morphstructures

consulting structural & civil engineers

27 Fitzroy Road, NW1 8TP

Basement Impact Assessment

Project no: 3149

January 2022

Contents

Revision	Date	Status
P1	24.01.22	DRAFT
Prepared By:		Dave Heeley and Carlo Gagliani
Checked By:		Dave Heeley
Approved By:		Dave Rayment

Non-Technical Summary

The site location is 27 Fitzroy Road, The National Grid Reference for the site is TQ 28141 83956.

The current site arrangement is a five-storey terraced Victorian property, construced between 1851 and 1872.

A geotechnical investigation has confirmed expected ground conditions in the area: a think layer of made ground overl London Clay.

The proposed development comprises the construction of a new single storey basement beneath the existing lower ground floor, a rear extension to the first floor level and a new garden room space. This will be an excavation of approximately 3m, and be founded on London Clay.

The basement will be constructed from reinforced concrete slabs and walls and using traditional underpinning techniquess, subject to shallow groundwater control measures.

A basement impact assessment and ground movement assessment performed by a geotechnical specialist, GEA, has concluded that the majority of impacts identified can be mitigated by appropriate and standard construction practices. Groundwater will form a pathway around and beneath the proposed basement and not build up behind it. A monitoring strategy is recommended for the propsed constrution and movement monitoring carried out on all structures prior to and during the proposed basement construction to limit deflections to a maximum of 5mm.

The following assessments are presented:

- Desk Study
- Screening
- Scoping
- Site investigation
- Ground movement assessment
- Impact Assessment

The authors of the assessments are Dave Heeley MEng, CEng, MIStructE and Carlo Gagliani for the structural design and collation of this covering report.

The Land stability element of the BIA has been carried our by Martin Cooper BEng, CEng MICE FGS who has 20 years specilist experience in ground engineering.

The subterranean (groundwater) flow assesment has been carried our by John Evans, MSc, CGeol, FGS.

The surface water and flooding assessments has been carried out by Rupert Evans MSc CEnv CWEN MCIWEM AIEMA.

The above has been reviewed by Steve Branch BSC MSc CGeol FGS.

2 Introduction

The purpose of this assessment is to consider the effects of a proposed basement development at 27 Fitzroy Road on the local hydrology, geology and hydrogeology and potential impacts to neighbours and the wider environment.

This report covers the work undertaken during the initial stage 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 BIA approach follows current planning procedure for basements and lightwells adopted by LB Camden and comprises the following elements (CPG Basements):

- Desk Study;
- Screening;
- Scoping;
- Site Investigation, monitoring, interpretation and ground movement assessment;
- Impact Assessment

2.1 Authors

The authors of the assessments are Dave Heeley MEng, CEng, MIStructE and Carlo Gagliani for the structural design and collation of this covering report.

The Land stability element of the BIA has been carried our by Martin Cooper BEng, CEng MICE FGS who has 20 years specilist experience in ground engineering.

The subterranean (groundwater) flow assesment has been carried our by John Evans, MSc, CGeol, FGS.

The surface water and flooding assessments has been carried out by Rupert Evans MSc CEnv CWEN MCIWEM AIEMA.

The above has been reviewed by Steve Branch BSC MSc CGeol FGS.

2.2 Sources of Information

The following baseline data have been referenced to complete the BIA in relation to the proposed development:

- Site walkover and discussion with residents and geotechnical investigation engineer CGL (2.10.2019);
- Current/historical mapping (OS Maps, old-maps.co.uk);
- Geological mapping (refer to CGL report);
- Hydrogeological data (refer to CGL report);
- Current/historical hydrological data (refer to CGL report);
- Flood risk mapping (refer to CGL report);
- LB Camden, Strategic Flood Risk Assessment (produced by URS, 2014);
- LB Camden, Floods in Camden, Report of the Floods Scrutiny Panel (2013);
- LB Camden, Planning Guidance (CPG) – Basements (March 2018);
- LB Camden, Camden Geological, Hydrogeological and Hydrological Study – Guidance for Subterranean Development (produced by Arup, 2010);
- LB Camden, Local Plan Policy A5 Basements (2017);
- LB Camden's Audit Process Terms of Reference;

2.3
Existing and Proposed Development

EXISTING SITE

The property is located in Primrose Hill, North London, approximately 2.9 miles north of Central London. The site is in the London Borough of Camden. It is bounded by back gardens of properties on Manley Street to the East, 25 Fitzroy Road to the North and and 29 Fitzroy Road to the South.

The neighbouring properties appear to be of a similar age and construction.

The National Grid Reference for the site is TQ 28141 83956. The ground level is approximately 46m above sea level.

The street level is between the lower ground and ground floor, as such, there are short retaining walls forming the front lightwell and under the main steps to the property.

EXISTING TREES

There are no major trees present on the site, although there are a few bushes in the rear garden of the property. None are being removed as a result of this development.

The trees within the site are short (maximum 3m in height) and as the surrounding soils are not cohesive they are unlikely to affect the development with regards to soil shrinkage.

Some large trees are present beyond the garden Party walls but due to their distance are unlikely to affect the development.

EXISTING DEVELOPMENT

The existing building is a five storey terraced house. The suspended floors comprise timber joists spanning front to back, supported by perimeter masonry walls and an internal loadbearing masonry spine wall.

Intrusive investigative were undertaken to confirm the composition of the existing structure, particularly retaining walls and foundations as well as the presence of internal masorny spine walls in the superstructure which will be incorpoated in the detailed design drawings.

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


Front Facade, 27 Fitzroy Road

Exising Manhole

xx

PROPOSED DEVELOPMENT - SUPERSTRUCTURE

The proposed development involves the construction of a full width rear extension to the first floor level and reconfiguration of the upper floor levels.

Internal refurbishment involves the removal of load bearing walls and reconfiguration of upper floors, particularly around the staircases. This will be achieved structurally by the introduction of steel columns and beams to transfer load to party walls.Lateral stability will be amintained through the introduction of a steel box frame where the rear wall is removed.

The rear extension will be formed party of steel and time and partly of exposed reinforced comments for aesthetic reasons. Lateral stability in the y-directon will be provided through diaphragm action of the floor and shear and bendingof box frames to the front and rear.

PROPOSED DEVELOPMENT - SUBSTRUCTURE

The proposal is to form a 3.4m deep basement beneath the existing building footprint. The front and side retaining walls align with the existing external wall above, with the retaining wall to the rear extended beyond the footprint of the rear perimeter wall.

LOWER GROUND FLOOR

The existing lower ground floor will be replaced with a new RC suspended flat slab which will be formed at a lower level. The slab will span onto the new perimeter walls and act as a diapragm restraining the tops of the retaining walls.

The existing spine wall is to be resupported in the permanent case by a new RC wall below to the new basement level.

NEW BASEMENT FLOOR

The new basement slab will be suspended between slab thickening along the perimeter.

Due to the presence of clay below the Made Ground, the excavation of the basement has the potential to cause heave to the basement slab. A proprietary compressible void former will be used under the suspended basement slab to accommodate this withough overstressing the slab.

Internally, a steel columns will support the new beams above and take the load to thickening integrated into the slab.

RETAINING WALLS

All retaining walls will be formed of reinforced concrete and designed as propped by the new lower ground and basement slabs.

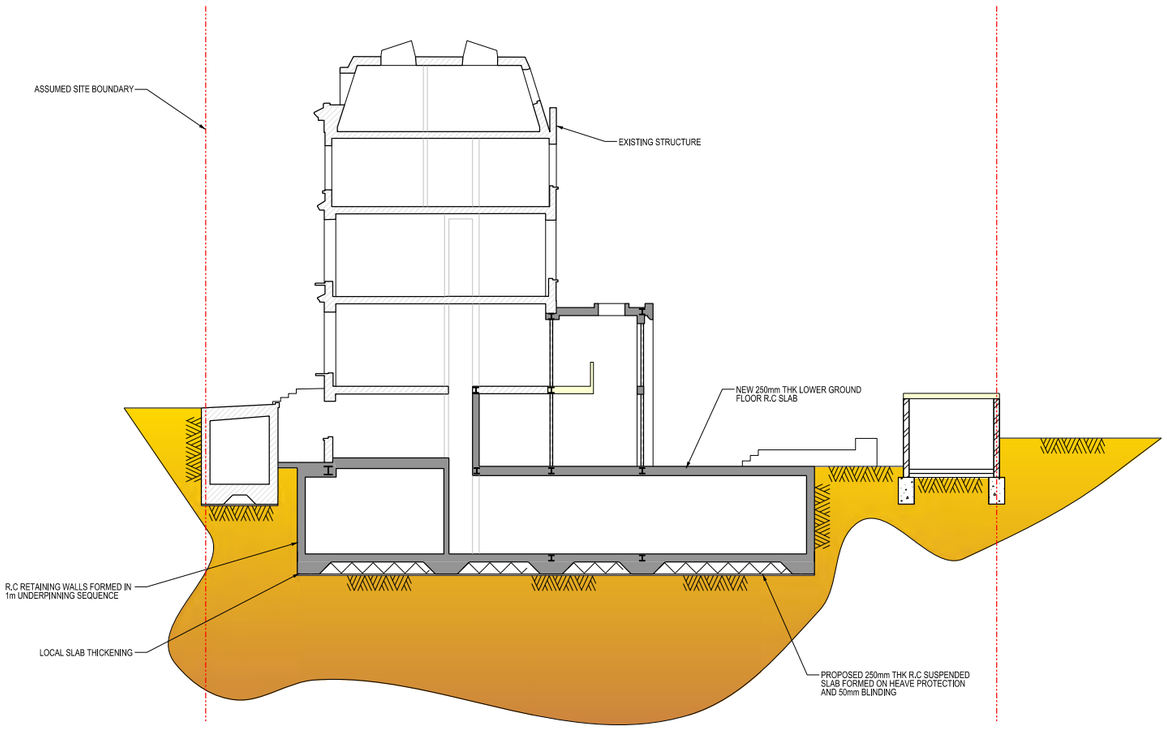
The retaining walls underneath the party walls to 25 and 29 Fitzroy road will be formed using reinforced underpinning.

The exact party wall thickness was not verified on site, but from inspection can be seen to be at least 330mm thick,

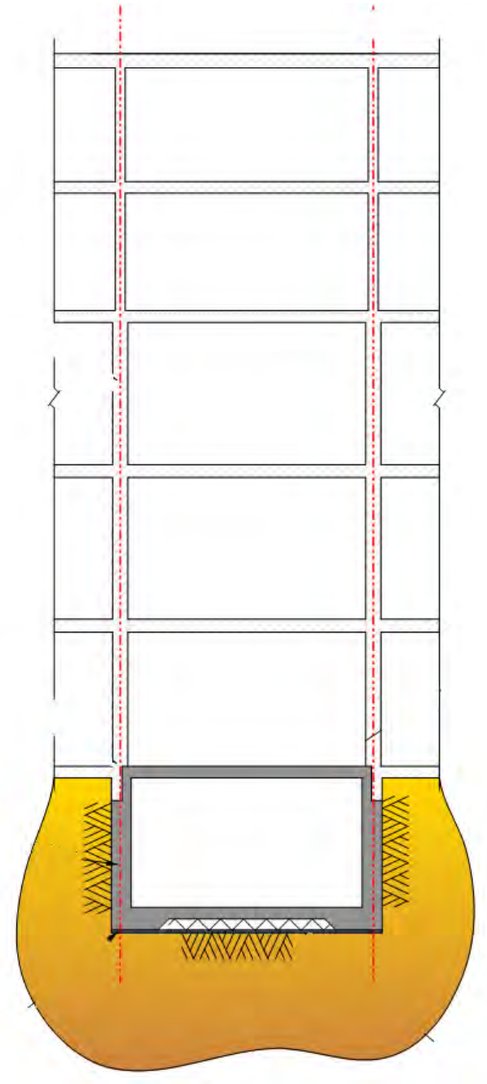
As the retaining walls are designed as minimum 200mm thick, in order to provide a minimum notional retaining wall thickness on our side of the party wall line, it is proposed to cast the wall 50mm thicker inside our basement and create a vertical notch to ensure a good connection to the lower ground floor slab (see global section BB).

This provides a conservative design thickness without relying upon reinforcement (or notionally the concrete) outside of the party wall line.,

The retaining walls to the front and rear are also designed as reinforced underpinning and will be designed to take the surcharge of the front wall of the vaults.



Proposed Global Section A-A



Proposed Global Section A-A

Desk Study

3.1
Site History

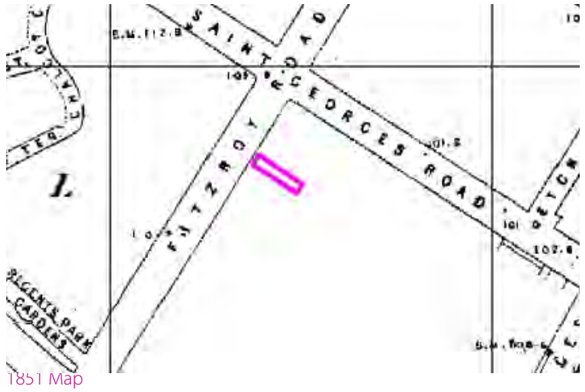
The earliest maps available for the area date back to 1851, with the property built between 1851 and 1872 and has since remained unchanged.

A map from 1923 shows the site to have been bordered to the southeast by a workshop and builders yard.

The site and its immediate surroundings survived bomb damage during WWII. The area to the southeast was redeveloped with garages, including a sunken petrol tank until at least 1966. the factory remained

3.2
Geology

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



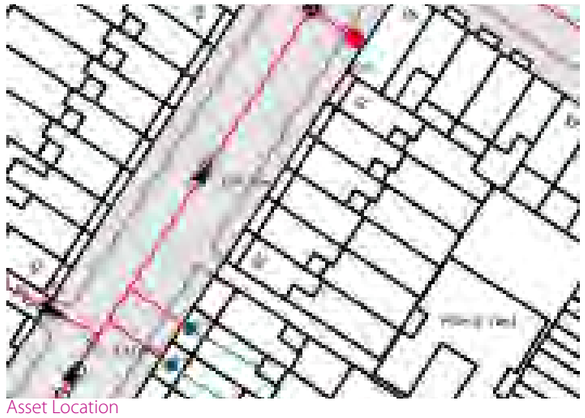
1851 Map

1872 Map

Bomb Map

3.3
Hydrogeology,

The underlying London Clay cannot support a water table or effectively transmit ground water flow due to it's low permeability. Any permeabilty through this strata is secondary, through fissures in the clay.


Asset Location

Flood Risk

3.4
Hydrology, Drainage and Flood Risk

The nearest surface water feature is the Regents Canal, present from around 230m to the southeast.

The site is almost entirely covered by the existing building and hardstanding and infiltration of rainwater into the ground beneath the site is limited to small patches of soft landscaping in the rear garden. the majority of the surface run off is likely to drain into the combined sewers into the road.

3.5
Other Information

A TFL asset search shows there are no recorded underground tunnels in the vicinity of the property. the nearest is the Northern line, approximately 670m to the East

The below ground drainage appears to culminate in a manhole at lower ground floor level under the main entrance stairs. As this is the final gravity fed manhole before the public sewer, the floor level in this area is limited by the drainage pipe invert level

Screening

A screening assessment has been undertaken by GEA to assess the potential risk posed to local hydrology, hydrogeology and land stability due to the proposed basement construction.

