Form

17 EAST HEATH ROAD, LONDON, NW3 1AL

BASEMENT CONSTRUCTION PLAN

Job No: 162611

Date: 15th August 2017

Prepared by Chartered Engineer: Rob Markovits C.Eng.M.I.Struct.E

Revision: P2

Residential

Commercial

Conservation

Retail

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	Date
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Document Ref:	
Basement Construction Plan	
Revision:	
P2	

Contents

1.0	Introduction	6
2.0	The Site and Existing Building	6
3.0	Boundary Conditions	6
4.0	Development proposals	6
5.0	Sub-Structure Construction	6
6.0	Design Life	6
7.0	Temporary Works Systems and Principals to be used on each part of the works	6
8.0	Potential Ground Movement and Monitoring of Adjoining Properties	6
9.0	Excavation of Soil	7
10.0	Waterproofing and Drainage systems	7
11.0	Rubbish Removal and Recycling	7
12.0	Noise, Vibration, Dust & Air Quality	7
13.0	Superstructure	7
Appendix A - Form Structural Drawings & Specifications		8
Appendix B - Temporary Works Design		9
Appendix C - Basement Impact Assessment		10
Appendix D - Movement Monitoring Specification		11
Appendix E - Design Philosophy & Preliminary Calculations		12
Appendix F - Confirmation of appointment		13

PREAMBLE

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ABOUT FORM STRUCTURAL DESIGN

Form has undertaken over 250 projects involving subterranean development, both new build and retrospective, using numerous techniques and sequences of construction. This extensive design, site and local geology/hydrology experience has positioned the practice as one of London's leading subterranean engineering design consultants.

Many of our subterranean projects are in the London Boroughs of RBKC, Westminster, Camden, Hammersmith & Fulham and Haringey, making us familiar with the most recent requirements of subterranean development.

Form has designed multi-level basements using techniques including open dig, underpinning (mass and 'L' shaped R.C. special foundations), temporary and permanent steel sheet piling, temporary and permanent concrete piled retaining walls, top down construction and tunnelling.

TERMS OF REFERENCE

We were appointed by the client, to prepare a Basement Construction Plan in support of the Section 106 Agreement for refurbishment including extending the lower ground floor further into the rear garden at 17 East Heath Road, London, NW3 1AL.

Form

Executive Summary

This document provides evidence to satisfy the requirements of a 'Basement Construction Plan' as defined in Camden's planning guidance document CPG4 – Basements and Lightwells section 3.37:

Extract Descriptions of Key Aspects from Camden's CPG4 – Basements and Lightwells	Reference Location within this Report	Compliance to Camden Policy
• A method statement detailing the proposed method of ensuring the safety and stability of neighbouring properties throughout the construction phase including temporary works sequence drawings	Section 7.0 & Appendix B	✓
• Appropriate monitoring including details of risk assessment thresholds and contingency measures, detail demonstrating that the basement has been designed using evidence of local factors including ground conditions, the local water environment and the structural condition of neighbouring properties, in order to minimise the impact on them.	Sections 3.0 - 8.0 & Appendices C & D	✓
• Provision to retain at the property throughout the construction phase a suitably qualified engineer from a recognised relevant professional body to monitor, inspect, and approve the permanent and temporary basement construction works	Section 8.0 & Appendix F	✓
• Measures to ensure the ongoing maintenance and upkeep of the basement.	Section 6.0	✓

1.0 Introduction

This report has been prepared as a supporting document to the Section 106 for the redevelopment of the site currently known as 17 East Heath Road (17EHR). The proposals involve the formation/expansion of some openings in internal loadbearing walls at lower ground floor level, the lowering of the lower ground floor level, the erection of a new single storey glazed extension to the rear and the extension of the lower ground floor further into the rear garden.

This report presents the structural scheme for the construction of the new section of lower ground floor.

