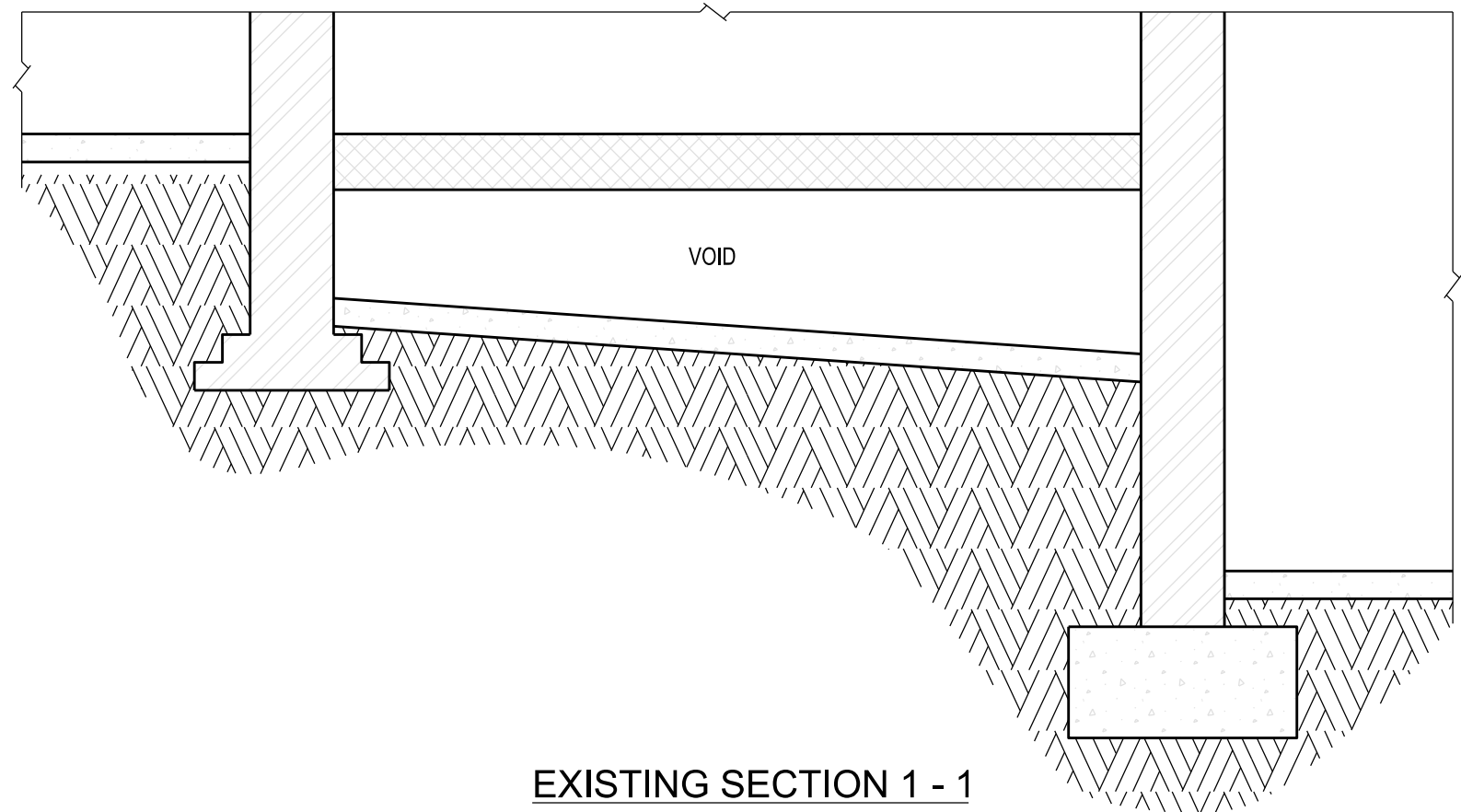
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DRAWING No.	P1	REVISION
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Appendix B