The assessment is undertaken in the form of a series of tables, setting out the questions with regard to the primary concerns associated with the proposed construction. Where 'yes' or 'unknown' can be simply answered with no analysis, these answers have been provided.

Where questions have been indentified as requiring further investigation, these have been summarised below.

4.1
Subterranean (groundwater) flow

No further investigations required. Please refer to appendix C for their detailed report.

4.2
Slope Stability

QUESTION	RESPONSE
Q5. Is the London Clay the shallowest strata at the site?	Yes, as indicated on the geological map and Figures 3,5 and 8 of the Arup report.
Q7. Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	Yes. The area is prone to these effects as the result of the presence of shrinkable London Clay.
Q12. Is the site within 5m of a highway or pedestrian right of way?	Yes. The site fronts onto Fitzroy Road. However, the existing lower ground floor level includes vaults below the existing pavement to Fitzroy Road already and so the proposed basement excavation will not encroach any closer to the road.
Q13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes. The neighbouring properties also include lower ground floor levels, but do not appear to include basements and so the proposed basement excavation will result in different founding depths.

Please refer to Appendix C for their detailed report.

4.3
Surface Water and Flooding

QUESTION	RESPONSE
Q6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	Yes. The findings of the BIA together with the Camden Flood Risk Management Strategy dated 2013 and figures 3ii, 4e, 5a and 5b of the SFRA dated 2014, in addition to the Environment Agency online flood maps show the site has a medium to low flooding risk from surface water. There is a low risk from sewers, reservoirs (and other artificial sources), groundwater and fluval/tidal watercourses. It is possible that the basement will be constructed within pockets of perched water and the recommendations outlined in the BIA with regards to water-proofing and tanking of the basement will reduce the risk to acceptable levels. In accordance with paragraph 5.11 of the CPG, a positive pumped device will be installed to further protect the site from sewer flooding. The site is located within the Critical Drainage Area number GROUP3-003 and is in a Local Flood Risk Zone (Primrose Hill) as identified in the updated SFRA Figure 6/Rev 2

Please refer to Appendix C for their detailed report.

4.4
Non Technical Summary of Screening Process

The screening process identifies the following issues to be carried forward to scoping for further assessment:

- The London Clay is the shallowest strata on the site;
- The site is in an area likely to be affected by seasonal skrink-swell;
- The site is within 5m of a Fitzroy Road;
- The proposed basement will increase the differetial depth of foundations relative to neighbours properties;
- The site in in an area identified to have a surface water risk;

The other potential concerns considered within the screening process have been demonstrated to be not applicable or not significant when applied to the proposed development.

Scoping

Based on the screening excercise, GEA have identified issues for scoping and further assessment.

A brief summary is provided below:

- **London Clay as Shallowest Strata/ Potential for seaonal shrink and Swell**– implications of deepened basement/ foundation system on neighbouring properties
- **Location adjacent to a highway** Potential for Excavation of basement may cause structural damage to roadway
- **Differential foundation depths to neighbouring properties**– Potential for movement of adjacent properties during construction if not adequately supported or if load effects not accounted for.
- **Flood Risk** – Potential for basement to flood.

Please refer to appendix C for their detailed report.

This, together with our own brief focused on the design and detailing around foundations formed the basis of the site specific geotechnical investigation.

Site Investigation / Additional Assessments

6.1
Geotechnical Investigation

GEA were appointed to carry out a geotechnical investigation of the site including trial pits and 10m borehole

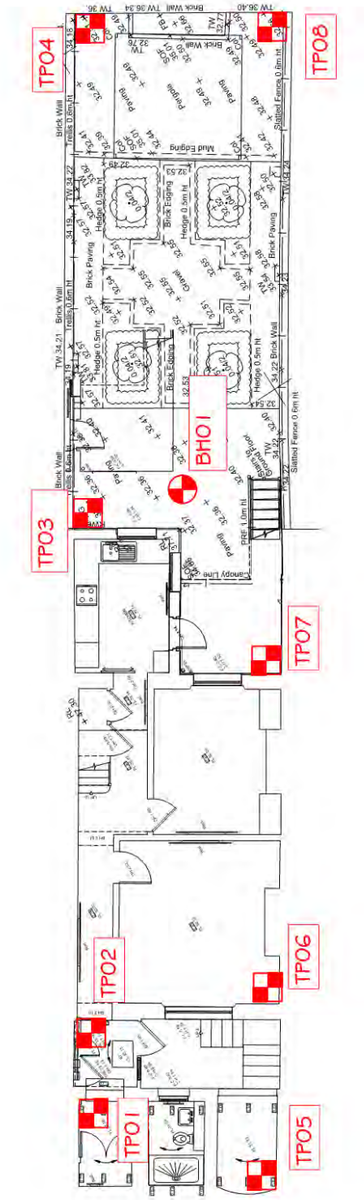
Trial pits were dug by hand to establish position, size and depth of existing foundations

The soil was tested using in-situ SPT and Hand Shear Vane tests. Samples were collected and used in laboratory tests.

The key conclusions were:

- The ground conditions were generally as expected, with a variable thickness (between 0.7 an 1m from the front lightwell / rear garden levels) of Made ground overlying London Clay.
- The London Clay was found to be fissured from about 2.6m and stiff from 3.4m from front lightwell level.
- Heave protection is required due to high plasticity and high volume change potential. The borehole was monitored for groundwater and found to be dry.
- Groundwater was found in the boreholes in the made ground and is considered likely to be due to a perching above the lower permeability London Clay. It could also be potentially due to nearby drains.
- Existing foundations are reasonably shallow, between 0.25 and 0.86m below ground level, in most cases bearing onto the made ground.
- The allowable bearing pressure at formation level is 100kN/m2 at 3m BGL
- The concrete design class is DS-2 / AC-1 for foundations in the London Clay Formation.

Please refer to appendix B for GEA's detailed report

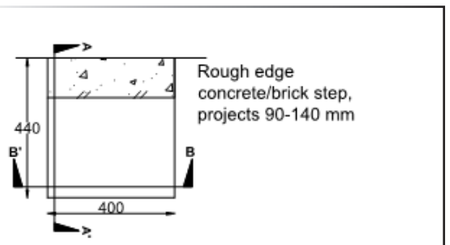


Geotechnical Investigations Plan

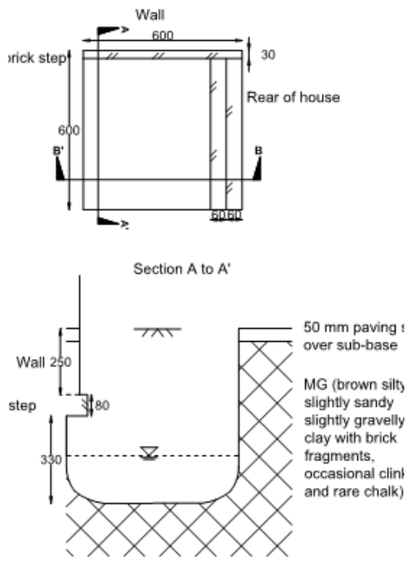
Project				BOREHOLE No
27 Fitzroy Road, London, NW1 8TP				BH1
Job No	Date	Ground Level (m OD)	Co-Ordinates ()	
J21276	30-09-21	32.50		
Client		Engineer		Sheet
Franklin Walding		Morph Structures		1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument / Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
0.50	ES			31.50		(1.00)	200 mm topsoil (dry dark brown silty sandy clay including brick, ash and rare chalk) over made ground (brown mottled light brown and light grey silty slightly sandy clay including fragments of red brick, oyster shell and occasional clinker, with only rare red brick from a depth of 0.80 m).	
0.90	ES					1.00		
1.10	D						Firm brown-grey mottled light grey silty CLAY with partings of fine orange sand and silt.	
1.30	D						1.45 ... inlcuding dead rootlets around 1.45 m.	
1.50	D						1.60 ... including blue-grey mottling between 1.40 m to 1.60 m.	
1.70	D						1.70 ... including a pocket of light brown friable clay around 1.70 m.	
1.90	D						2.00 ... including blue-grey mottling from 2.00 m.	
2.10	D					(3.00)	2.60 ... fissured from 2.60 m.	
2.30	D							
2.50	D						3.10 ... inlcuding pockets of coarse sand sized selenite around 3.10 m and 3.30 m.	
2.70	D						3.40 ... becoming stiff and grey-brown with rare light grey mottling from 3.40 m.	
2.90	D							
3.10	D							
3.30	D							
3.50	D							
3.70	D			28.50		4.00		
3.90	D							

BH01 Trial Pit Log



TP03



TP07

Construction Methodology / Engineering Statements

7.1
Outline Geotechnical Design Parameters

The reasonably conservative geotechnical parameters have been determined, based on the site investigation data presented and relevant technical guidance.

The following design parameters have been assumed:

- A bearing capacity of 100kPa is recommended for strip foundations at new basement level
- Concrete should be designed for class DS-2 / AC-1 for disturbed ground
- No permanent groundwater table was present, although local seepage present. Conservatively, the retaining walls have been designed assumed ground water table at surface.
- Imposed load surcharge 10kN/m^2 assumed to rear and part walls, 20kN/m2 from weight of vaults to front.
- Overconsolidated London Clay assumed throughout with Ko of 1. (conservative)
- Existing vertical load paths are maintained into formation level below

7.2
Outline Temporary and Permanent Works

It is currently proposed that the construction of the basement is undertaken using a traditional underpinning sequence, with a bottom-up methodology.

The Party walls will be underpinned in sequence with reinforced concrete and then propped in the temporary case to retain the earth pressures.

The basement slab will then be cast which will be supported on thickenings around the perimeter of the basement and allow the slab to be suspended between them. The lower ground floor slab will then be installed, after which the propping will be removed.

CONSTRUCTION GENERALLY

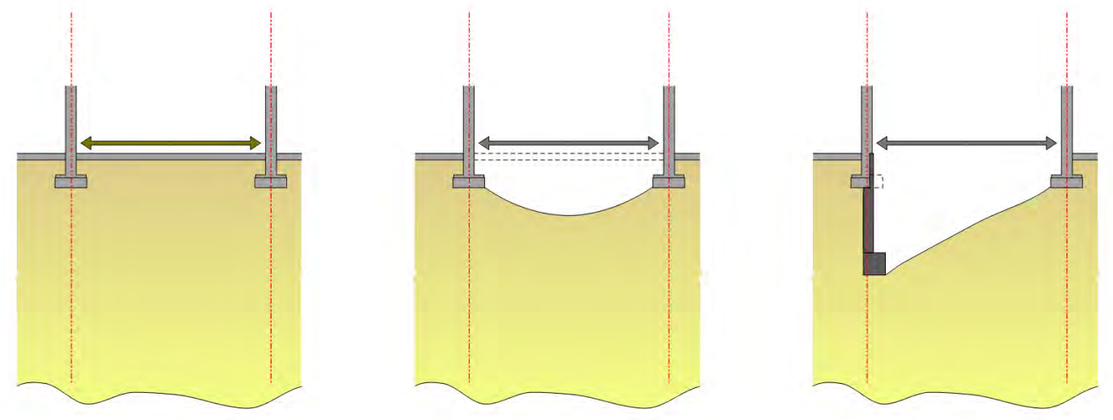
The works are required to be undertaken in accordance with all statutory legislation relating to construction works.The

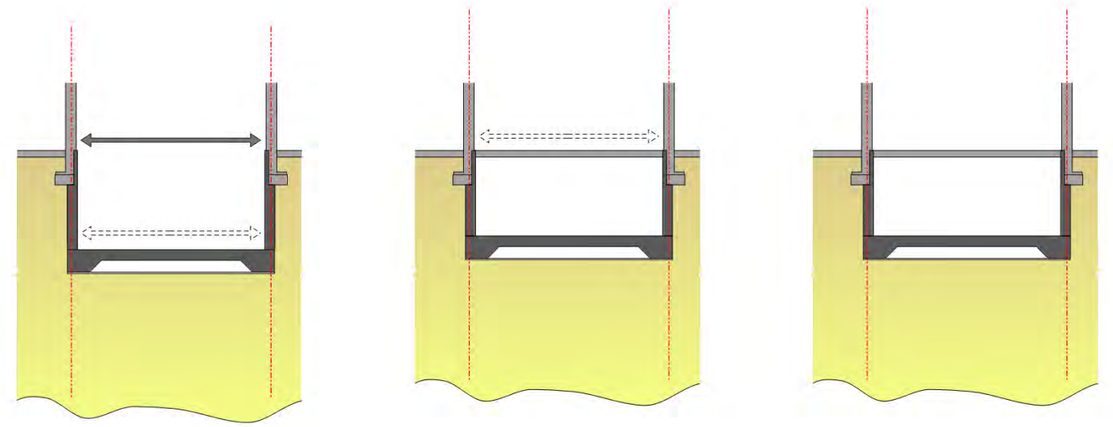
Contractor will be required to demonstrate a positive attitude and commitment toward minimising environmental disturbance to local residents and will be required to be registered with the Considerate

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 1994
- The Clean Air Act 1993

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





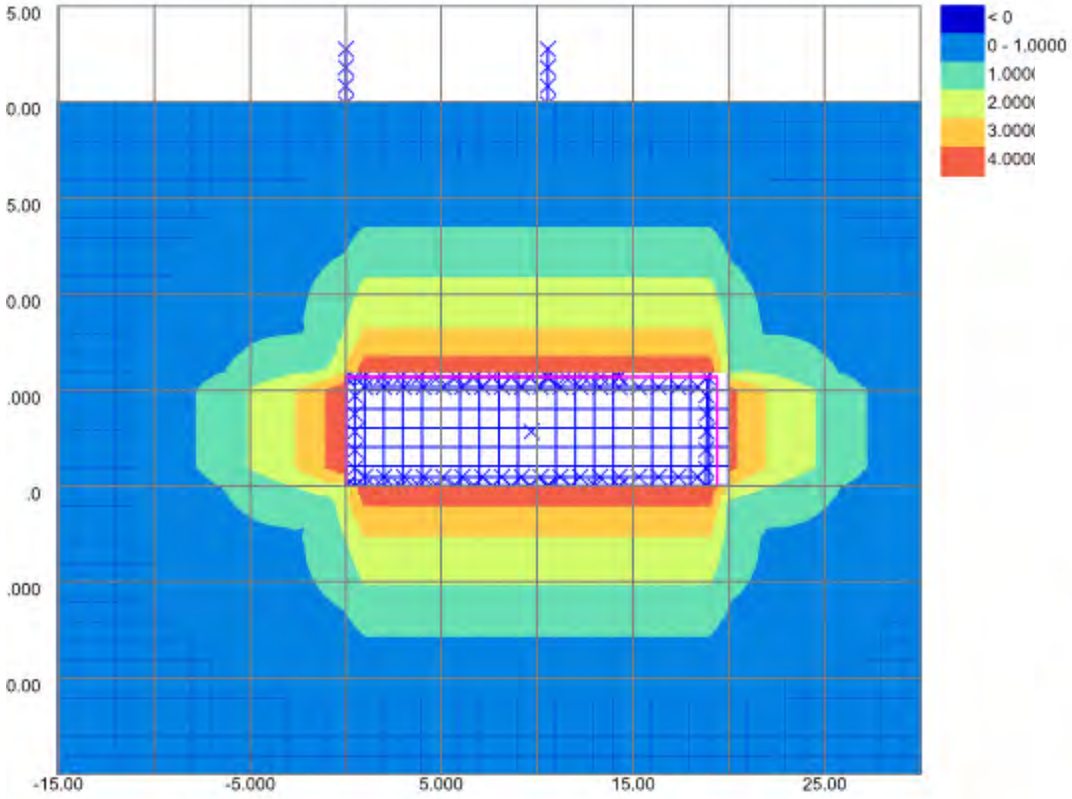
Construction Methodology Sketches

7.3
Ground Movement and Damage Impact Assessment

GEA were appointed to carry out a Ground Movement and Damage Impact Assessment. This is described in detail in Part 3 of their report, the results shown in the tables opposite, and summarised below:

The analysis has concluded that the predicted damage to the majority of the neighbouring properties from the installation of the proposed underpin construction and basement excavation would be 'negligible' to 'very slight' for which damage would occur to fall within the accetpable limits.