2.0 The Site and Existing Building

The existing structure is a late-Victorian semi-detached house located on East Heath Road, close to the junction with Squires Mount. The property is Grade II listed and is within the Hampstead conservation area. The existing property is laid out over four storeys with storage in the roof void and constructed from masonry walls with timber floors and a timber cut roof.

3.0 Boundary Conditions

The property has six adjoining owners and one boundary with the public highway.

South Eastern (Rear) Boundary

The rear boundary of the property is formed by the rear external wall of The Cottage, Squires Mount which is a grade II listed, two-storey early to mid C19 property with no basement.

North Western (Front) Boundary

The front boundary of the property is separated from the footway of East Heath Road by the front garden wall of 17EHR.

North Eastern Boundary

To the north east the property adjoins 16 East Heath Road. The houses share a party wall with the front and rear gardens separated by a party garden wall. 16EHR is grade II listed in conjunction with 17EHR.

South Western Boundary

To the South West, the property adjoins the rear of No.s 1-4 Squires Mount. In some locations the boundary wall remains a garden wall and in others it has been enclosed upon to form the external wall of a rear extension. This row of properties are mid C19 and grade II listed.

4.0 Development proposals

It is proposed to extend the current rear projection at lower ground floor further back into the garden. As the rear section of the garden is circa 2m higher than the internal lower ground floor level this will necessitate some excavation and the formation of new RC cantilever retaining walls. It is also proposed to lower the existing floor slabs within the house at lower ground floor level and within the vaults to the front of the property. The slabs within the house are to be reduced in level as much as possible without undermining the existing foundations. The vault walls will need to be underpinned as the proposed slab level reduction would undermine the existing walls. An existing wall is also to be removed within the vault and a new support beam provided.

5.0 Sub-Structure Construction

The proposals for the construction of the substructure to the rear take account of the development proposals as indicated on the architect's drawings, anticipated ground conditions, the stability of the neighbouring properties, health and safety considerations and the physical constraints of the site. (See drawings in **Appendix A** for proposed structural arrangement).

6.0 Design Life

The structural concrete foundations are designed to be lifelong; however obvious defects should be repaired during the building life and a defined maintenance plan should be adopted. The drained cavity system and sump pump will be subject to regular inspection and maintenance, this will be specified by the specialist.

7.0 Temporary Works Systems and Principals to be used on each part of the works

It is proposed to construct the new rear extension by forming L-shaped reinforced concrete cantilever retaining walls in underpin fashion. Some of these sections will be formed below the party wall with Nos. 3 and 4 Squires Mount, some will be simply retaining the high level garden to the rear within the boundary of 17EHR.

The reinforced concrete underpins have been designed to be freestanding i.e. no props are required in the permanent condition. Conservative levels and loads for the adjoining buildings have been taken at this stage, site visits will be carried out during strip-out and demolition works to verify any assumptions. No groundwater is expected. Calculations relating to substructure design are attached to this report as **appendix E**.

The existing boundary garden wall between 17 and 16 East Heath Road may need to be underpinned in order to facilitate the reduction in ground level. The foundation beneath the party wall with 3 Squires mount will need to be investigated further as it was not possible to expose it in the original site investigations. This may also need mass concrete underpinning depending on the actual depth. The wall to the rear of the garden which forms the back wall of The Cottage, Squires Mount will need to be partially underpinned in order to facilitate a reduction in level.

All of the works, particularly the sub-structure, are to be carried out in a manner which minimises any noise and vibration that may affect the neighbouring properties. The engineer will make regular site visits during the basement works in order to ensure good practise is being followed. A detailed method statement for the works and temporary propping to the basement is provided in **appendix B**.

8.0 Potential Ground Movement and Monitoring of Adjoining Properties

A detailed ground movement assessment has been carried out by Card Geotechnics Limited. This is attached to this report as **appendix C** and has informed the construction methods and monitoring regime**.** We have extensive experience of underpinning and will visit the site periodically during the works to ensure it is being carried out to our specifications. Confirmation of our appointment as engineers for the project is attached as **appendix F**.