Proposed Lower Ground Section Sketches



FOR INFORMATION ONLY

P2	11.12.17	GROUND LEVEL CLARIFIED	DH	DH
P1	08.12.17	ISSUED FOR INFORMATION	BB	MF
REV	DATE	DESCRIPTION	BY	CHECKED

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24 LAWN ROAD

GLOBAL SECTIONS

VARIES	NOV '17	BB	MF
SCALE	DATE	DRAWN	CHECKED

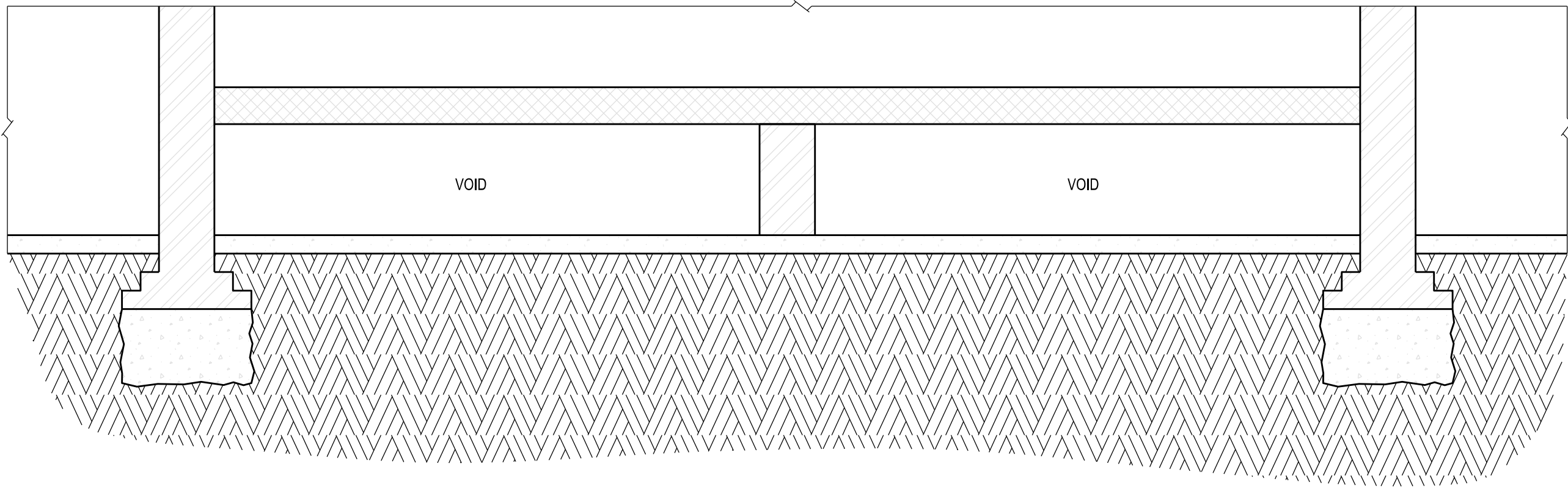
2513-MORPH-ZZ-00-SK-S-0002

DRAWING No. P2 REVISION

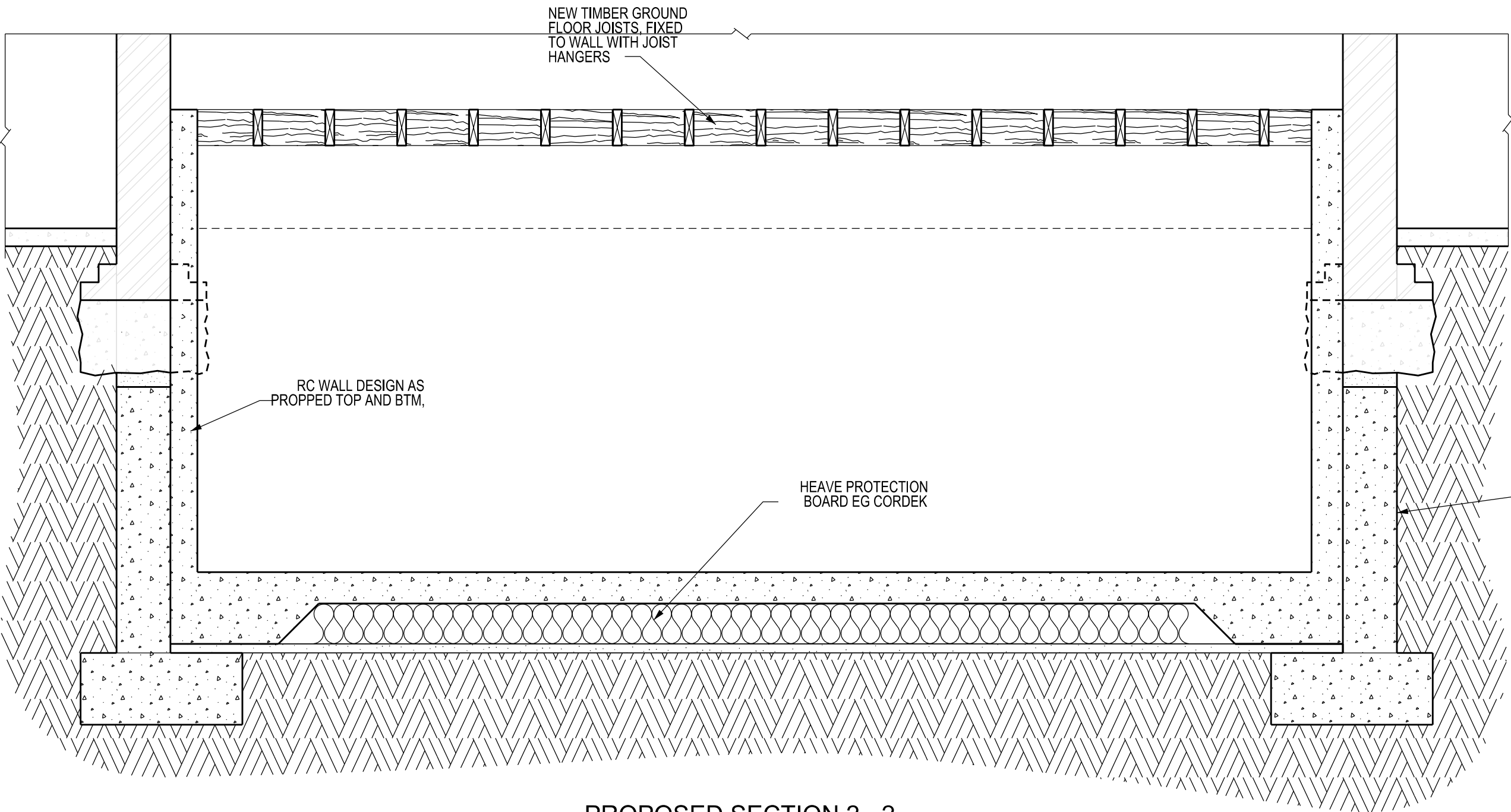
CLIENT

PROJECT

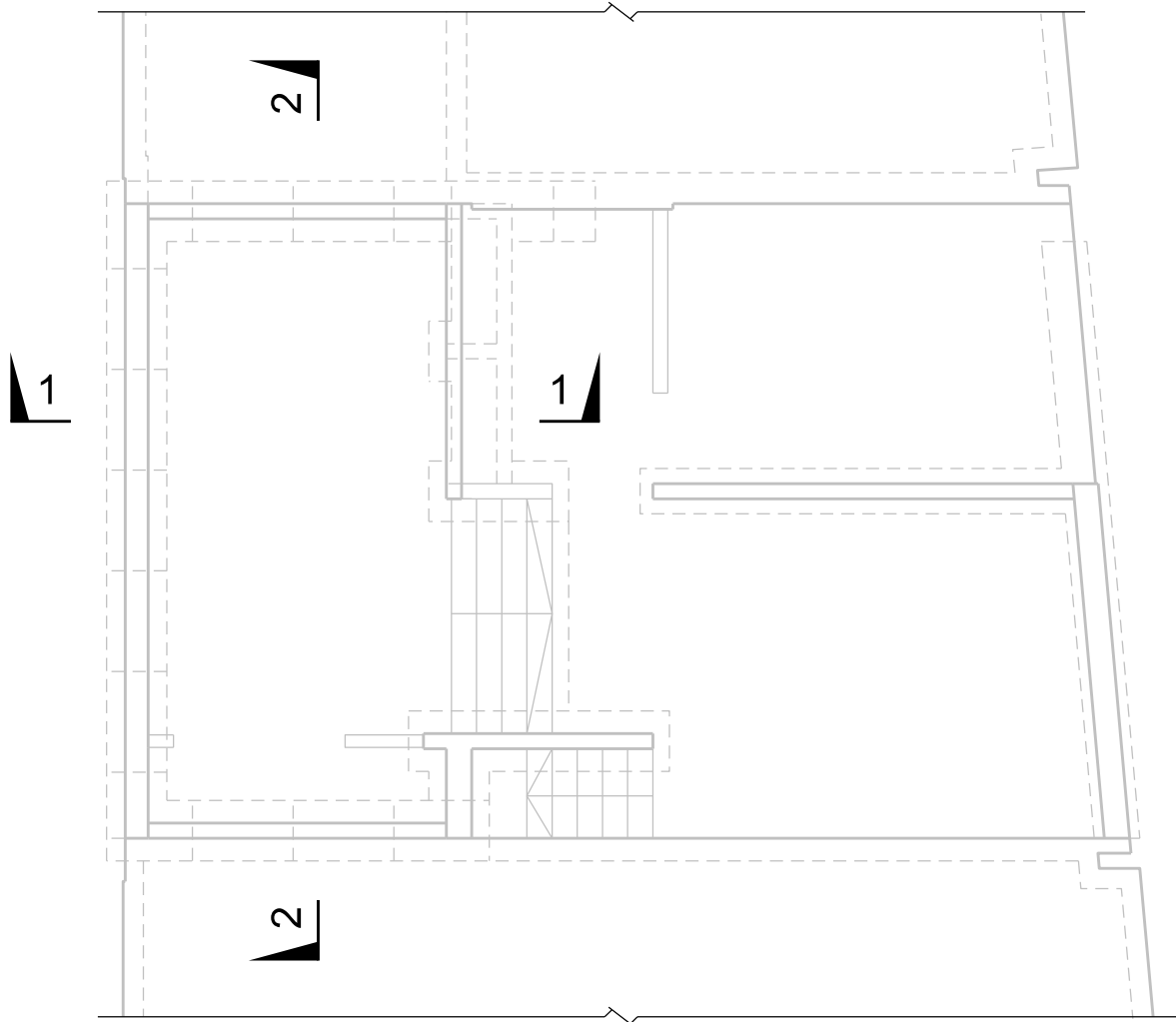
TITLE



EXISTING SECTION 2 - 2



PROPOSED SECTION 2 - 2



LOWER GROUND FLOOR KEY PLAN

FOR INFORMATION ONLY

P2	11.12.17	GROUND LEVEL CLARIFIED	DH	DH
P1	08.12.17	ISSUED FOR INFORMATION	BB	MF
REV	DATE	DESCRIPTION	BY	CHECKED

Appendix C

Geotechnical Screening and Scoping Report



Providing Ground Solutions

James and Victoria Twining

24 Lawn Road, Camden
Screening and Scoping Report
(Revision 1)

December, 2017



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Telephone: 01483 310600
www.cgl-uk.com

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Card Geotechnics Limited ("CGL") has prepared this report in accordance with the instructions of James and Victoria Twining ("the Client") under the terms of its appointment for consulting engineering services by the Client dated 13 November 2017. The report is for the sole and specific use of the Client, and CGL shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by CGL in this connection without the explicit written agreement thereto by CGL.

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Reference	CG/28395	Revision 0 Issue Date December 2017
		1 December 2017

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FIGURES

Figure 1 Site location plan

Figure 2 Site layout plan

APPENDICES

Appendix A Existing and proposed layouts and sections

Appendix B Morph Structures' Foundation Inspection Pit records

Appendix C BGS borehole records

1. INTRODUCTION

It is proposed to redevelop 24 Lawn Road in the London Borough of Camden (LBC). The proposed redevelopment includes the demolition and replacement of the garage and utility room at lower ground floor level and the extension of the lower ground floor beneath the main house.

The London Borough of Camden's guidance document "*CPG4, Basements and Lightwells*"¹, requires a Basement Impact Assessment (BIA) to be undertaken for new basements in the Borough and sets out 5 stages for a BIA to "enable the Borough to assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated by the developer". The five stages are set out below:

1. Screening
2. Scoping
3. Site investigation
4. Impact assessment
5. Review and decision making

Card Geotechnics Limited (CGL) has been instructed by Morph Structures Limited (the Structural Engineers) on behalf of James and Victoria Twining (the Client), to undertake a *Screening (Stage 1) and Scoping (Stage 2) Report* for the proposed development.