Deflections will need to be strictly limited to a maximum of 5mm, in particular to avoid damage beyond Category 1 for the neighbouring rear wall of the rear extension to No 29 Fitzroy Road/



GEA Plan for building damage assessment

GEA Horizontal movement output

7.4
Control of Construction Works

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 Fitzroy 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 1 - very 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 agreed 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 montored 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	<5	No action required
Amber	5-10	Notify the CA and Party Wall Surveyor(s). Increase frequency of monitoring. Implement contingency measures if movement continues.
Red	>10	Notify the CA and the Party Wall Surveyor(s). Implement measures to cease movement and stop work.

Indicative Ground Movement Trigger Values

Basement Impact Assessment

The following section summarises the findings from the GEA report.

8.1
Conceptual Site Model

The Conceptual Site Model (CSM) is…described below and is presented in GEA report in the appendices

- The proven ground conditions are a variable thickness of Made Ground, overlying London clay to the maximum depth of the investigations
- The monitored groundwater level is below maximum depth of investigations, although local seepages were present.
- The existing building is founded at 0.25 to 0.86m below ground level
- The proposed development will be founded at approximately 3.5m lower than the current case,
- The depths of neighbouring foundations/basements are arund ,15 to 0.5m below ground levels
- The distance to the highway/footpath is less than 5m

8.2
Land Stability/Slope Stability

- The proposed basement will extend to such a depth that new foundations will be expected to bypass any desiccated soilts. Subject to inspection of foundation excavations in te normal way to ensure that thereis not significantly unexpectedly deep root growth. It is not considered that the occurance of shrink swell issues in the local area has any bearing on the proposed development
- The proposed excavation for the proposed basement extension is in proximity to the pathway along Fitzroy Road,, however there is nothing unusual or exceptional in the proposed development, or the findings of the results into the investigation.
- The new basement will result in deepening of foundations compared to the adjacent lower ground floor level foundations of neighbouring properties and underpinning is required. An analysis has been carried out to assess the impact of the proposed development on neighbouring properties and concluded that the predicted damage to the majority of the neighbourhood properties from the installation of the proposed underpin construction and basement excavation would negligible to very slight, for which the damage that would occur would fall within the acceptable limits. A monitoring strategy is recommended for the proposed construction and it is recommended that movement monitoring is carried out on all structures prior to and during the proposed basement construction. Deflections will need to be strictly limited to a maimum of 5mm

8.3
Hydrogeology and Groundwater Flooding

- The BIA has concluded there is a low risk of groundwater flooding.
- The BIA has concluded there are impacts/no impacts to the wider hydrogeological environment.

8.4
Hydrology, Surface Water Flooding and Sewer Flooding

- The BIA has concluded there is a low to mediumrisk of surface water or sewer flooding, This risk is unchanged by the the development proposals. It is proposed to improve the surface water drainage and include a positive pumped device to further protect the site from sewer flooding. Residual impacts are reduced from te current case. .
- The BIA has concluded there are no impacts to the wider hydrological environment

Appendix A

Proposed Structural Drawings

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING.

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

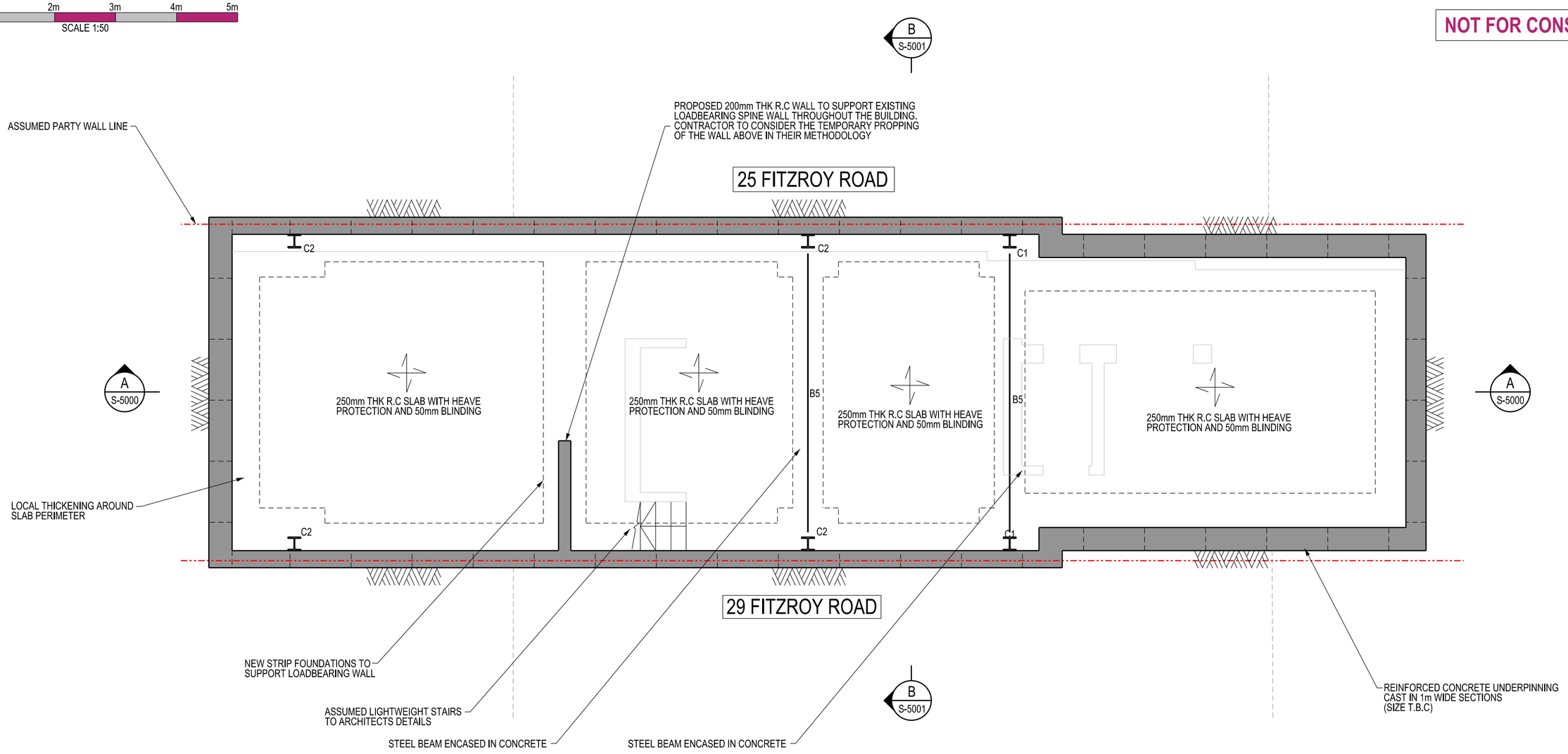
PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	

0m 1m 2m 3m 4m 5m
SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING
PROJECT: 27 FITZROY ROAD
TITLE: PROPOSED BASEMENT PLAN

SCALE: 1:50 @ A2 | DATE: OCT '21 | DRAWN: BB | CHECKED: ES

DRAWING No.: 3149-MORPH-ZZ-ZZ-B1-S-1000
REVISION: P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING..

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

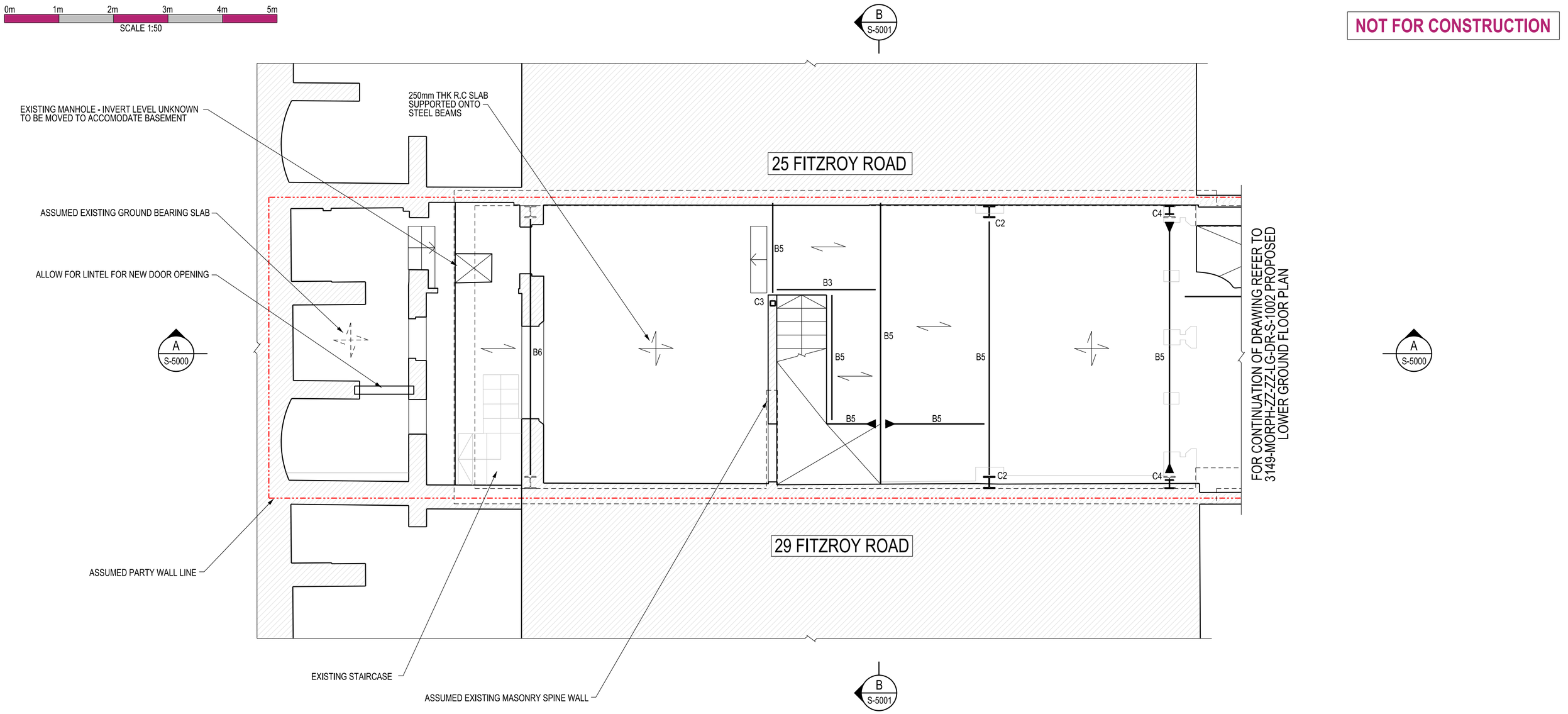
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
MOMENT CONNECTION	
PROPOSED STEEL BEAMS	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED LOWER GROUND FLOOR PLAN SHEET 1 OF 2

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No. 3149-MORPH-ZZ-ZZ-LG-S-1001 REVISION P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING..

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

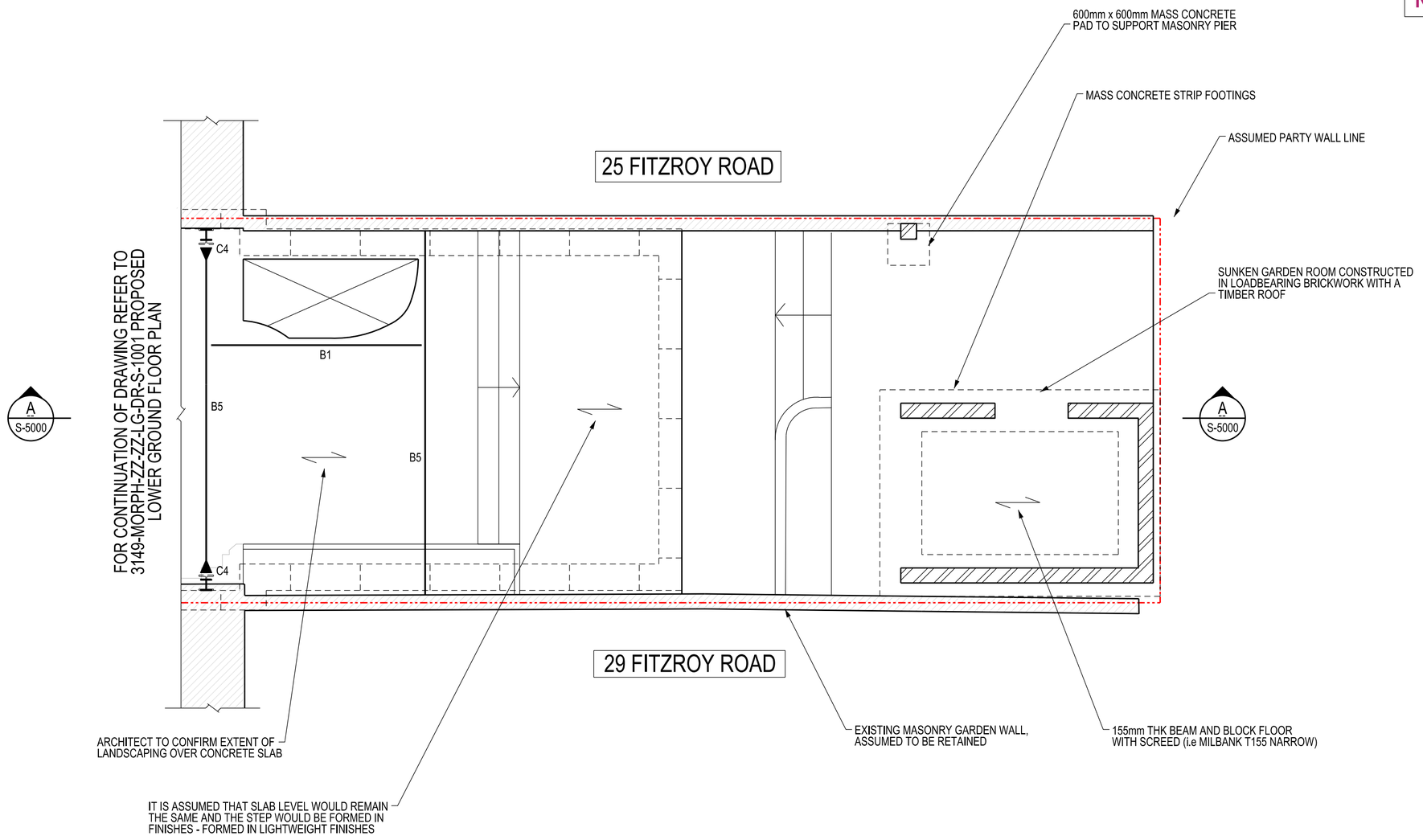
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED LOWER GROUND FLOOR PLAN SHEET 2 OF 2

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No. 3149-MORPH-ZZ-ZZ-LG-S-1002 REVISION P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING..