Monitoring of the surrounding buildings will be carried out during the works to assess possible movements and the findings will be reported to the adjoining surveyors periodically. It is anticipated that only the adjacent structures at 3 and 4 Squires mount are within the zone of influence of the sub-structure works, it is therefore proposed to monitor the party wall in this area. The monitoring regime has been agreed with the adjoining owners' surveyors and checking engineer as part of the party wall approval process. The monitoring specification which forms part of the party wall documentation is in **appendix D**.

9.0 Excavation of Soil

The soil will be excavated and transferred to normal 7m skips kept on site. The excavation would be undertaken by small excavators and transferred to the skip to the front of the site by hand. The footpath and street adjacent to the site will be cleaned each evening. The frequency of vehicle movement will be confirmed by the chosen contractor. The skip is to be located in the front garden.

10.0 Waterproofing and Drainage systems

Reinforced concrete retaining walls will be detailed with hydrophyllic strips at all concrete joints in order to minimise water ingress. However, as the proposed level of the substructure is not lower than the existing adjacent floor no significant water is expected however final waterproofing details will need to be confirmed by the architect / specialist.

Drainage will remain as a gravity system.

11.0 Rubbish Removal and Recycling

An important part of the site management process involves site cleansing, rubbish removal and recycling.

To reduce and manage site waste:

- Materials such as stock-bricks, re-useable timbers, steel beams etc are to be recycled where possible.
- All material removed from site is to be taken to waste recycling stations and separated for recycling where possible. Records of the waste recycling will be provided by the recycling stations.
- Waste types to facilitate recycling activities.
- All Duty of Care and other legal requirements are complied with during the disposal of wastes.
- Suppliers are to be consulted to determine correct / appropriate disposal routes for waste products and containers.

It will be the responsibility of each contractor to keep the site area under his control safe from build-up of rubbish.

12.0 Noise, Vibration, Dust & Air Quality

Noise

- Building work which can be heard at the boundary of the site may only be carried out between 08:00 and 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. Building work which can be heard at the boundary of the site may not be carried out on Sundays or Bank Holidays.
- Noise limits are to be set according to BS5228-1 2009. The contractor is to select plant, methodology and controls in order to keep within these limits and avoid disruption to adjacent premises.
- The works are to take place within the hoarded confines of the site. Above the 6 foot plywood hoarding line (approx. 1.2m off the face of the front elevation) any scaffolding is to be clad with fire rated monoflex sheeting. As well as providing a visual screen this will help to contain noise and dust from the works.

Vibration

The methods proposed in this report have been selected to reduce vibration as much as possible. It is however not possible to remove vibration-producing operations entirely, particularly during the demolition phase of the project. Key measures to reduce the impact of vibration are as follows:

- Keeping the number of vibration-producing operations happening simultaneously to a minimum as total vibration levels will be multiplied by simultaneous operations.
- The use of low-vibration techniques such as sawing in preference to pneumatic breakers.
- Where possible locating operations producing vibrations away from receptors i.e. adjacent occupied premises.

Dust and & Air Quality

The contractor will, where possible need to keep gaseous and particulate emissions to the atmosphere to a minimum. This will be particularly important during the demolition phase. The most important mitigation measure is the provision of effective hoarding which must extend one level above the working floor during demolition. Additional precautions include:

- A ban on burning of waste
- Stripping the inside of buildings prior to demolition of structure
- Regular cleaning of hard standings and adjacent footways and roadways using wet sweeping methods
- Keep stockpiles of demolished materials on site to a minimum and damp down what is present.
- Ensure water suppression is used during demolition
- Use enclosed rubble chutes
- Use prefabrication to avoid the need for grinding, sawing or cutting on site where reasonable practicable
- Avoid unnecessary running of exhaust-producing plant