This report is intended to address the screening and scoping stages. It identifies the key issues relating to land stability, hydrogeology and hydrology as part of the screening process (Stage 1) and includes recommendations for appropriate site investigation (Stage 2).

¹ Camden Planning Guidance. (July 2015). *Camden Planning Guidance Basements and Lightwells*. CPG4.

2. SITE CONTEXT

2.1 Site location

The site is located at No. 24 Lawn Road, Camden, NW3 2XD. The National Grid Reference for the approximate centre of the site is 527560E, 185271N. The site location is shown in Figure 1.

2.2 Site layout

The site covers an area of approximately 185m² (6.8m wide by 27m long) and is currently occupied by a mid-terrace house comprising three above ground storeys and a lower ground floor to the rear of the property. The current site layouts and sections are presented in Appendix A and a site layout plan is presented as Figure 2.

A garden area is present to the front of the property. This is laid to lawn with border planting. There are no soft landscaped areas to the rear of the property. A ground level of approximately 55mOD for the front garden and 55.2mOD for the existing ground floor level is assumed.

The lower ground floor is occupied by a utility area and a garage. The garage is approximately 1.7m below the house ground floor level (56.9mOD), and slopes up by 0.1m towards the house, but is at a similar level to the private access way. It is noted that the utility area is approximately 1.4m below the house ground floor level (56.6mOD), corresponding to 0.3m above the existing garage level. A 0.8m deep 'inspection hatch' is present beneath the garage (at approx. 57.7mOD). The lower ground floor may be accessed directly from the house or via a private access way off Garnett Road. The garage roof forms a terrace, accessed from the house. The lower ground floor does not encroach beneath the main house in the current condition, however a shallow void is present beneath the single storey rear portion of the house.

The site is bounded by the terrace residential properties of 23 and 25 Lawn Road to the south and north of the site respectively. These properties are of a similar size and layout to, and share party walls with, 24 Lawn Road. It is noted that these properties also have garages that front onto the private access way. The site is bound to the west by the pavement and highway of Lawn Road, and to the east by the private access way off Garnett Road (located to the north of the site).

Two foundation inspection pits were inspected by Morph Structures and these records are presented in Appendix B. The records indicate that the party wall foundation with 23 Lawn Road (south of the site) is approximately 0.8m deep (approx. 55.8mOD) and the party wall foundation with 25 Lawn Road (north of the site) is approximately 0.6m deep (approx. 56.3mOD). Further discussion on the inspection pits provided in Section 2.8.

2.3 Topography

The site is situated on the eastern side of a hill, which rises up towards the Hampstead to the north-west of the site. In the area of the site, levels fall towards the east, with the front garden of the site at an elevation of approximately 58mOD.

The eastern area of Hampstead Heath is situated directly to the north of the site, with the ponds at an elevation of approximately 65mOD to 70mOD. It is noted that ground levels reduce to around 50mOD to 55mOD between the site and the ponds, before rising to around 55mOD to 60mOD in the area of the site.

Ground level contours on and within close proximity of the site have been included within Figure 2 and are based on available lidar mapping. The contours indicate that Lawn Road slopes down gently towards the north.

2.4 Tunnels

It is noted that two network rail tunnels (for the Thameslink line) are located either side of the property. The *Belsize Tunnel*, located to the south of the site, was constructed between 1865 and 1867 for the Midland Railway extension from Bedford to London St Pancras. The *Belsize New Tunnel*, the tunnel to the north of the site, was constructed by the mid-1880s to increase the tunnel capacity. It is understood that the tunnel is brick lined.

With reference to the architects drawing (528_001_P1 dated October 2017), the nearest tunnel crown of the *Belsize Tunnel* is approximately 5m to the south of the site and the nearest tunnel crown of the *Belsize New Tunnel* is approximately 22m to the north of the site. The approximate alignment is indicated on Figure 2, however, this should be confirmed with Network Rail.

The railway track level at the eastern portal is approximately 38mOD (280m to the east of the site), increasing by 10m to approximately 48mOD at the western portal (1.4km to the west-south west of the site). Assuming a 6m diameter tunnel, tunnel crown levels in the area of the site may be inferred at around 45mOD – this should be confirmed with Network Rail.

2.5 Proposed development

It is understood that the proposed development comprises the lowering of the existing lower ground floor beneath the existing garage/utility room, generally by up to 0.2m, to form a consistent floor level of approximately 56.5mOD; this area will be occupied by a living area and a smaller garage (in the northern area).

It is noted that the existing floor level within a small area of the utility area is some 0.5m above the general laundry level (at approx. 57.3mOD), and this area will be lower by approximately 0.7m.

A storage/games room is proposed beneath the existing single storey part of the property (where a void is currently noted) and will have a floor level of approximately 55.7mOD (2.5m below existing lower ground floor level), with access to the living area via a small staircase; this will result in an excavation of approximately 1.7m (based on the assumed void depth indicated in the architects drawings), and corresponds to level of the existing 'inspection hatch' (approx. 55.7mOD).

It is understood that the existing party walls will be underpinned to form the retaining walls for the excavation of the storage/games room. However, given the shallow nature of the lower ground floor lowering, no significant underpinning will be required.

Current and proposed development plans are included as Appendix A.

2.6 Site history

A review of available historical mapping indicates that the site and surrounding area comprised farmland until the late 1800s.

The *Belsize Tunnel*, located to the south of the site, was constructed between 1865 and 1867 for the Midland Railway extension from Bedford to London St Pancras. The *Belsize New Tunnel*, to the tunnel to the north of the site, was constructed by the mid-1880s to increase the tunnel capacity.

The mapping between the late 1800s and the early 1900s indicate residential development to the north, east and south of the site, with the North Western Fever Hospital to the north-west of the site and a Nursey to the west. A 'corridor' of limited development is noted along the alignment of the tunnels, incorporating the site. It is anticipated that this localised lack of development is associated with the presence tunnels.

The site was developed by the mid-1930s, with a similar configuration to present day.

2.7 Published geology

The British Geological Survey (BGS) sheet² of the area indicates that the site to be underlain by the London Clay Formation with no record of superficial deposits on or close to the site. An area of anticipated Quaternary head deposits ('head propensity') is noted a short distance to the south-west of the site, owing to the slope angles.

The London Clay Formation is typically an over-consolidated, firm to very stiff, fissured, blue to grey silty clay of very high plasticity. The upper and lower parts may contain silty or fine grained sand partings. The stratum may also contain laminated, structured, nodular claystone and rare sand partings. Crystals of gypsum (selenite) are often present within the weathered London Clay Formation. The stratum is generally horizontally bedded.

The basal contour map on the geological sheet² suggest that the London Clay Formation is approximately 50m thick in the area of the site.

2.8 Unpublished geology

Records of historical boreholes within 350m of the site have been reviewed and are presented as Appendix B. A summary of the information from these records is provided in Table 1.

Table 1. Summary of BGS borehole records

BH record reference	Distance (m)	Direction	Base of BH (mbgl) [mOD]	Ground water level (mbgl) [mOD]	Depth to top of stratum (mbgl) [mOD]				
					Made Ground	London Clay Formation	Lambeth Group	Thanet Sand	Upper Chalk
TQ28NE277	211	NW	177	95.65 [-36.4]	-	GL ¹	69 [-9.7]	90 [-30.7]	101 [-41.7]
TQ28NE77	240 to 270	N	15.25	12.2 [40.1]	GL [52.3]	0.3 [52.0]	-	-	-
TQ28NE78			12.2	2.2 [52.4]	GL [54.6]	3.05 [51.6]	-	-	-
TQ28NE79			12.2	1.5 [53.0]	GL [54.5]	2.15 [52.4]	-	-	-
TQ28NE48	260	SW	43.5	-	GL	3.8	-	-	-
TQ28NE38	355	W	6.1	-	GL	1.2	-	-	-

Notes

1. GL = ground level (shallowest stratum noted); - = Not recorded

² British Geological Survey. (2006). *North London Sheet 256*. England and Wales. Solid and Drift Geology. 1:50,000.