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

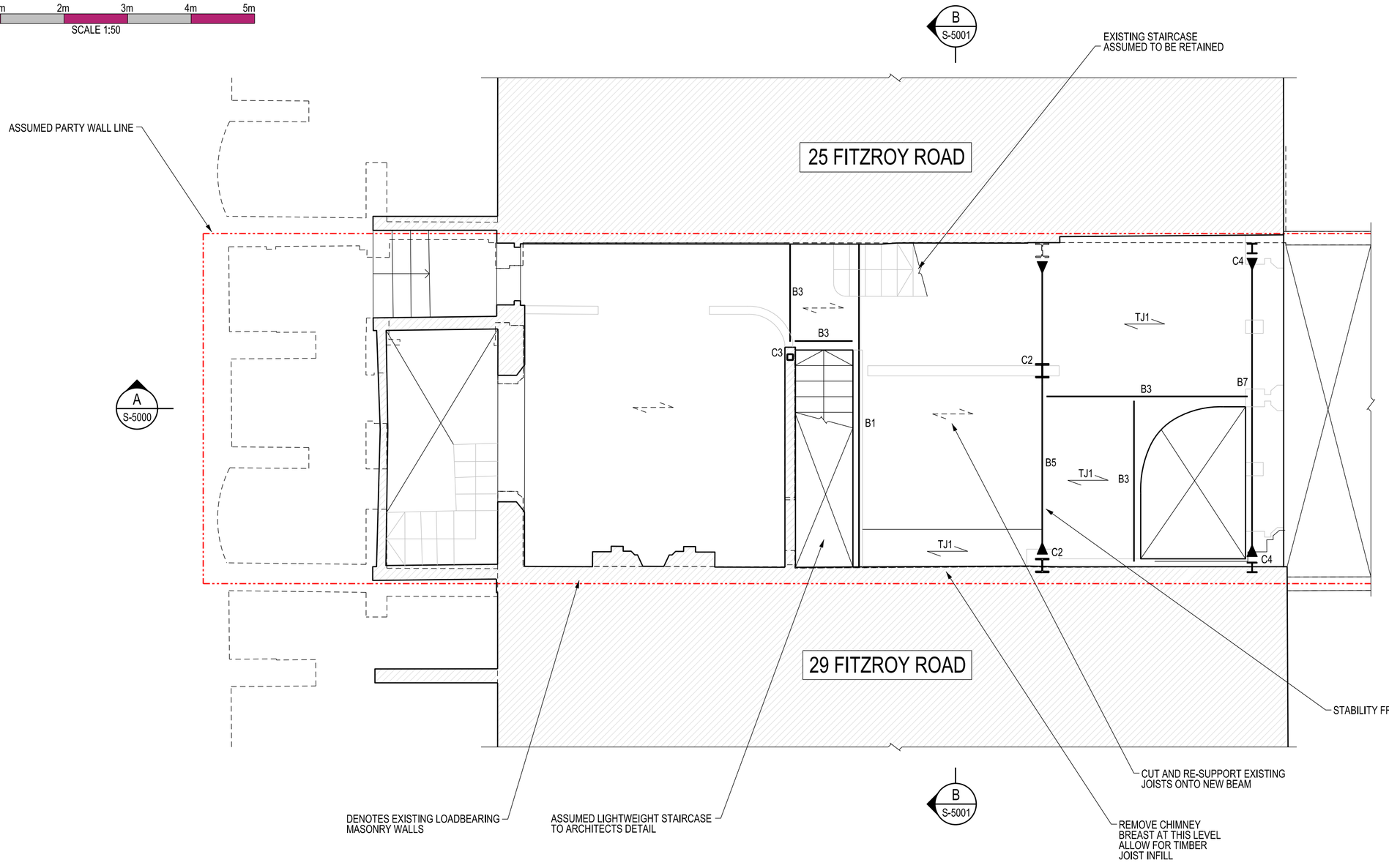
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

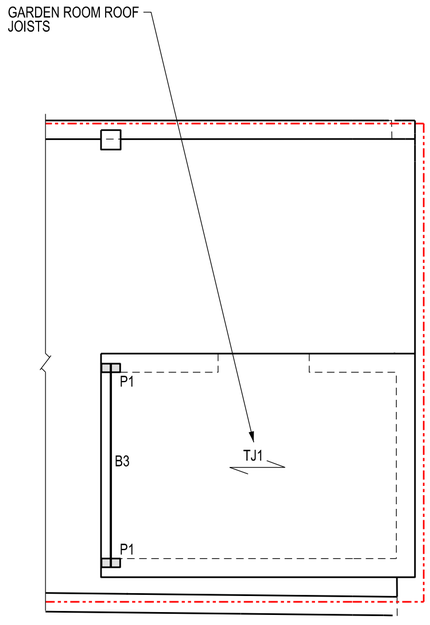
LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
EXISTING STEEL BEAMS	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION





GARDEN ROOM ROOF PLAN

FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET,
LONDON
E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED UPPER GROUND FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No. 3149-MORPH-ZZ-ZZ-UG-S-1003

REVISION P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING.

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

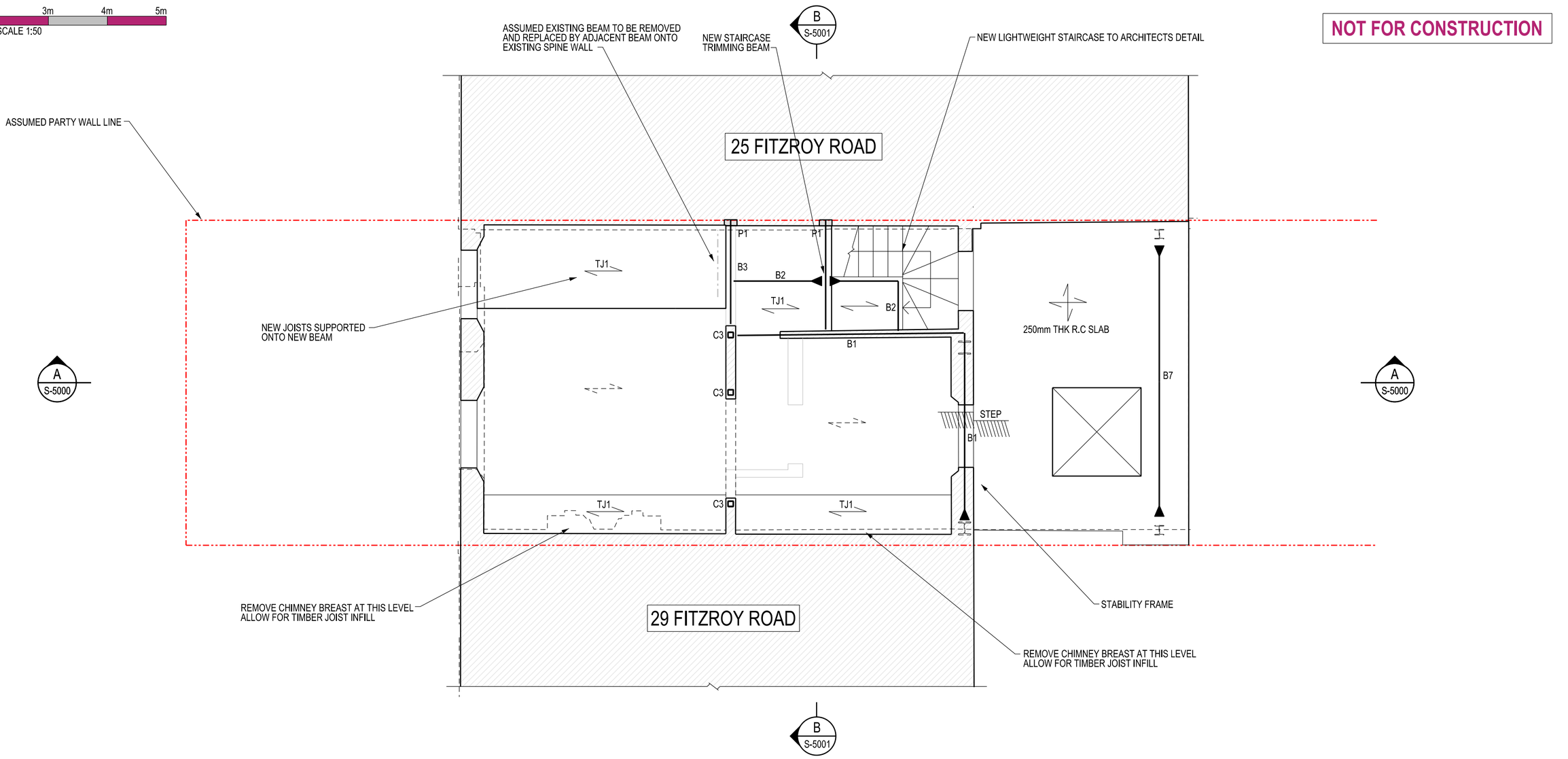
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
EXISTING STEEL BEAMS	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED FIRST FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No. 3149-MORPH-ZZ-ZZ-01-S-1004

REVISION P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING..

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

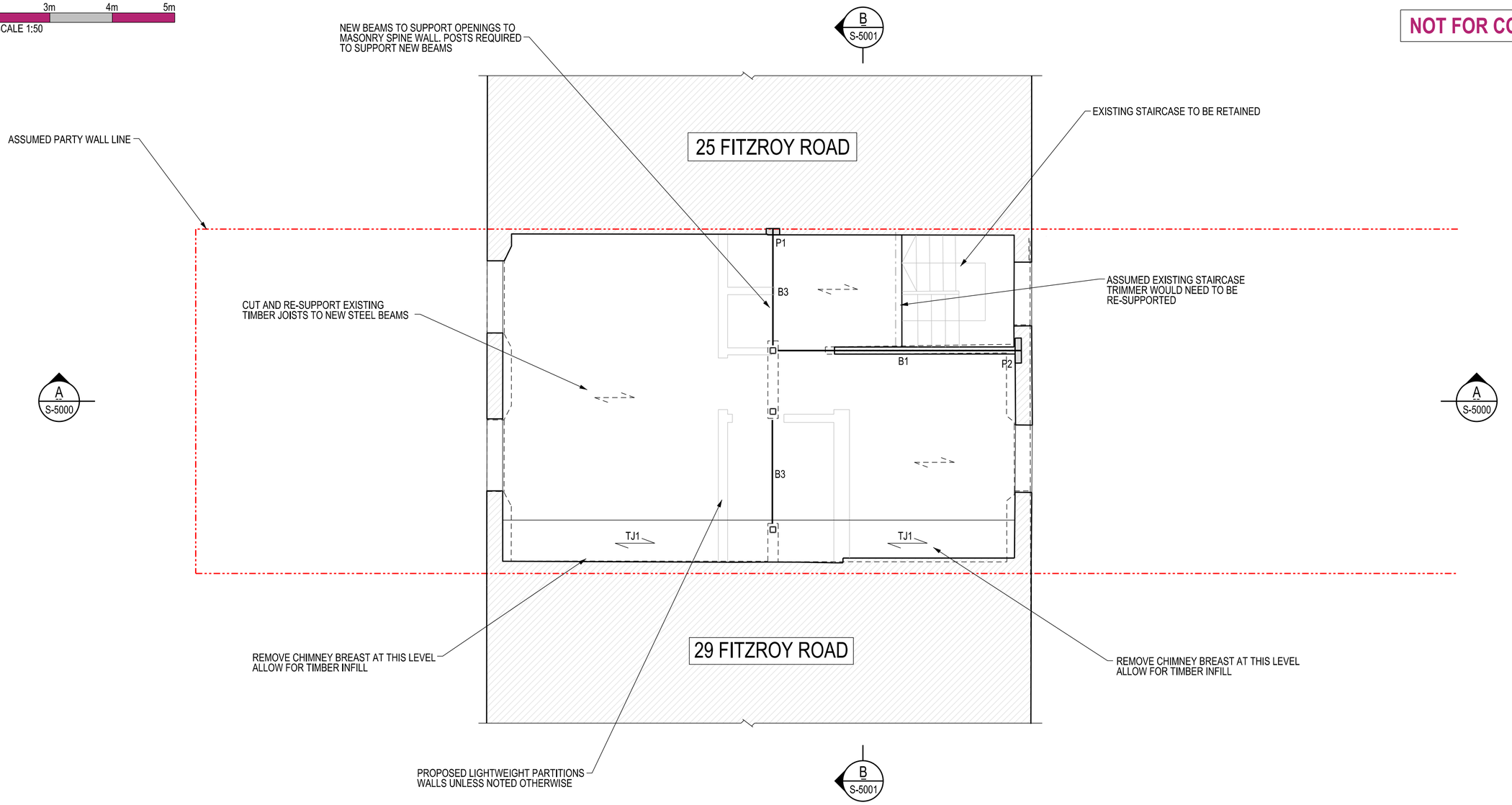
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
EXISTING STEEL BEAMS	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED SECOND FLOOR PLAN

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No.: 3149-MORPH-ZZ-ZZ-02-S-1005

REVISION: P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING.

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

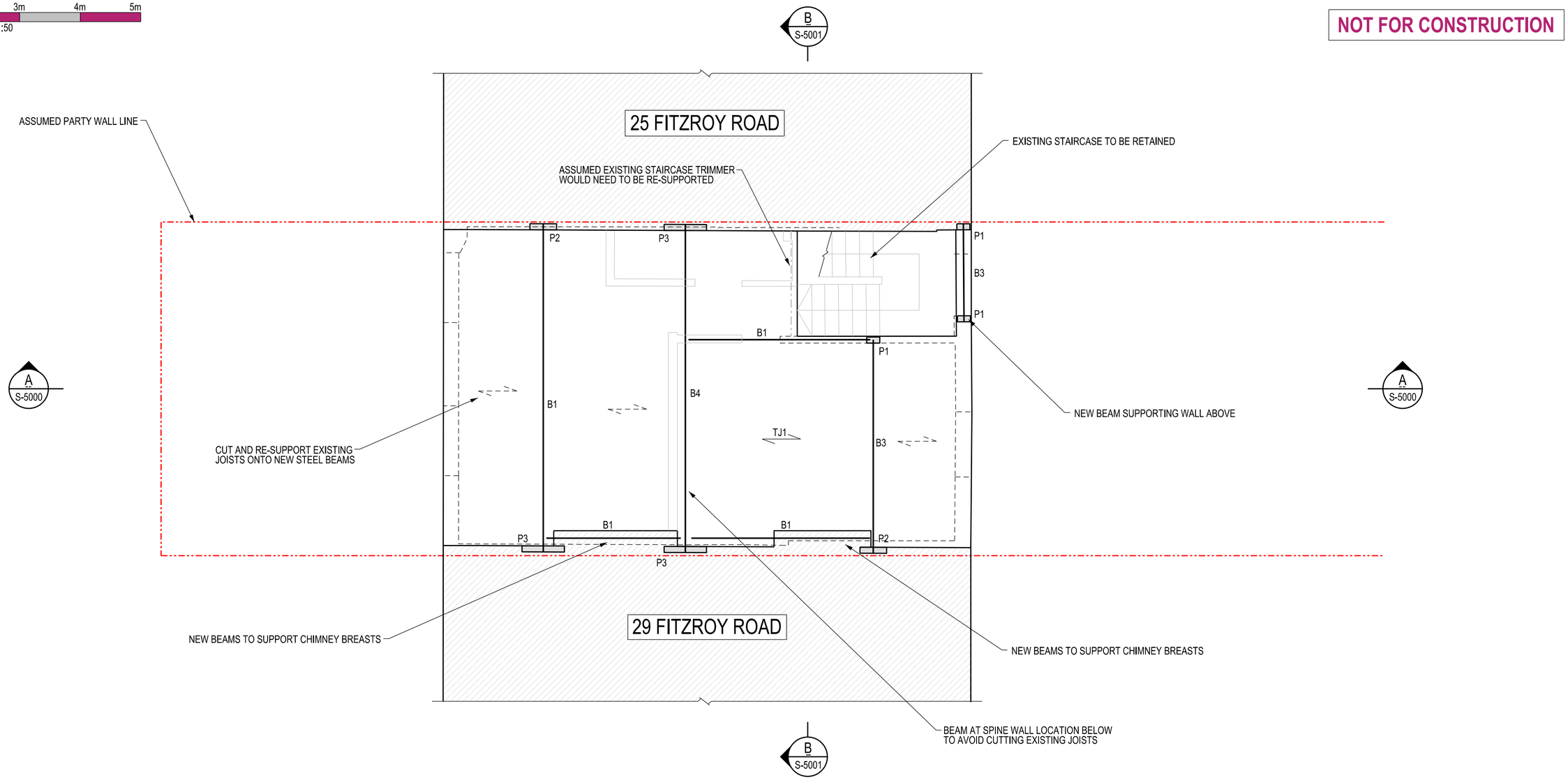
PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
EXISTING STEEL BEAMS	

0m 1m 2m 3m 4m 5m
SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET, LONDON E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

FRANKLIN WALDING — CLIENT

27 FITZROY ROAD — PROJECT

PROPOSED THIRD FLOOR PLAN — TITLE

SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

3149-MORPH-ZZ-ZZ-03-S-1006 — DRAWING No.