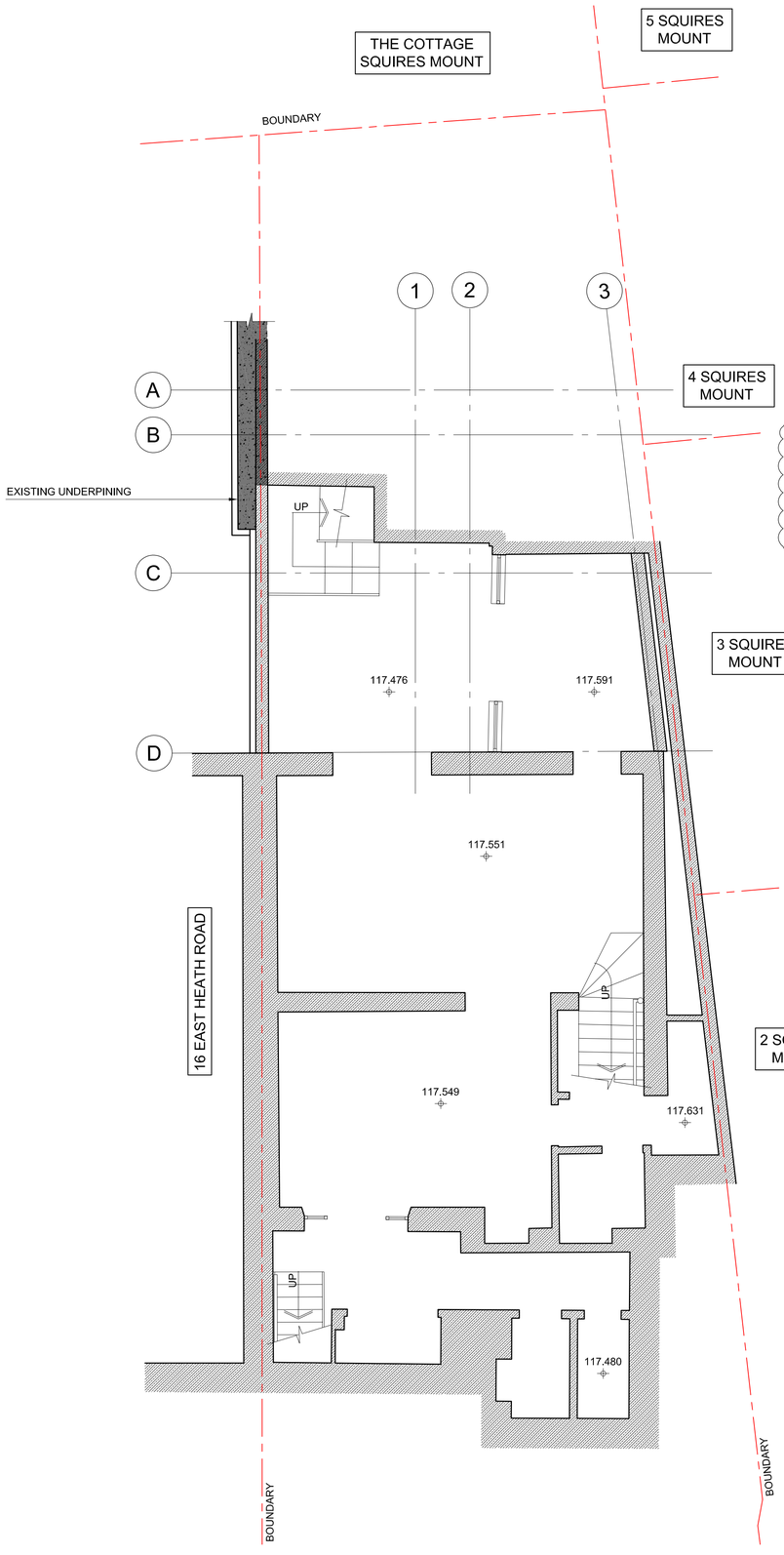
13.0 Superstructure

No structural work is proposed above lower ground floor.