The BGS borehole records indicated that the London Clay is the shallowest natural stratum, locally overlain by Made Ground. The London Clay was identified to a depth of 69m bgl (-9.7mOD) in record TQ28NE277, which is consistent with the published records. It is noted that groundwater strikes were noted in records TQ28NE77 to TQ28NE79 (a collection of boreholes between 240m and 270m to the north of the site), and it is considered that this water is perched.

The results of nearby CGL investigations, within 100m of the site, indicates that some 0.9m of Head Deposits may be present between the Made Ground and London Clay Formation.

Two foundation inspection pits were inspection by Morph Structures on 22 November 2017 along the northern (TP1) and southern (TP2) party walls with 25 and 23 Lawn Road, respectively. The records are presented as Appendix B and are summarised in Table 2.

Table 2. Summary of foundation inspection pit details

Pit reference	Location	Details
TP1	Party wall with 25 Lawn Road	The brick wall is founded on concrete, which extends to some 0.6mbgl. The concrete steps out some 0.26m to 0.35m at 0.2mbgl.
TP2	Interior wall with void	The brick wall steps out in a corbel at some 0.2mbgl and is underlain at 0.33mbgl by concrete of unknown thickness.
	Party wall with 24 Lawn Road	The brick wall steps out at some 0.5mbgl and extends to a depth of 0.8mbgl.

Two samples of the soils at formation level were recorded and provided to CGL for inspection. The ground conditions encountered in the foundation inspection pits comprised two types: a soft, dark brown, sandy, gravelly (red brick) clay; and a firm, light brown, very sandy, gravelly (flint) clay. The former may be described as Made Ground and the later may be natural Head Deposits, or reworked London Clay.

2.9 Hydrogeology and Hydrology

The Environment Agency³ (EA) has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply, and their role in supporting surface water bodies and wetland ecosystems.

The site does not overlie a designated superficial or bedrock aquifer and is noted as being underlain by the London Clay Formation, designated a 'non-productive stratum' by the Environment Agency.

With reference to Environmental Agency mapping, the site is not located within a groundwater source protection zone (GSPZ) or a Groundwater Vulnerability Zone, and is in a Flood Zone 1 (low probability of flooding: no risk assessment required).

The flood maps included within CPG4¹ and Camden's Strategic Flood Risk Assessment⁴ (SFRA) indicate that *Lawn Road* was not flooded during the extreme rainfall events in 1975 and 2002 and is not within a Local Flood Risk Zone.

The closest significant surface water features are the *Hampstead Ponds* located approximately 630m north of the site.

³ <http://www.environment-agency.gov.uk> (accessed November 2017)

⁴ URS (2014) *London Borough of Camden – Strategic Flood Risk Assessment*

3. SCREENING (STAGE 1)

3.1 Introduction

A screening assessment has been undertaken based on structured guidance presented in Camden Borough Council's CPG4¹. Responses to the questions posed by the flowcharts are presented below and where 'yes' or 'unknown' may be simply answered with no analysis required, these answers have been provided.

3.2 Subterranean (Groundwater) flow

This section answers questions posed by Figure 3 in CPG4:

Table 3. Responses to Figure 3, CPG4

Question	Response	Action required
1a. Is the site located directly above an aquifer?	No. The site is directly underlain by the London Clay Formation, designated an unproductive stratum by the Environment Agency.	None
1b. Will the proposed basement extend beneath the water table surface?	No. Limited water may be encountered in the Made Ground (if present), but this is anticipated to be perched and not representative of a continuous groundwater body. Additionally, the proposed development does not extend beneath the deepest point of the current building.	None
2. Is the site within 100m of a watercourse, well or potential spring line?	No.	None
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No.	None
4. Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	No.	None
5. As part of site drainage, will more surface water than at present be discharged to ground (e.g. via soakaways and/or SUDS)?	No.	None
6. Is the lowest point of the proposed excavation close to or lower than, the mean water level in any local pond or spring-line?	No.	None

3.2.1 Non-technical summary: Groundwater

The proposed development is underlain by the London Clay Formation, designated an 'unproductive stratum' by the Environment Agency. Although perched water may be encountered within Made Ground (if present) this is not expected to be laterally persistent.

The proposed basement and replacement garage will not increase the proportion of hard-standing across the site and there will be no increase in surface water runoff.

3.3 Slope/land stability

This section answers questions posed by Figure 4 in CPG4.

Table 4. Responses to Figure 4, CPG4

Question	Response	Action required
1. Does the site include slopes, natural or man-made, greater than about 1 in 8?	No.	None
2. Will the proposed re-profiling of the landscaping at site change slopes at the property boundary to greater than about 1 in 8?	No.	None
3. Does the development neighbour land including railway cuttings and the like with a slope greater than about 1 in 8?	No.	None
4. Is the site within a wider hillside setting in which the general slope is greater than about 1 in 8?	No.	None
5. Is the London Clay the shallowest strata on site?	Yes Although Made Ground and/or Head Deposits may be present above the London Clay.	Investigation and assessment
6. Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?	No.	None
7. Is there a history of shrink/swell subsidence in the local area and/or evidence of such at the site?	Unknown. However, there is no significant vegetation/trees in the area of the proposed lower ground floor therefore movements associated with shrink/swell are not anticipated to be significant.	None
8. Is the site within 100m of a watercourse or a potential spring line?	No.	None
9. Is the site within an area of previously worked ground?	No.	None

Question	Response	Action required
10. Is the site within an aquifer?	No.	None
11. Is the site within 50m of the Hampstead Heath ponds?	No.	None
12. Is the site within 5m of a highway or pedestrian right of way?	Yes. However, the proposed lower ground floor is greater than 5m from Lawn Road (west of the site) and Garnett Road (north of the site) and excavation within 5m of the private access to the rear of the site is not considered to be significant (<0.5m).	None
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes. The construction of the proposed storage/games room may result in excavation of approximately 1.7m, and these party walls will be underpinned to form the new retaining walls.	Impact Assessment
14. Is the site over (or within the exclusion zone of) any tunnels?	Unknown The available drawings indicate that the closest tunnel is 5m to the south of the site. However, inferred crown level (45mOD) is approximately 10.7m below proposed lower ground floor level.	Impact Assessment

3.3.1 Non-technical summary: Slope/land stability

The proposed development comprises an extension of the existing lower ground floor beneath the main part of the property and will not extend beneath the current lowest part of the site (the inspection pit beneath the garage). The extension will include the excavation of up to approximately 1.7m of soil and the slight deepening of some existing party wall foundations.

The proposed lower ground floor works will result in ground movements. The magnitudes of the movements are anticipated to be relatively low, given the shallow nature of the proposed excavation and the high stiffness of underpin foundations. However, assessment of ground movements may be required to confirm their magnitudes.

3.4 Surface flow and flooding

This section covers the main surface flow and flooding issues as set out in Figure 5, CPG4.

Table 5. Responses to Figure 5, CPG4

Question	Response	Action required
1. Is the site within the catchment area of the pond chains on Hampstead Heath?	No.	None
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off), be materially changed from the existing route?	No.	None
3. Will the proposed development result in a change in the proportion of hard surfaced/paved external areas?	No.	None
4. Will the proposed basement result in a change to the profile of the inflows of surface water being received by adjacent properties or downstream watercourses?	No.	None
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No.	None
6. Is the site in an area known to be at risk from surface flooding, or is it at risk from flooding because the proposed basement is below the static water level of a nearby surface water feature?	No.	None

3.4.1 Non-technical summary: Surface flow and flooding

The proposed development includes the deepening of the existing garage/utility room. There will therefore be no change to the proportion of hard landscaping at the property and the proposed development will not affect surface flow.

3.5 Summary

The above screening exercise shows that the proposed development will not affect groundwater or surface water flow and is not at risk of flooding.