P3 — REVISION

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING.

STEEL BEAM SCHEDULE	
REF	SIZE
B1	203 x 203 x 46 UC
B2	203 x 133 x 23 UB
B3	203 x 133 x 30 UB
B4	203 x 203 x 86 UC
B5	254 x 254 x 73 UC
B6	305 x 305 x 118 UC
B7	152 x 152 x 37 UC

STEEL COLUMN SCHEDULE	
REF	SIZE
C1	203 x 203 x 46 UC
C2	203 x 203 x 86 UC
C3	100 x 100 x 10 SHS
C4	152 x 152 x 37 UC

TIMBER JOIST SCHEDULE	
REF	SIZE
TJ1	200 x 50 C16 AT 400mm C/C
TJ2	150 x 50 C16 AT 400mm C/C

PADSTONE SCHEDULE	
REF	SIZE (mm)
P1	ENGINEERING BRICK
P2	100 x 400 x 215 DEEP
P3	100 x 700 x 350 DEEP
NOTE: ALL PADSTONES MASS CONCRETE UNO	

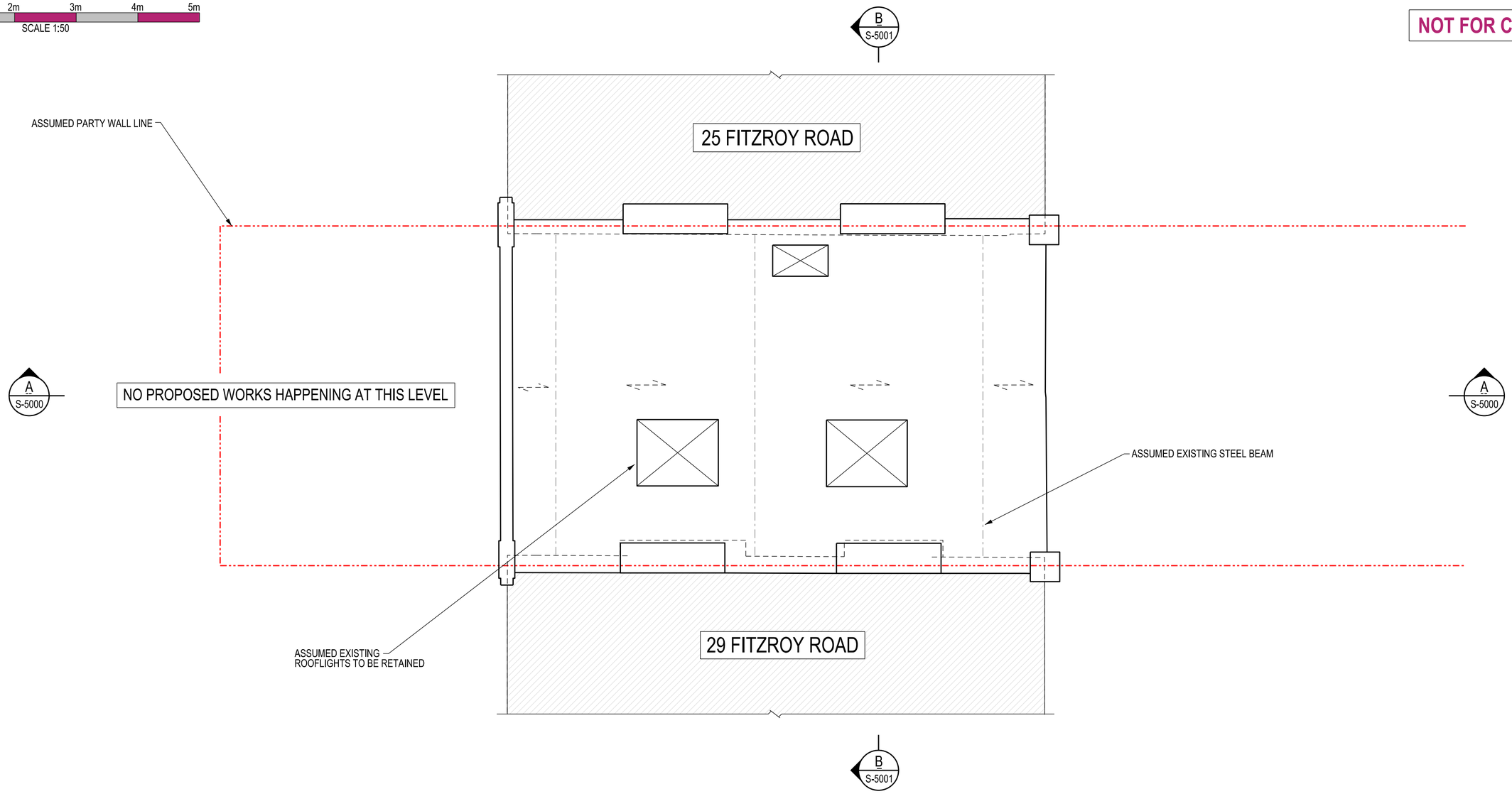
MATERIAL GRADES	
ELEMENT	GRADE
MASS CONCRETE	GEN 1
STRUCTURAL SOFTWOOD	C24
STRUCTURAL STEELWORK	S355

LEGEND	
SITE BOUNDARY	
SPAN DIRECTION OF FLOOR	
PROPOSED R.C	
PROPOSED MASS CONCRETE	
EXISTING STRUCTURE	
SPAN DIRECTION OF EXISTING FLOOR	
EXISTING STEEL BEAMS	

0m 1m 2m 3m 4m 5m

SCALE 1:50

NOT FOR CONSTRUCTION



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P3	26.11.21	ISSUED FOR INFORMATION	BB	ES
P2	05.11.21	ISSUED FOR INFORMATION	BB	ES
P1	13.10.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET,
LONDON
E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED ROOF PLAN

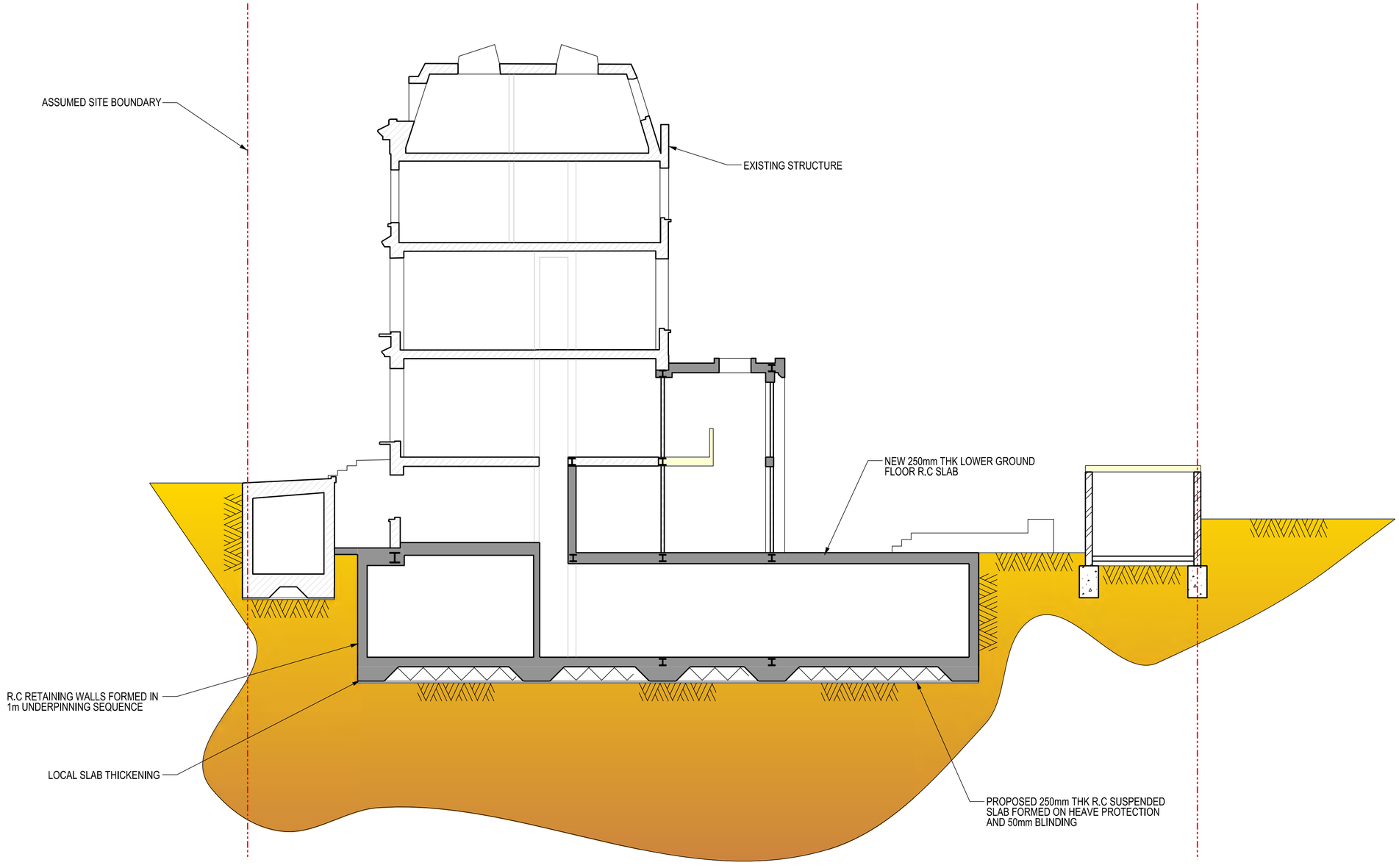
SCALE	DATE	DRAWN	CHECKED
1:50 @ A2	OCT '21	BB	ES

DRAWING No.: 3149-MORPH-ZZ-ZZ-RF-S-1007

REVISION: P3

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING.



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P2	26.11.21	ISSUED FOR INFORMATION	HOC	ES
P1	08.11.21	ISSUED FOR INFORMATION	HOC	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET,
LONDON
E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

PROJECT: 27 FITZROY ROAD

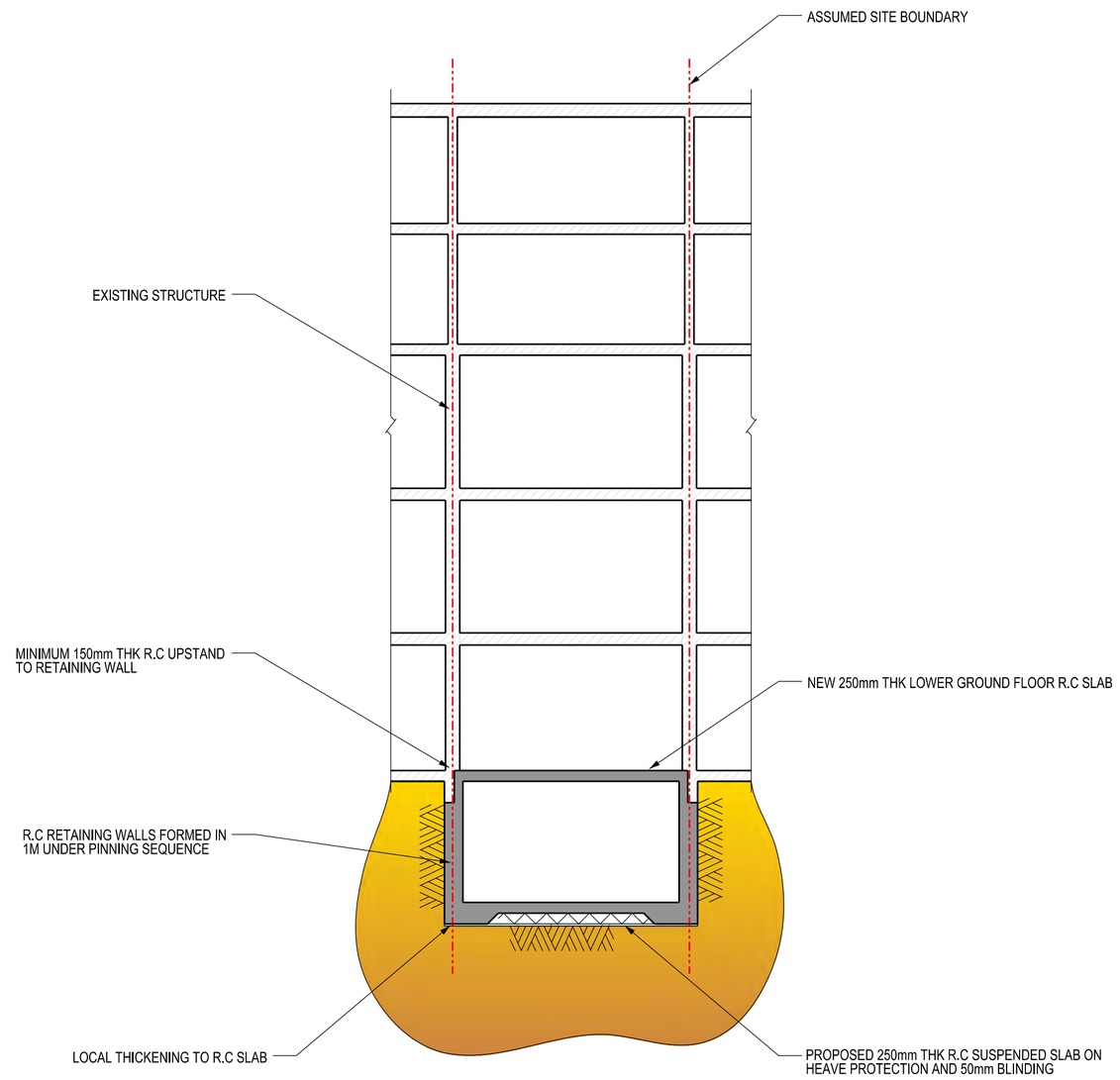
TITLE: PROPOSED GLOBAL SECTION AA

SCALE	DATE	DRAWN	CHECKED
1:100 @ A2	OCT '21	HOC	ES

DRAWING No. 3149-MORPH-ZZ-ZZ-DR-S-5000 REVISION P2

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE FROM THIS DRAWING..