Appendix A

Form Structural Drawings & Specifications

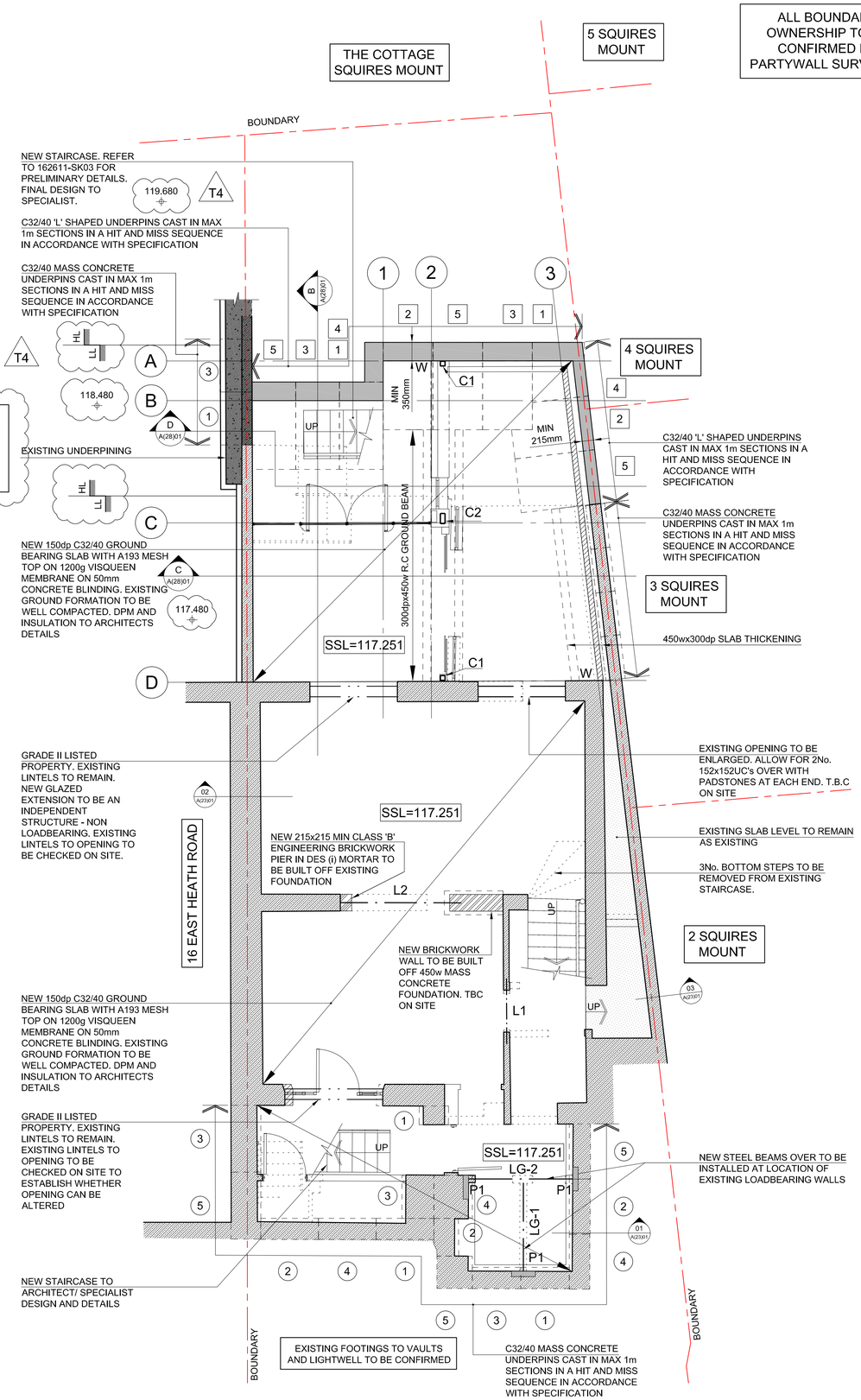
162611 - L(23)01	EXISTING AND PROPOSED LOWER GROUND FLOOR GENERAL ARRANGEMENT	T4
162611 - L(23)02	EXISTING AND PROPOSED GROUND FLOOR GENERAL ARRANGEMENT	T3
162611 - A(23)01	PROPOSED SECTIONS AND DETAILS GENERAL ARRANGEMENT	T1
162611 - A(28)01	PROPOSED CROSS SECTIONS A-A, B-B, C-C, D-D & E-E GENERAL ARRANGEMENT	T4
162611 - A(00)01	TRIAL PITS LOCATION PLAN & DETAILS	P2
	STRUCTURAL SPECIFICATION	T1