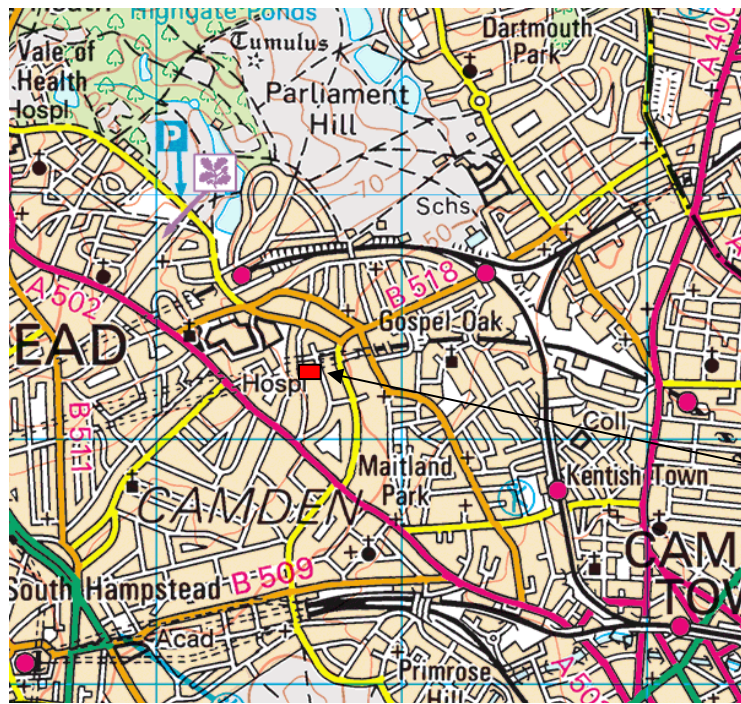
The proposed development comprises an extension of the existing lower ground floor beneath the main part of the property and will not extend beneath the current lowest part of the site (the inspection pit beneath the garage). The extension will include the excavation of up to approximately 1.7m of soil and the slight deepening of some existing party wall foundations. The proposed lower ground floor works will result in ground movements including heave due to unloading (basement excavation) and settlement due reapplication of party walls via underpins and workmanship. However, with appropriate control measures during construction, the magnitudes of movements are anticipated to be relatively low. Notwithstanding this, a ground movement assessment may be required once the development plans and construction methodology are finalised to confirm the magnitude of these movements. Assessment may also be requested by Network Rail, if required to provide information for assess safeguarding. We understand that Network Rail have been contacted and a response is awaited in this regard.

4. SCOPING (STAGE 2)

On the basis of the Screening Report, an intrusive investigation may be required to confirm the underlying geological sequence and groundwater levels, if present, and to derive specific geotechnical design parameters for detailed design.

The intrusive investigation would typically comprise the excavation of a minimum of one borehole with in-situ testing undertaken at regular intervals. Soil samples should be obtained to allow geotechnical classification to be undertaken. Monitoring wells should be installed to allow groundwater monitoring.

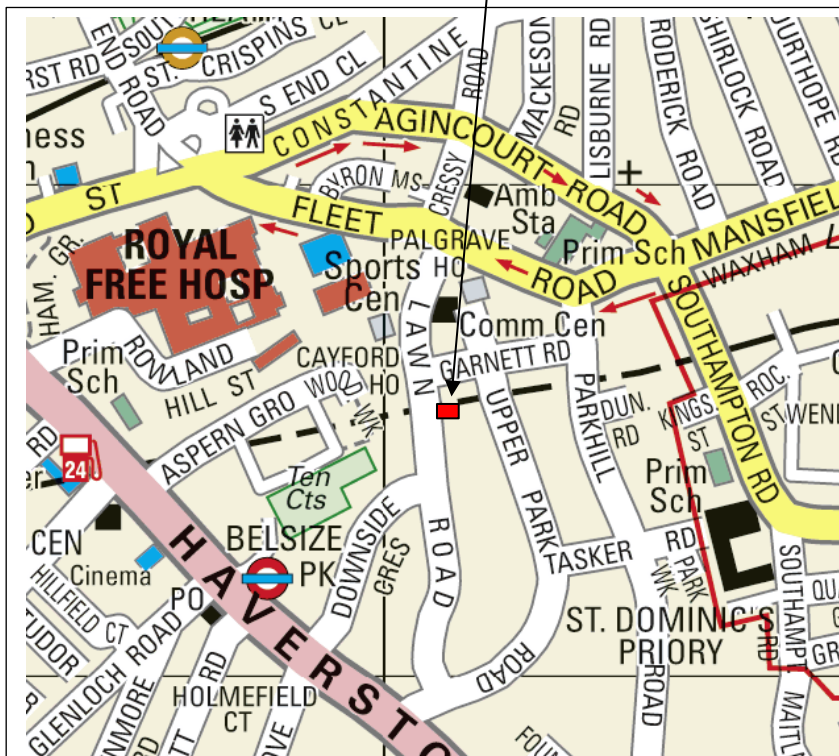
FIGURES



Site location

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Licence No. 100012585



Client

**James and Victoria
Twining**

Project

24 Lawn Road, Camden

Job No

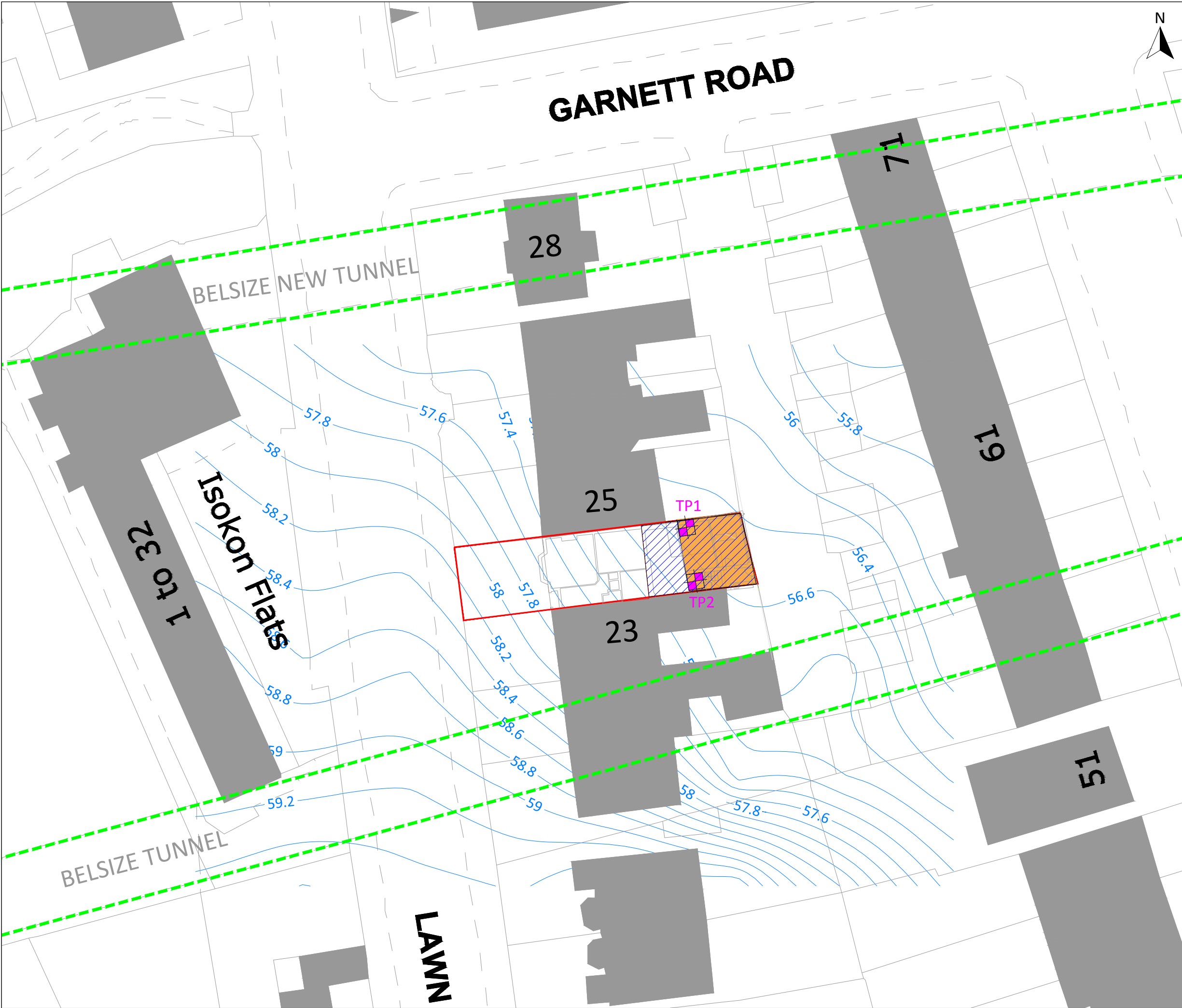
CG/28395

Title

Site location plan

Figure 1





KEY

- Site boundary
- Ground level (mOD)
- Existing Lower Ground Floor Level
- Proposed Lower Ground Floor Level
- Network Rail Tunnel (taken from CON|FORM architects drawing '528_001_P1')
- Trial pits logged by Morph Structures (2017)

- Notes.
- Drawing not to scale.
 - Ground levels approximate and taken from LIDAR data (<http://environment.data.gov.uk/ds/survey/index.jsp#/survey>)

0	01/12/17	
Rev	Date	Comments
 Card Geotechnics Ltd 4 Godalming Business Centre Woolsack Way Godalming Surrey GU7 1XW T: 01483 310600		
Project 24 Lawn Road, Camden		
Client James and Victoria Twining		
Drawing title Figure 2 - Site Layout Plan		
Scale(s) NTS		Job No. CG/28395
Drawn Checked Approved	TSB 01/12/17	Dwg No. CG/28395-001 Rev. 0

APPENDIX C

BGS borehole records



Source: BGS Geoindex, accessed November 2017.