FOR INFORMATION ONLY

REV	DATE	DESCRIPTION	BY	CHECKED
P1	26.11.21	ISSUED FOR INFORMATION	HOC	ES

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET,
LONDON
E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT: FRANKLIN WALDING

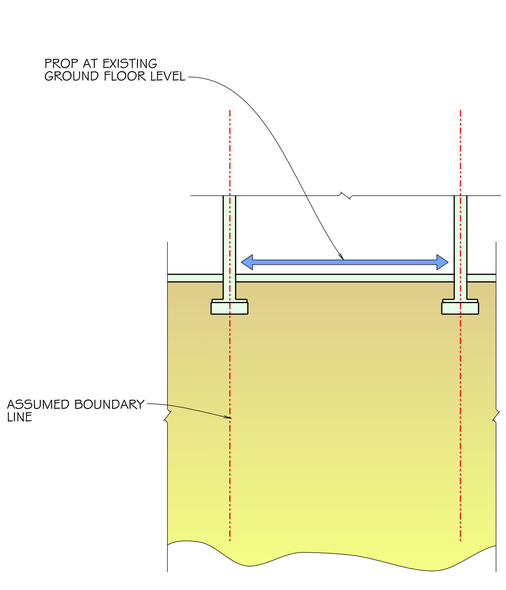
PROJECT: 27 FITZROY ROAD

TITLE: PROPOSED GLOBAL SECTION BB

SCALE	DATE	DRAWN	CHECKED
1:100 @ A2	NOV '21	BB	ES

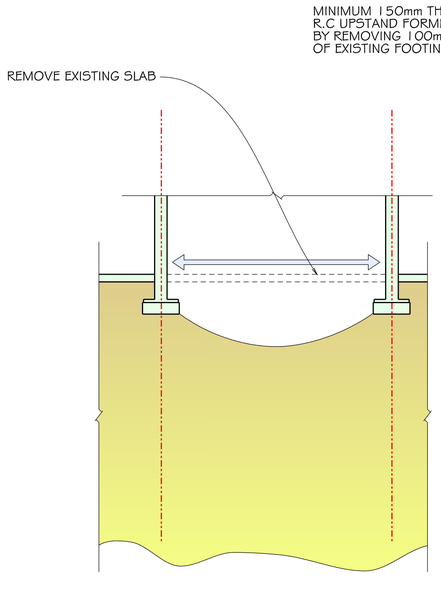
DRAWING No.: 3149-MORPH-ZZ-ZZ-DR-S-5001

REVISION: P1



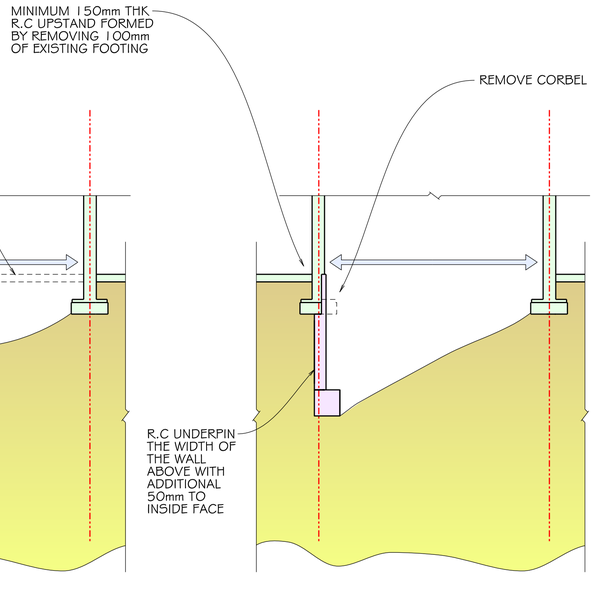
STAGE 1

PROP AS NECESSARY BEFORE EXCAVATION



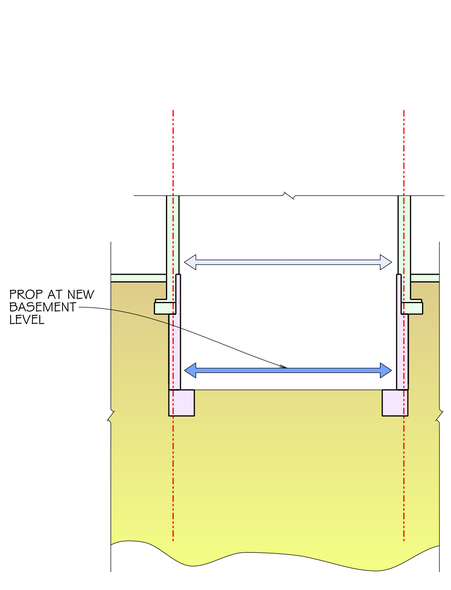
STAGE 2

REMOVE EXISTING GROUND FLOOR, EXCAVATE TO EXISTING FOUNDATION LEVEL



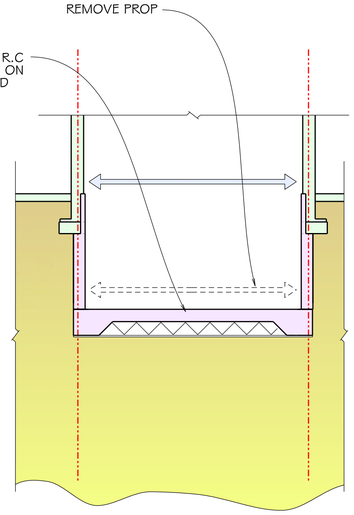
STAGE 3

NEW R.C RETAINING WALL FORMED IN 1m UNDERPIN SEQUENCE TO BASEMENT FLOOR LEVEL WITH MASS CONCRETE TOE



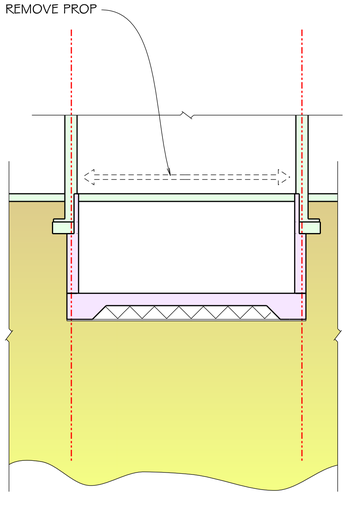
STAGE 4

PROP AS NECESSARY AT NEW BASEMENT LEVEL



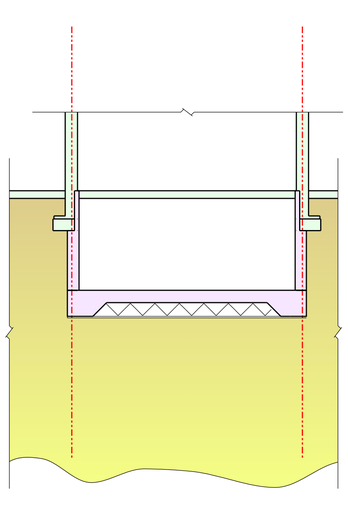
STAGE 5

INSTALL BASEMENT SLAB WAIT FOR CONCRETE STRENGTH GAIN AND THEN REMOVE PROP



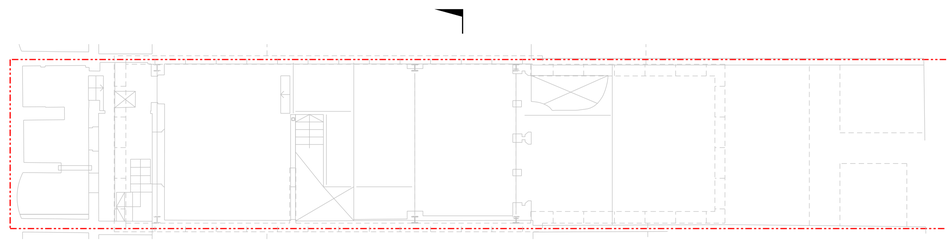
STAGE 6

CAST GROUND FLOOR SLAB, REMOVE PROPS



STAGE 7

COMPLETE



KEY PLAN

REV	DATE	DESCRIPTION	BY	CHECKED
P2	26.11.21	ISSUED FOR INFORMATION	BB	ES
P1	05.11.21	ISSUED FOR INFORMATION	BB	ES

morphstructures
consulting structural & civil engineers

27 FITROY ROAD
PROJECT

ASSUMED BASEMENT CONSTRUCTION SEQUENCE
TITLE

2905-MORPH-ZZ-ZZ-SK-S-2000 P2
SKETCH No. REVISION

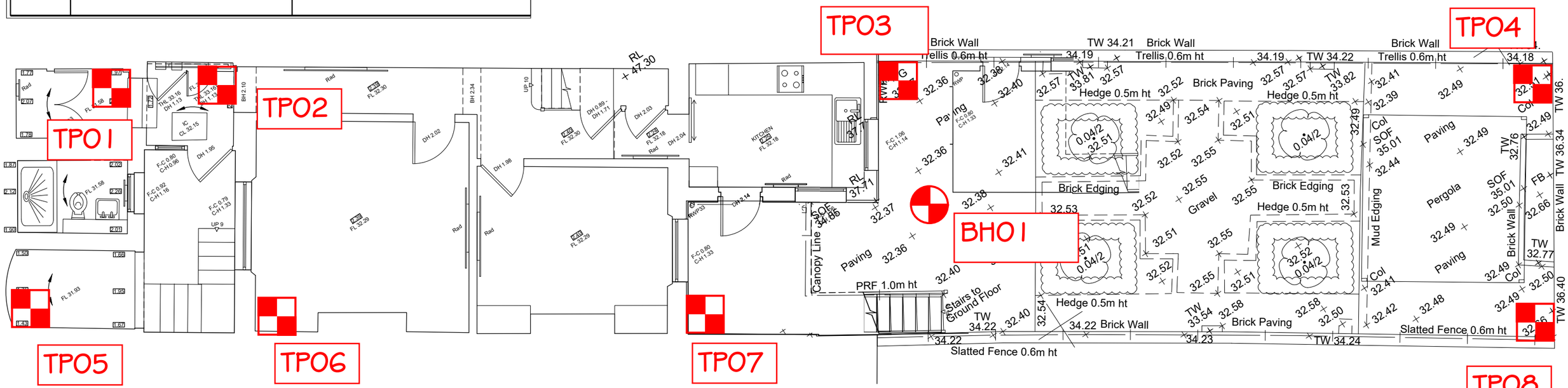
Appendix B

Scope of Investigative Works

NOTES

GEOTECHNICAL INVESTIGATIONS

REF	DESCRIPTION OF WORKS	COMMENTS
	REMOVE FINISHES LOCAL TO PROPOSED TRIAL PITS, EXCAVATE DOWN TO ESTABLISH DEPTH OF EXISTING FOUNDATIONS	DEPTH OF EXCAVATION SUBJECT TO DEPTH OF EXISTING FOOTINGS - ALLOW FOR 1.2M DEPTH OF DIG. BACKFILL UPON INSPECTION
	BOREHOLE INVESTIGATIONS TO BE CARRIED OUT IN ACCORDANCE WITH GEOTECHNICAL BRIEF.	CONTRACTOR TO CHECK ACCESS.



REV	DATE	DESCRIPTION	BY	CHECKED
P1	AUG'21	ISSUED FOR INFORMATION	DH	DR

morphstructures
consulting structural & civil engineers
221-222 SHOREDITCH HIGH STREET,
LONDON
E1 6PJ
T +44(0)20 3978 7300
W www.morphstructures.com
E mail@morphstructures.com

CLIENT

PROJECT 27 FITZROY ROAD

TITLE GEOTECH INVESTIGATION

SCALE	DRAWN	CHECKED	DATE
NTS	AUG'21	DH	DR

DRAWING No. 3149-MORPH-HSK-0001 REV P1

Appendix C

CGL Basement Impact Assessment

27 Fitzroy Road
London, NW1 8TP

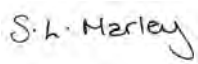
Desk Study, Basement Impact Assessment, Ground Investigation and Ground Movement Analysis Report

Franklin Walding

January 2022

J21267
Rev 1

Report prepared by



Susie Marley BSc MSc DIC FGS
Senior Geotechnical Engineer

With input from

John Evans MSc FGS CGeol
Consultant Hydrogeologist

Rupert Evans MSc CEnv CWEM MCIWEM AIEMA
Consultant Hydrologist

Matthew Penfold MSci MSc DIC CGeol FGS
Principal Geotechnical Engineer

Martin Cooper BEng CEng MICE FGS
Technical Director

Report checked and approved for issue by

Steve Branch BSc MSc CGeol FGS FRGS
Managing Director

Rev No	Status	Revision Details	Date	Approved for Issue
0	Final		9 November 2021	
1	Final	Including GMA	17 January 2022	

This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the project engineer at the office indicated below or to Steve Branch in our main Herts office.

✓	**Hertfordshire**	tel 01727 824666
	Nottinghamshire	tel 01509 674888
	Manchester	tel 0161 209 3032

This report is intended as a Ground Investigation Report (GIR) as defined in BS EN1997-2, unless specifically noted otherwise. The report is not a Geotechnical Design Report (GDR) as defined in EN1997-2 and recommendations made within this report are for guidance only.

CONTENTS

Part 3: GROUND MOVEMENT ASSESSMENT

Part 4: BASEMENT IMPACT ASSESSMENT

EXECUTIVE SUMMARY

This executive summary contains an overview of the key findings and conclusions. No reliance should be placed on any part of the executive summary until the whole of the report has been read. Other sections of the report may contain information that puts into context the findings that are summarised in the executive summary.

BRIEF

This report describes the findings of a desk study, basement impact assessment and ground investigation carried out by Geotechnical and Environmental Associates Limited (GEA) on the instructions of Studio McW Architects, on behalf of Franklin Walding, with respect to the construction of a single level basement beneath the existing property. The proposals also include renovation of the existing house and garden and an extension at first floor level. The purpose of the investigation has been to research the history of the site with respect to possible contaminative uses, to determine the ground conditions, to provide an indication of the presence of contamination and to provide information to assist with the design of retaining walls and spread foundations. The report also includes information required to comply with London Borough of Camden Planning Guidance: Basements (2021), relating to the requirement for a Basement Impact Assessment (BIA). This report also includes a ground movement analysis, including building damage assessment.

SITE HISTORY

The earliest map studied, dated 1851, shows the existing road network to have been constructed and the site fronted onto Fitzroy Road to the northwest. The existing house is mapped by 1872 and the site has since remained essentially unchanged. A pianoforte factory was located around 35 m to the west. Primrose Hill Studios were established on a previously vacant plot of land from around 20 m to the south by 1895. The 1923 historic building plan shows the site to have been bordered to the southeast by a workshop and builder's yard. The site and its immediate surroundings survived bomb damage during WWII. The area to the southeast was redeveloped with garages, including a sunken petrol tank, by 1957, although these are all labelled as vacant on the 1966 historic building plan. The factory remained present to the west until some time between 1954 and 1963, when it was converted into a public health department building and later flats by 1978. The site surroundings have since remained essentially unchanged. The site is not in proximity to any of London's "lost rivers"; the Rivers Tyburn and Fleet flowed around 500 m to the west and 600 m to the northwest respectively.

GROUND CONDITIONS

The investigation encountered the expected ground conditions in that, beneath a moderate thickness of made ground, London Clay was encountered and proved to the maximum depth of investigation at 4.00 m (28.00 m OD). The made ground extended to depths of between 0.20 m and 1.00 m (31.50 m OD) where proved. The underlying London Clay consisted of firm brownish grey mottled light grey silty clay with partings of fine orange-brown sand and silt, becoming fissured from depths of around 2.60 m and stiff from depths of around 3.40 m. No desiccation was observed. Refusal was reached at depths of 4.00 m. Groundwater was encountered in Trial Pit Nos 1 and 5 to 7 and Borehole No 2 at depths of between 0.40 m and 0.50 m within the made ground. Contamination testing has indicated elevated concentrations of lead in two samples of made ground from Borehole No 1 in the rear garden, in addition to an elevated concentration of arsenic in the shallower sample of made ground.

RECOMMENDATIONS

The proposed basement will extend to a depth of approximately 3 m below the existing lower ground floor level, such that formation level is expected to be within London Clay. Shallow inflows of perched groundwater are likely to be encountered within the basement excavation and should be suitably controlled by sump pumping, although the contractor should have contingency plans in place to deal with more significant inflows should they occur. Traditional underpinning should be feasible, subject to shallow groundwater control measures. Clean subsoil and topsoil are likely to be required for re-landscaping of the rear garden.

BASEMENT IMPACT ASSESSMENT AND GROUND MOVEMENT ANALYSIS

It has been concluded that the majority of the impacts identified can be mitigated by appropriate design and standard construction practice. As the new basement does not close a pathway or create a cut-off to groundwater flow, it is considered that the groundwater will follow a pathway around and beneath the proposed basement and will not build up significantly behind it. The basement should not, therefore, have any noticeable effect on groundwater flow. A monitoring strategy is recommended for the proposed construction and it is recommended that movement monitoring is carried out on all structures prior to and during the proposed basement construction. Deflections will need to be strictly limited to a maximum of 5 mm.

Part 1: INVESTIGATION REPORT

This section of the report details the objectives of the investigation, the work that has been carried out to meet these objectives and the results of the investigation. Interpretation of the findings is presented in Part 2 and a Ground Movement Assessment is included in Part 3.

1.0 INTRODUCTION

Geotechnical and Environmental Associates Limited (GEA) has been commissioned by Studio McW Architects, on behalf of Franklin Walding, to carry out a desk study and ground investigation at 27 Fitzroy Road, London, NW1 8TP.

This report also forms part of a Basement Impact Assessment (BIA), which has been carried out in accordance with guidelines from the London Borough of Camden in support of a planning application. A Ground Movement Analysis (GMA) including building damage assessment has been carried out in accordance with the guidance and is included in Part 3.

1.1 Proposed Development

It is understood that it is proposed to construct a new single level basement beneath the existing building. The proposals also include renovation of the existing house, which will include the construction of a side extension at first floor level and a new staircase at third floor level, plus relandscaping of the garden and a new garden room.

This report is specific to the proposed development and the advice herein should be reviewed once the development proposals have been finalised.

1.2 Purpose of Work

The principal technical objectives of the work carried out were as follows:

- to check the history of the site with respect to previous contaminative uses;
- to provide an assessment of the risk of encountering unexploded ordnance (UXO);
- to determine the ground conditions and their engineering properties;
- to use the above information to provide recommendations for retaining walls and shallow foundations;
- to assess the impact of the proposed basement on the local hydrogeology, hydrology and stability of the surrounding natural and build environment;
- to provide an indication of the presence of soil contamination; and
- to assess the risk that any such contamination may pose to the proposed development, its users or the wider environment.

1.3 Scope of Work

In order to meet the above objectives, a desk study was carried out, followed by a ground investigation. The desk study comprised:

- a review of historical Ordnance Survey (OS) maps and environmental searches sourced from the Envirocheck database;
- commissioning of a Preliminary UXO Risk Assessment from 1st Line Defence;
- a review of readily available geology maps; and
- a walkover survey of the site carried out in conjunction with the fieldwork.

In the light of this desk study an intrusive ground investigation was carried out which comprised, in summary, the following activities:

- two boreholes advanced to depths of 4.00 m (28.00 m OD and 28.50 m OD) using drive-in sampling equipment;
- the manual excavation of nine trial pits to a maximum depth of 1.05 m to investigate the configuration of the existing foundations;
- the installation of two standpipes and two return groundwater monitoring visits;
- testing of selected soil samples for contamination and geotechnical purposes; and
- provision of a report presenting and interpreting the above data, together with our advice and recommendations with respect to the proposed development.

This report includes a contaminated land assessment which has been undertaken by a suitably qualified and competent professional in accordance with the methodology presented by the Environment Agency in their Land contamination risk assessment (LCRM)[1] published 8 October 2020. This involves identifying, making decisions on, and taking appropriate action to deal with, land contamination in a way that is consistent with government policies and legislation within the United Kingdom. Risk management is divided into three stages; Risk Assessment, Options Appraisal and Remediation, and each stage comprises three tiers. The Risk Assessment stage includes preliminary risk assessment (PRA), generic quantitative risk assessment (GQRA) and detailed quantitative risk assessment (DQRA)and this report includes the PRA and GQRA.

The exploratory methods adopted in this investigation have been selected on the basis of the constraints of the site including but not limited to access and space limitations, together with any budgetary or timing constraints. Where it has not been possible to reasonably use an EC7 compliant investigation technique a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

[1] https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

1.3.1 Basement Impact Assessment

The work carried out includes a Hydrological and Hydrogeological Assessment and Land Stability Assessment (also referred to as Slope Stability Assessment). These assessments form part of the BIA procedure specified in the London Borough of Camden Planning Guidance CPG[2] and their Guidance for Subterranean Development[3] prepared by Arup (the "Arup report") in accordance with Policy A5 of the Camden Local Plan 2017. The aim of the work is to provide information on surface water, groundwater and land stability and in particular to assess whether the development will affect neighbouring properties or groundwater movements and whether any identified impacts can be appropriately mitigated by the design of the development.

1.3.2 Qualifications

The land stability element of the Basement Impact Assessment (BIA) has been carried out by Martin Cooper, a BEng in Civil Engineering, a chartered engineer (CEng), member of the Institution of Civil Engineers (MICE), and Fellow of the Geological Society (FGS) who has over 20 years' specialist experience in ground engineering. The subterranean (groundwater) flow assessment has been carried out by John Evans, MSc in Hydrogeology, Chartered Geologist (CGeol) and Fellow of the Geological Society of London (FGS). The surface water and flooding assessment has been carried out by Rupert Evans, a hydrologist with more than ten years consultancy experience in flood risk assessment, surface water drainage schemes and hydrology / hydraulic modelling. Rupert Evans is a Chartered Environmentalist, Chartered Water and Environmental Manager and a Member of CIWEM.

The assessments have been made in conjunction with Steve Branch, a BSc in Engineering Geology and Geotechnics, MSc in Geotechnical Engineering, a Chartered Geologist (CGeol) and Fellow of the Geological Society (FGS) with some 30 years' experience in geotechnical engineering and engineering geology.

All assessors meet the qualification requirements of the Council guidance.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or ground water samples tested. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

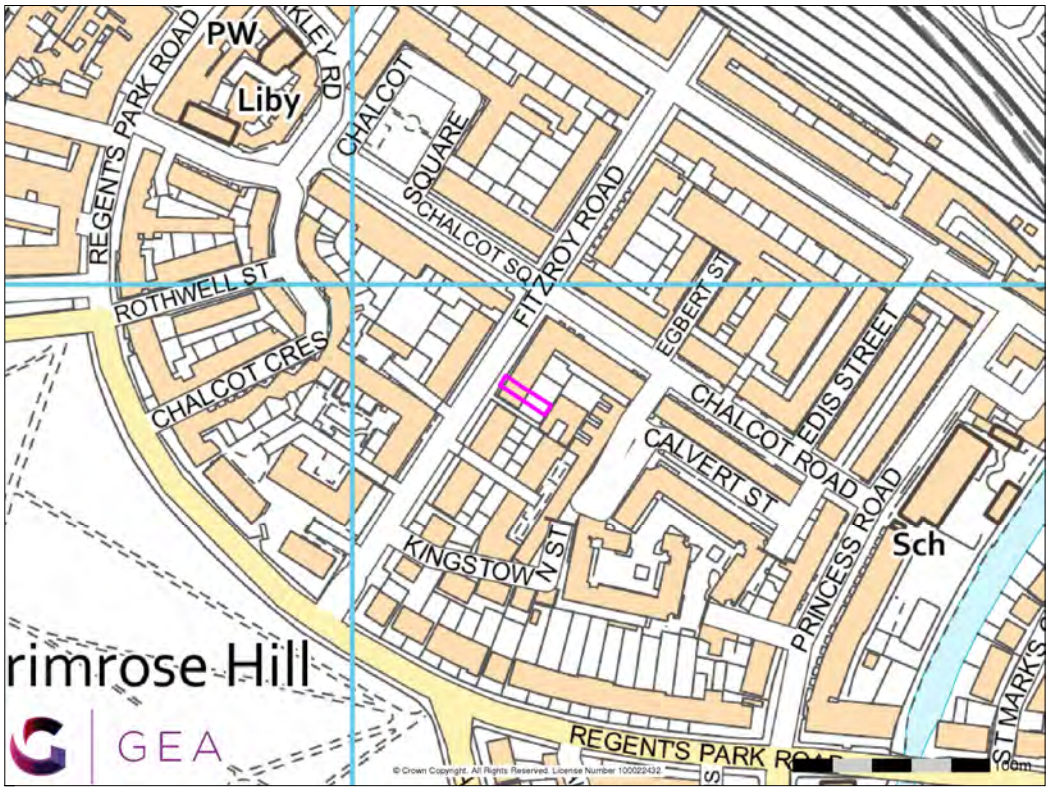
2 London Borough of Camden Planning Guidance CPG (January 2021) *Basements*
3 Ove Arup & Partners (2010) *Camden geological, hydrogeological and hydrological study. Guidance for Subterranean Development.* For London Borough of Camden November 2010

2.0 THE SITE

2.1 Site Description

The site is located in London Borough of Camden, approximately 450 m to the south of Chalk Farm London Underground station and approximately 820 m west of Camden Town London Underground station. It fronts onto Fitzroy Road to the northwest and is bounded by similar properties to the northeast and southwest, and by a roughly 4 m high building to the southeast.

The site may be additionally located by National Grid Reference 528067, 183920 and is shown on the map extract below.



A walkover of the site was carried out by a geotechnical engineer from GEA at the time of the fieldwork. The site is rectangular in shape and measures approximately 27 m by 5.7 m in maximum dimensions. It is occupied by 27 Fitzroy Road, a five-storey house including a lower ground floor level and rear courtyard-style brick walled garden. A lightwell is present at the front of the property with two vaults extending further out beneath the pavement. The garden is mostly paved or gravel covered, except for four planted areas in the centre.

The site adjoins similar properties of 25 and 29 Fitzroy Road to the northeast and southwest respectively, both of which also including lower ground floor levels, properties of a similar size and footprint and rear gardens. The gardens are separated by brick walls.

2.1.1 Thames Water

The Thames Water utility drawing is appended and shows a large diameter sewer along Fitzroy Road, along with a 6 inch main and a 125 mm supply pipe. The assets are at a distance from the proposed basement such that it is unlikely to affect them, but Thames Water may require demonstration of this as discussed in Part 3.

2.2 Site History

The site history has been researched by reference to internet sources and historical Ordnance Survey (OS) maps obtained from the Envirocheck database.

The earliest map studied, dated 1851, shows the existing road network to have been constructed and the site fronted onto Fitzroy Road to the northwest. The existing house is mapped by 1872 and has since remained essentially unchanged. A pianoforte factory was located around 35 m to the west. Primrose Hill Studios were established on a previously vacant plot of land from around 20 m to the south by 1895.

The 1923 historic building plan shows the site to have been bordered to the southeast by a workshop and builder's yard.

The site and its immediate surroundings survived bomb damage during WWII. The area to the southeast was redeveloped with garages, including a sunken petrol tank, by 1957, although these are all labelled as vacant on the 1966 historic building plan.

The factory remained present to the west until sometime between 1954 and 1963, when it was converted into a public health department building and later flats by 1978. The site has since remained essentially unchanged.

2.3 Other Information

A search of public registers and databases has been made via the Envirocheck database and relevant extracts from the search are appended. Full results of the search can be provided if required.

The Envirocheck report indicates that there are no landfill sites within 1 km of the site and additionally, no waste management, waste transfer, treatment or disposal sites are located within 500 m of the site. The nearest area of infilled land is located 360 m to the southeast (at unknown filled ground over water) but is unlikely to affect the site at such a distance.

The nearest discharge consent is located 261 m to the east of the site. A local authority pollution prevention and control point is located 204 m to the north of the site and permission is authorised for the respraying of road vehicles. A pollution incident to controlled waters is located 91 m to the northwest of the site for oil pollutants and is categorised as a Category 3 – minor incident. There are no other incidents within 300 m of the site.

The nearest groundwater abstraction point is located 398 m to the east of the site. The site is not within a Source Protection Zone (SPZ) or any other sensitive land use.

Envirocheck does not record the site to be at risk of flooding from rivers or the sea.

Reference to records compiled by the Health Protection Agency (formerly the National Radiological Protection Board) indicates that the site falls within an area where less than 1 % of homes are affected by radon emissions and therefore radon protective measures will not be necessary.

There are no contemporary trade directories entries recorded within 100 m of the site. The nearest record is for an inactive upholstery cleaner located 34 m to the east at 4a Manley Street. It is unlikely to have affected the site at such a distance. There are no fuel stations within 450 m of the site.

2.4 Preliminary UXO Risk Assessment

A Preliminary UXO Risk Assessment has been completed by 1st Line Defence (report ref PA14216-00, dated 17 September 2021) and the report is included in the appendix. The risk assessment has been carried out in accordance with the guidelines provided by CIRIA[4], which state that the likelihood of encountering and detonating UXO below a site should be assessed along with establishing the consequences that may arise. The first phase comprises a preliminary risk assessment, which should be undertaken at an early stage of the development planning. If such an assessment identifies a high level of risk then a detailed risk assessment should be carried out by a UXO specialist, which will identify an appropriate course of action with regard to risk mitigation.

The report indicates that, during World War II (WWII), the site was located within the Metropolitan Borough of St Pancras, which sustained an overall very high bomb density. There are however no records of bomb strikes on or near to the site, except for an incendiary shower covering the general area. Additionally, it is considered likely that the properties would have been subject to regular post-raid checks for signs of UXO. The report therefore concluded that the risk of UXO at this site is not considered to be above the background level for the region, such that no further action was recommend in this respect.