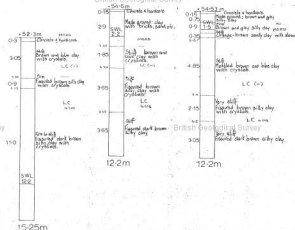
Client James and Victoria Twining	Project 24 Lawn Road, Camden	Job No CG/28395
	Title BGS borehole location plan	Appendix C

British Geological Survey

British Geological Survey

British Geological Survey

KEY PLAN
Scale 1:1250



Size A2 16" x 23" - 420mm x 594mm			
div	job no.	diag. no.	rev.
G	3287	01	
DW			
JOB D M E S			
OFFICES & WORKSHOPS			
CRESSY ROAD			
CAMDEN			
TITLE			
TRIAL BORINGS 1-3			
KEY PLAN & SECTIONS			
scale		VERTICAL	
		1:500	
date	drawn	checked	
25. 7. 1971	W. C.	H. C. T.	
GLC ILEA			
Dept of Architecture and Civic Design			
Architect	<i>Roger Hoadley</i>		
01-632 5000	Ext. 838f		
NOTES			
1 Newlyn Datum Levels			
2 $\odot$ Denotes Trial Boring			
3 WS. Denotes Water Strike			
4 SWL Denotes Standing Water Level at the time of boring in July 1971			
British Geological Survey			
REVISIONS			
no.	date		
COPY			
reference			
div.	job no.	diag. no.	rev.
G	3287	01	
SW			

GROUND EXPLORATIONS LTD.

T018NE/77

BOREHOLE NO. 1

2754.8550.

Contract Name Cressy Road, Camden

Report No. 5332/BW/MA

Client Greater London Council

Site Address

Department of Architecture

Address and Civic Design

Cressy Road

The County Hall

Camden

London, S.E.1.

London, N.W.3.

ORDER NO.: BC.85977

Standing Water Level 12.2 m.

Method of Boring Shell and auger

Water Struck -

Diameter 0.15 m.

Ground Level 52.295 m. O.D.

Start 7.6.71 Finish 9.6.71

Remarks

JARS metres		CORES metres		BULK metres	
1530	0.75	1550	15.25		
1532	2.3	1551	Water		
1534	3.5				
1536	4.7				
1538	6.25				
1540	7.75				
1542	9.3				
1544	10.8				
1546	12.35				
1548	13.85				
		1531	1.05		
		1533	2.6		
		1535	4.1		
		1537	5.65		
		1539	7.15		
		1541	8.7		
		1543	10.2		
		1545	11.75		
		1547	13.25		
		1549	14.8		
Description				Thickness	Depth
				m	m
Concrete and hardcore.				0.3	0.3
Stiff Brown and blue clay with crystals				3.05	3.35
Firm Fissured brown silty clay with crystals				0.9	4.25
Firm to stiff fissured dark brown silty clay with crystals.				11.0	15.25
TOTALS				15.25	15.25

Notes 1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001

Clients are requested to compare with samples submitted.

2. Core samples are nominally 4 ins. diameter and 18 ins. long.

Depths shown are to top of sample.

GROUND EXPLORATIONS LTD.

TQ/28NE/78

BOREHOLE NO. 2

2755 8552

Contract Name Cressy Road, Camden.

Report No. 5332/BW/MA

Client Greater London Council,

Site Address

Department of Architecture,

Address and Civic Design,

Cressy Road,

The County Hall,

Camden,

London, S.E.1.

London, N.W.3.

ORDER NO.: DC.85977

Standing Water Level 2.2 m.

Method of Boring Shell and auger

Water Struck

Diameter

0.15 m.

Ground Level 54.605 m. O.D.

Start 3.6.71

Finish 9.6.71

Remarks

JARS metres		CORES metres		BULK metres	
1513	0.75	1517	3.5	1514	1.5
1515	2.3	1519	5.05		
1516	3.2	1521	6.55		
1518	4.7	1523	8.1		
1520	5.65	1525	9.6		
1522	7.15	1527	11.15		
1524	8.7				
1526	10.2				
1528	12.35				
1529	Water				
Description				Thickness	Depth
				<u>m</u>	<u>m</u>
Concrete and hardcore				0.15	0.15
Made ground : clay with bricks, sand, etc.				2.9	3.05
Stiff brown and blue clay with crystals				1.85	4.9
Stiff Fissured brown silty clay with crystals				3.65	8.55
Stiff Fissured dark brown silty clay				3.65	12.2
TOTALS				12.2	12.2

Notes 1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001

Clients are requested to compare with samples submitted.

2. Core samples are nominally 4 ins. diameter and 18 ins. long.

Depths shown are to top of sample.

GROUND EXPLORATIONS LTD.

TA/28NE/79
2756.8553

BOREHOLE NO. 3

Contract Name Cressy Road, Camden Report No. 5332/BW/MA
Client Greater London Council Site Address
Department of Architecture
Address and Civic Design Cressy Road
The County Hall Camden
London, S.E.1 London, N.W.3
ORDER NO.: BC.85977

Standing Water Level 1.5 m. Method of Boring Shell and auger
Water Struck 0.15 m. Diameter
Ground Level 54.535 m. O.D. Start 28.5.71 Finish 9.6.71
Remarks No water encountered while drilling. Bore left open over weekend - now standing at 5'0" from surface.

JARS metres		CORES metres		BULK metres	
8294	0.75	1600	Water	8296	1.05
8295	1.05			8298	2.0
8297	2.0			8300	3.5
8299	2.9			1502	5.05
1501	4.4			1504	6.55
1503	5.95			1506	8.1
1505	7.45			1509	9.6
1507	9.0			1511	11.15
1508	9.5				
1510	10.8				
1512	12.2				
Description				Thickness	Depth
				m	m
Concrete and hardcore				0.15	0.15
Made ground : brown and grey silty clay				0.75	0.9
Firm Brown and grey silty clay				0.9	1.8
Stiff Orange-brown sandy clay with stones				0.35	2.15
Stiff Mottled brown and blue clay with crystals				4.85	7.0
Very stiff Fissured brown silty clay with crystals				2.15	9.15
Very stiff Fissured dark brown silty clay				3.05	12.2
TOTALS				12.2	12.2

Notes 1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001

2. Clients are requested to compare with samples submitted.

3. Core samples are nominally 4 ins. diameter and 18 ins. long.

British Geological Survey 69, Upper Ground,
S.W.1.

British Geological Survey

The London Passenger Transport
Board,
55, Broadway,
S.W.1.

TQ28NE/48

2737.8510

256

British Geological Survey

BRITISH GEOLOGICAL SURVEY
STRATA DETAILS OF TRIAL HOLE DRILLED BY
MESSRS. R. RICHARDS & CO. FOR THE LONDON
PASSENGER TRANSPORT BOARD, 55 BROADWAY, S.W.1.
Site - Belsize Park.

British Geological Survey

— Belsize Park Stn
not sited.

British Geological Survey

British Geological Survey

Thickness. Depth.
Ft. In. Ft. In.