2.5 Geology

The British Geological Survey (BGS) map of the area indicates that the site is directly underlain by the London Clay Formation. A nominal thickness of made ground may be present above the London Clay, but the majority of made ground is likely to have been removed at the lower ground floor level as a result of the historical excavation.

GEA has carried out a number of investigations in the surrounding area, the nearest of which was carried out along Fitzroy Road approximately 120 m to the north of the site. Here, the expected ground conditions were encountered in that, below a variable and locally significant thickness of made ground, London Clay was encountered and proved to the full depth of the investigation. Made ground extended to depths of 0.3 m (30.2 m OD) and 3.5 m (29.0 m OD), with the greatest thickness assumed to be associated with the construction of a vault at the front of the site. The London Clay comprised an upper layer of firm medium strength brown to brownish grey silty clay with occasional grey markings, partings of silty sand and occasional pockets of selenite crystals, which extended to depths of between 4.0 m (26.5 m OD) and 6.0 m (26.5 m OD), and was underlain by stiff becoming very stiff fissured high strength brownish grey becoming dark grey silty clay with occasional partings of sandy silt, to the maximum depth investigated, of 20.0 m (12.5 m OD).

2.6 Hydrology and Hydrogeology

The London Clay Formation is classified as Unproductive Strata, referring to rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The London Clay cannot support a water table or effectively transmit groundwater flow because of its low permeability and cohesive nature. The permeability will be predominantly secondary, through fissures in the clay. Published data indicates the horizontal permeability of the London Clay to generally range between 1×10^{-11} m/s and 1×10^{-9} m/s, with an even lower vertical permeability.

4 CIRIA C681 (2009) *Unexploded ordnance (UXO) A guide for the construction industry*

The nearest surface water feature is Regent's Canal, present from around 230 m to the southeast, which is a manmade structure and not in hydraulic continuity with the London Clay Formation.

The site is not in proximity to any of London's "Lost Rivers" [5]; the River Tyburn flowed around 500 m to the west of site and the River Fleet around 600 m to the northwest.

The nearby previous GEA investigation encountered isolated groundwater seepages at depths of 1.8 m (28.7 m OD) and 2.5 m (28.0 m OD). Groundwater was subsequently measured at depths of between 0.21 m (30.29 m OD) and 6.67 m (25.83 m OD) in standpipes installed in the clay and is likely to represented water that has drained into the standpipe and is trapped by the relatively low permeability clay.

The site is almost entirely covered by the existing building and hardstanding, and infiltration of rain water into the ground beneath the site is therefore limited to the small patches of soft landscaping in the rear garden, such that the majority of surface runoff is likely to drain into combined sewers in the road.

2.7 Preliminary Risk Assessment

Part IIA of the Environmental Protection Act 1990, which was inserted into that Act by Section 57 of the Environment Act 1995, provides the main regulatory regime for the identification and remediation of contaminated land. The determination of contaminated sites is based on a "suitable for use" approach which involves managing the risks posed by contaminated land by making risk-based decisions. This risk assessment is carried out on the basis of a source-pathway-receptor approach.

2.7.1 Source

The desk study findings do not indicate the site to have a potentially contaminative history, as it has been occupied by the existing house since at least 1872 and no on-site sources of contamination have therefore been identified.

Off site sources of contamination have however been identified and include the garages and workshops, including a sunken petrol tank, to the rear of the site, which are assumed to have comprised vehicle maintenance and servicing garages. Typical contaminants could include hydrocarbon fuels, fuel additives, metals, PAHs, solvents, paints, paint thinners and associated hydrocarbon vapours. Such contamination is however likely to be localised to the source site as a result of spillages or leaks. The workshops are mapped from around 1927 and the garages added by 1957, and all were redeveloped by 1966, such that they no longer represent ongoing sources of contamination.

No historical landfill sites or other sources of soil gas have been identified on or in close proximity to the site.

2.7.2 Receptor

The proposed redevelopment of the site will result in a continued residential end use with plant uptake and as such, end users represent relatively high sensitivity receptors.

The site is underlain by Unproductive Strata and as such, groundwater is not considered to be a sensitive receptor.

[5] Barton, N, & Meyers, S (2016) *The Lost Rivers of London (revised and extended edition with colour maps).* Historical Publications Ltd.

Adjacent sites, site workers and buried structures and services are sensitive receptors.

2.7.3 Pathway

Within the site, end users will be isolated from direct contact with any potential contaminants present within the made ground by the presence of the building and the extent of the hardstanding. A pathway will however exist in areas of soft landscaping whereby end users could come into direct contact with potentially contaminated soils, and where there is the opportunity for consumption of home grown produce, although this pathway is already in existence.

The development proposals do however include the excavation of a single level basement beneath existing house and as such, the majority of the made ground, if not all, and any associated contaminants included within it will be removed from site. Only where made ground remains outside of the footprint of the proposed excavation in the rear garden will a pathway remain present, but the proposals also include significant relandscaping and it is likely that made ground will also be removed from the garden to ensure successful plant growth.

The presence of negligibly permeable London Clay beneath the site will limit the potential for potentially contaminated groundwater, or hydrocarbon vapours, migrating onto the site and vice versa. There is however potential for a pathway exist through granular portions of made ground, although this is considered to be of limited extent and is unlikely to be realised. The London Clay will also limit the potential for groundwater percolation into the underlying chalk and thus a pathway is not considered likely to exist to the Principal Aquifer.

Buried services may be exposed to any contaminants present within the soil through direct contact and site workers will come into contact with the soils during construction works. There is thus considered to be a low potential for a contaminant pathway to be present between any potential contaminant source and a target for the particular contaminant.

2.7.4 Preliminary Risk Appraisal

On the basis of the above it is considered that there is a LOW risk of there being a significant contaminant linkage at this site which would result in a requirement for major remediation work.

3.0 SCREENING

The LBC guidance suggests that any development proposal that includes a basement should be screened to determine whether or not a full BIA is required.

3.1 Screening Assessment

A number of screening tools are included in the Arup document and for the purposes of this report reference has been made to Appendices E1, E2 and E3 which include a series of questions within screening flowcharts for surface flow and flooding, subterranean (groundwater) flow and land stability. The flowchart questions and responses to these questions are tabulated below.

3.1.1 Subterranean (groundwater) Screening Assessment

Question	Response for 27 Fitzroy Road
1a. Is the site located directly above an aquifer?	No. The site is directly underlain by London Clay, which is classified as Unproductive Strata.
1b. Will the proposed basement extend beneath the water table surface?	No. London Clay cannot support a water table and is classified as Unproductive Strata. However, if an upper weathered layer is present, this may have a higher permeability and could have the potential to collect groundwater if the stratum has a predominantly granular matrix, which is unlikely in this setting.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No. Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report confirm this.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No. Figure 14 of the Arup report confirms that the site is not located within this catchment area.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No. The proposed basement excavation will extend beneath the footprint of the existing house and beneath an existing area of external hardstanding and will not therefore result in a significant change in the proportion of hard surfaced / paved areas.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	No. It is not considered feasible that the ground would be sufficiently permeable to allow for a soakaway discharge design, nor do the details of the proposed development indicate the use of soakaway drainage.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	No. Topographical maps acquired as part of the desk study and Figures 11 and 12 of the Arup report confirm this.

The above assessment has not identified any potential issues that need to be further assessed.

3.1.2 Stability Screening Assessment

Question	Response for 27 Fitzroy Road
1. Does the existing site include slopes, natural or manmade, greater than 7°?	No, as indicated on the Slope Angle Map Fig 16 of the Arup report.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	No. The proposed re-landscaping is not understood to include significant reprofiling such that a slope will be created.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No. As indicated on the Slope Angle Map Fig 16 of the Arup report.
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No. As indicated on the Slope Angle Map Fig 16 of the Arup report.

Question	Response for 27 Fitzroy Road
5. Is the London Clay the shallowest strata at the site?	*Yes. As indicated on the geological map and Figures 3, 5 and 8 of the Arup report.*
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. There are no trees on the site.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	*Yes. The area is prone to these effects as a result of the presence of shrinkable London Clay.*
8. Is the site within 100 m of a watercourse or potential spring line?	No. Not according to Figure 12 of the Arup report, extracts from the Envirocheck report and Ordnance Survey maps.
9. Is the site within an area of previously worked ground?	No. Not according to Figure 3 of the Arup report.
10a. Is the site within an aquifer?	No. The site is located above Unproductive Strata.
10b. Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No. The London Clay Formation cannot support a water table and is classified as Unproductive Strata.
11. Is the site within 50 m of Hampstead Heath ponds?	No. Figure 14 of the Arup report confirms that the site is not located within this catchment area.
12. Is the site within 5 m of a highway or pedestrian right of way?	*Yes, the site fronts onto Fitzroy Road. However, the existing lower ground floor level includes vaults below the existing pavement to Fitzroy Road already and so the proposed basement excavation will not encroach any closer to the road.*
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	*Yes. The neighbouring properties also include lower ground floor levels, but do not appear to include basements and so the proposed basement excavation will result in different founding depths.*
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No. Not according to Figure 18 of the Arup report and information provided by London Underground.

The above assessment has identified the following potential issues that need to be assessed:

Q5 The London Clay is the shallow stratum on the site.
Q7 The site is in an area likely to be affected by seasonal shrink-swell.
Q12 The site is within 5 m of Fitzroy Road.
Q14 The proposed basement excavation will result in different depth of foundations relative to neighbouring properties.

3.1.3 Surface Flow and Flooding Screening Assessment

Question	Response for 27 Fitzroy Road
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No. Figure 14 of Arup report confirms that the site is not located within this catchment area.
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. There will not be an increase in impermeable area across the ground surface above the basement, so the surface water flow regime will be unchanged. The basement will be beneath the footprint of the existing building and areas of hardstanding, therefore the 1 m distance between the roof of the basement and ground surface as recommended by the Arup report and para 3.2 of the CPG (2021) does not apply across these areas.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No. There will not be an increase in impermeable area across the ground surface above the basement.

Question	Response for 27 Fitzroy Road
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No. There will not be an increase in impermeable area across the ground surface above the basement, so the surface water flow regime will be unchanged.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No. The proposed basement is very unlikely to result in any changes to the quality of surface water being received by adjacent properties or downstream watercourses as the surface water drainage regime will be unchanged and the land uses will remain the same.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	*Yes. The Camden Flood Risk Management Strategy dated 2013, together with Figures 4e, 5a and 5b of the SFRA dated 2014, and Environment Agency online flood maps show that the site has a very low flooding risk from sewers, reservoirs (and other artificial sources), groundwater and fluvial/tidal watercourses.* *The Environment Agency online flood maps and Figure 3ii of the SFRA show that the site has a low to very low flooding risk from surface water.* *It is possible that the basement will be constructed within pockets of perched water and the recommendations outlined in the BIA with regards to water-proofing and tanking of the basement will reduce the risk to acceptable levels.* *In accordance with paragraph 6.13 of the CPG, a positive pumped device will be installed in the basement in order to further protect the site from sewer flooding.* *The site is located within the Critical Drainage Area number GROUP3-003, and within the Primrose Hill Local Flood Risk Zone as identified in the Updated SFRA Figure 6/Rev 2.*

The above assessment has identified the following potential issue that needs to be assessed:

Q6 The site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk of flooding.

4.0 SCOPING

The purpose of scoping is to assess in more detail the factors to be investigated in the impact assessment. Potential impacts are assessed for each of the identified potential impact factors.

4.1 Potential Impacts

The following potential impacts have been identified by the screening process;

Potential Impact	Consequence
London Clay is the shallowest stratum at the site.	The London Clay is prone to seasonal shrink-swell (subsidence and heave).
Seasonal shrink-swell can result in foundation movements.	Multiple potential impacts depending on the specific setting of the basement development. For example, in terraced properties, the implications of a deepened basement/foundation system on neighbouring properties should be considered.
The site is located within 5 m of a highway or pedestrian right of way.	Excavation of a basement may result in structural damage to the road or footway.
The proposed basement excavation will result in different depth of foundations relative to neighbouring properties.	Underpinning will need to be carried out competently so as not to cause movement of surrounding structures.

These potential impacts have been investigated through the ground investigation, as detailed in Section 5.0.

5.0 EXPLORATORY WORK

The site was partly occupied at the time of the fieldwork. In order to meet the objectives described in Section 1.2 as far as possible within the access limitations presented by the presence of the existing building, two drive-in opendrive sampler boreholes were advanced to a depth of 4.00 m. Additionally, nine trial pits were manually excavated to investigate the configuration of the existing foundations.

Groundwater monitoring standpipes were installed into the two boreholes, as detailed on the logs appended. Two return groundwater monitoring visits have been completed.

A selection of the disturbed samples recovered from the boreholes and trial pits was submitted to a soil mechanics laboratory for a programme of geotechnical testing and an analytical laboratory for a programme of contamination testing.

All of the work was carried out under the part time supervision of a geotechnical engineer from GEA.

The borehole and trial pit records are appended, together with the results of the laboratory testing and a site plan indicating the exploratory locations. The Ordnance Datum (OD) levels on the borehole and trial pit records have been interpreted from spot heights provided on a drawing detailing existing levels (drawing ref 21/097/100, dated April 2021, created by Maltby Surveys Ltd and provided by the consulting engineers).

5.1 Sampling Strategy

The borehole and trial pit locations were agreed with the consulting engineers during an initial conversation with GEA and were positioned on site by an engineer from GEA in accessible locations whilst avoiding known and suspected buried services.

Three samples were subjected to analysis for a range of common industrial contaminants and contamination indicative parameters. For this investigation the analytical suite for the soil and water included a range of metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), total cyanide and monohydric phenols. The samples were also screened for the presence of asbestos.

The soil samples were selected to provide a general view of the chemical conditions of the soils that are likely to be involved in a human exposure or groundwater pathway and to provide advice in respect of re-use or for waste disposal classification. The contamination analyses were carried out at a MCERTs accredited laboratory with the majority of the testing suite accredited to MCERTS standards.

A number of the disturbed samples of natural soil were submitted to a geotechnical testing laboratory and were subject to a number of material property tests, including four-point Atterberg Limit, moisture content tests and soluble sulphate and pH analysis.

6.0 GROUND CONDITIONS

The investigation has generally confirmed the expected ground conditions in that, beneath a nominal thickness of made ground, the London Clay Formation is present and was proved to the maximum depth of investigation at 4.00 m (28.00 m OD).

6.1 Made Ground

The made ground generally comprised brown mottled light brown and grey silty slightly sandy clay including fragments of red brick, oyster shell and occasional clinker, and extended to a depth of 0.70 m (31.30 m OD) in Borehole No 2 advanced in the front lightwell and to a depth of 1.00 m (31.50 m OD) in Borehole No 1 advanced in the rear garden. Made ground extended to depths of between around 0.20 m and 1.00 m where proved in the trial pits.

Apart from the presence of fragments of extraneous material noted above, no visual or olfactory evidence of contamination was observed during the fieldwork. Three samples of the made ground have however been analysed for a range of contaminants as a precautionary measure and the results are detailed within Section 4.4.

6.2 London Clay

The London Clay consisted of firm brown-grey mottled light grey silty clay with partings of fine orange-brown sand and silt, becoming fissured from a depth of around 2.60 m and stiff from a depth of 3.40 m, and was proved to the maximum depth of investigation at 4.00 m (28.00 m OD). No desiccation was observed. Refusal was reached at a depth of 4.00 m in both boreholes.

The results of plasticity index tests indicate the clay to be of high volume change potential.