Ashes	...	...	...	0	6"	0	6"
Made up Ground	...	...	...	7	6	8	0
Mud with water	...	...	...	1	0	9	0
Made up Yellow Clay	...	...	...	3	6	12	6
Yellow Clay	...	...	...	12	6	25	0
Blue Clay	...	...	...	118	0	143	0

British Geological Survey

British Geological Survey

British Geological Survey

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British Geological Survey

British Geological Survey

British Geological Survey

GEOLOGICAL SURVEY OF GREAT BRITAIN

(For Survey use only)

6-inch Map Registered No.

RECORD OF SHAFT OR BORE FOR MINERALS

Name of Shaft or Bore given by Geological Survey:

TQ28NE/38

Name and Number given by owner:

C 16.

Nat. Grid Reference

2722.8520

For whom made

Town or Village

Hampstead.

County

Exact site Junction of Belage Av. and Haverstock Hill.

Attach a tracing from a map, or a sketch-map, if possible.

Purpose for which made

Ground Level at shaft bore relative to O.D. 234'

If not ground level give O.D. of beginning of shaft bore

Made by

Date of sinking

1900.

Information from

LCC.

Date received

Examined by

SPECIMEN NUMBERS AND ADDITIONAL NOTES

(For Survey use only)

GEOLOGICAL
CLASSIFICATION

DESCRIPTION OF STRATA

THICKNESS

DEPTH

Ft.

IN.

Ft.

IN.

Made Ground
Clay

4

-

123

16

-

20

6.10

For Hampstead Tube Rly.

TQ 28/198

Owner ROYAL FREE HAMPSHIRE Licence No. 1147

Licence No.

Nat. Grid Ref. **7Q 2739 8538**

Occupier	IGS Ref. No.
----------	--------------

IGS Ref. No.

Status OBH

Ground Level	m OD	ft. OD
--------------	------	--------

Level of Well Top 59.280 m OD ft. OD

Rest Water Level 95.65 m bwt ft. bwt

(Date 26/7/20) m OD fl OD

Construction

Aquifer UPPER CHALK

Summary of Geological Section

Thickness

Depth

Depth bwt m	Dia. mm	Linings (below well top)			
		From	To m	Dia. mm	Type
114	300	0	114	200	plain
177	200				

LONDON CLAY

69

69

W8 RB

21

90

Tharnek Sands

11

101

UPPER CHALK

76

177

Abstraction Rates	Type of Pump	
gph	Chem./Bact. Anal.	YES NO

gpd Well Driller *Soil Mechanics*

If insufficient space has been allowed, continue in 'Notes' overleaf.

British Geological Survey

This record has already been entered, but contains some geological information.

* Not found as registered!

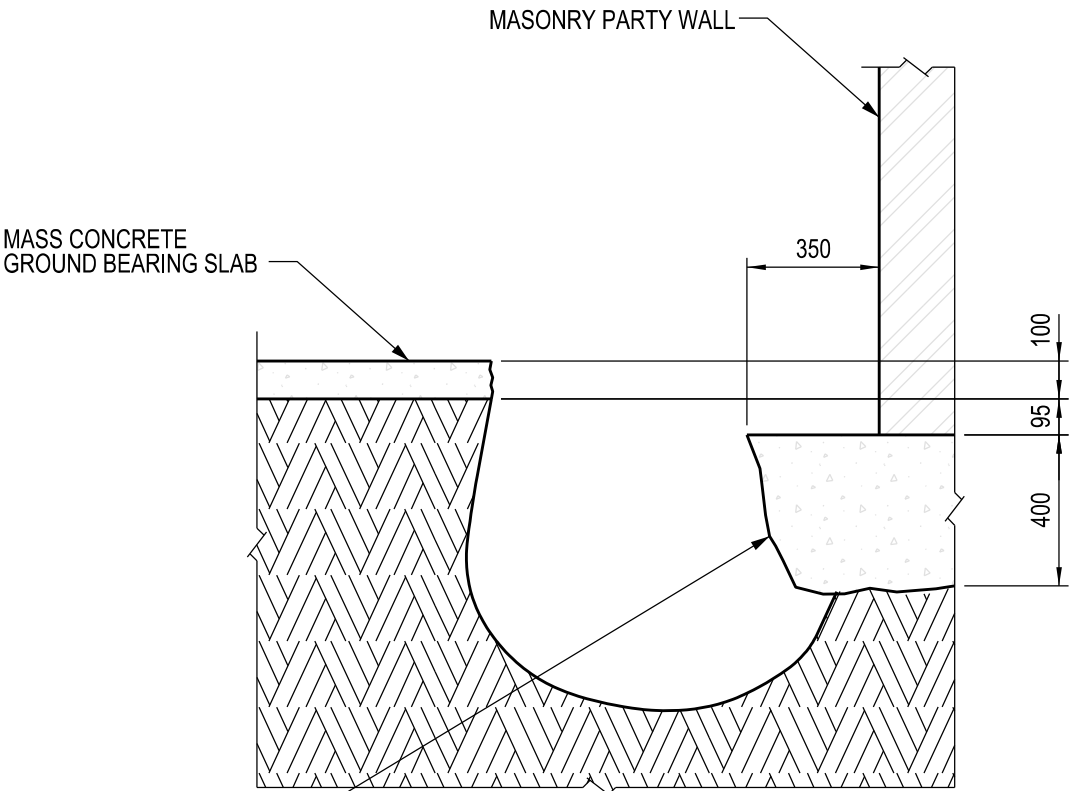
British Geological Survey

British Geological Survey

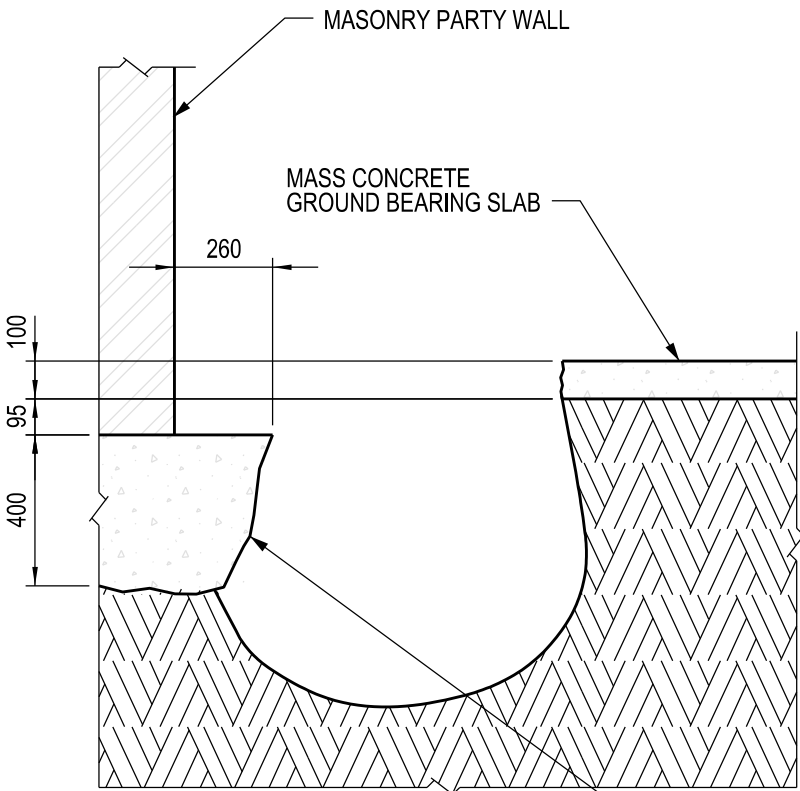
REC
ACCESSION
NUMBER
360914

Appendix D

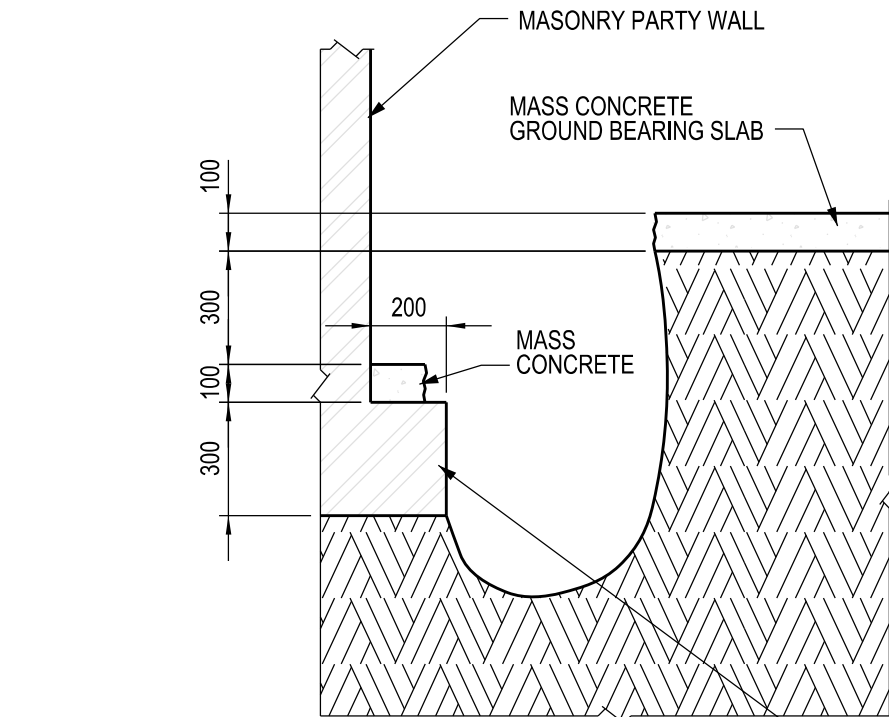
Trial Pit Investigations Sketch



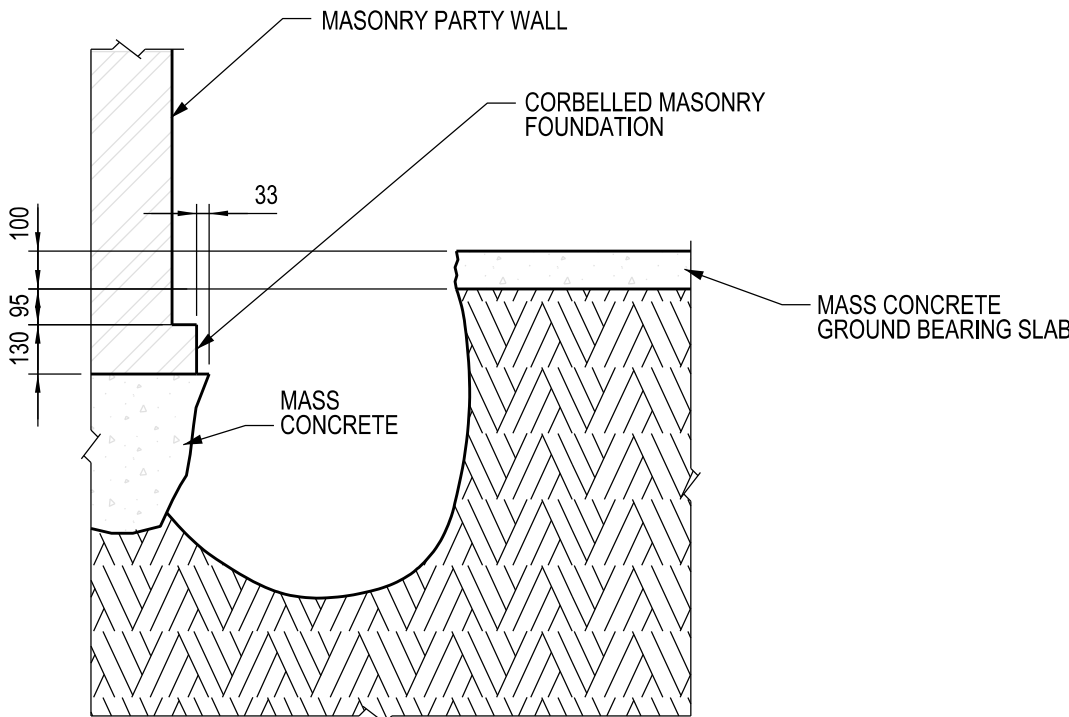
TP1 A - A



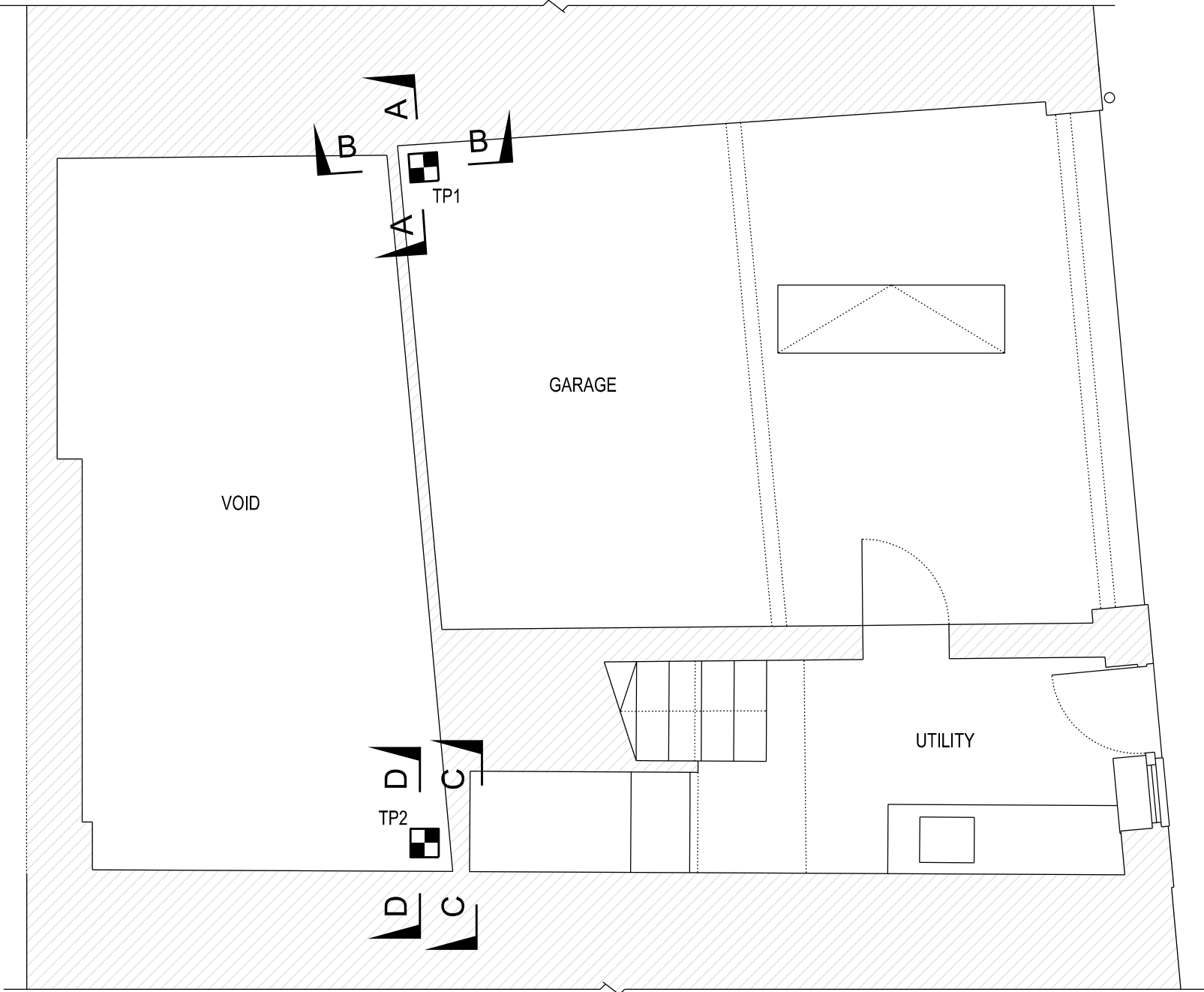
TP1 B - B



TP2 C - C



TP2 D - D



LOWER GROUND FLOOR KEY PLAN

FOR INFORMATION ONLY

morphstructures
consulting structural & civil engineers

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W www.morphstructures.com
E mail@morphstructures.com

JAMES & VICTORIA TWINING

24 LAWN ROAD

TRIAL PIT INVESTIGATIONS

P1	04.12.17	ISSUED FOR INFORMATION	BB	MF
REV	DATE	DESCRIPTION	BY	CHECKED

VARIES	NOV '17	BB	MF
SCALE	DATE	DRAWN	CHECKED

2513-MORPH-ZZ-00-SK-S-0001

DRAWING No. P1 REVISION