EXISTING LOWER GROUND FLOOR PLAN

SCALE 1:50 @A1 1:100@A3

LEVELS OF ADJACENT BUILDINGS ARE BASED ON THE COMPARISON OF AVAILABLE DRAWINGS WITH KNOWN LEVELS FROM SURVEY



PROPOSED LOWER GROUND FLOOR PLAN

SCALE 1:50 @A1 1:100@A3

ALL BOUNDARY OWNERSHIP TO BE CONFIRMED BY PARTYWALL SURVEYOR

KEY

WALL TYPES

- EXISTING WALL.
- EXISTING WALL TO BE REMOVED.
- NEW 7N/mm² MEDIUM DENSE BLOCKWORK IN DESIGNATION (iii) MORTAR.
- NEW NON LOAD BEARING PARTITION.
- LOAD BEARING WALL UNDER.
- NEW BRICKWORK TO BE FULLY TOOTHED IN AND PACKED UP TO EXISTING BRICKWORK.
- W — STAINLESS STEEL WALL EXTENSION PROFILES.

ALL MASONRY BELOW DPC LEVEL TO BE FROST RESISTANT AND IN DESIGNATION (i) MORTAR.

LEGEND

- NEW BEAM UNDER.
- (#) DENOTES C32/40 CONCRETE 'L' SHAPED UNDERPINS/ RETAINING WALL SEQUENCE - REFER TO FORM SPECIFICATION.
- (#) DENOTES C32/40 MASS CONCRETE UNDERPINNING L SEQUENCE - REFER TO FORM SPECIFICATION.
- DENOTES SPAN OF EXISTING TIMBER JOISTS.
- DENOTES SPAN OF NEW 50x100 C24 TIMBER FLAT ROOF JOISTS AT 400c/c U.N.O.
- DENOTES SPAN OF NEW 150dp RC COMFLOR 60, S350, 1.2 GAUGE METAL PROFILED DECKING WITH 1 LAYER OF A393 MESH TOP. MIN COVER 25mm.

COLUMN SCHEDULE

MARK	DESCRIPTION
C1	100x100x10 SHS
C2	200x100x10 RHS
CU	COLUMN UNDER

PADSTONE SCHEDULE

MARK	DESCRIPTION
P1	450x100x225dp MASS CONCRETE
P2	215x215x215dp MASS CONCRETE
P3	330x215x215dp MASS CONCRETE

LINTEL SCHEDULE

MARK	DESCRIPTION
L1	WALL CONSTRUCTION TO BE CONFIRMED
L2	203x203 UC46 OVER, P2 AT EACH BEARING
L3	2No. 152 UC37 OVER, P3 AT EACH BEARING

BEAM SCHEDULE

MARK	DESCRIPTION
LG-1	152x89 UB16 (GALVANISED)
LG-2	152x89 UB16 (GALVANISED)

NOT FOR CONSTRUCTION

Rev.	Date	Amendment	Drawn	Chkd
T4	14.03.17	ADJACENT LEVELS ADDED	HG	EH
T3	19.01.17	PARTYWALL 16/17 REVISED TO SUIT PWS COMMENTS	HG	EH
T2	21.11.16	REVISED TO SUIT ARCHITECTS COMMENTS	HG	EH

Drawing Status: TENDER

Form

Job Title
17 EAST HEATH ROAD
LONDON
NW3 1AL

Drawing Title
EXISTING AND PROPOSED LOWER GROUND FLOOR GENERAL ARRANGEMENT

Form Structural Design Ltd 77 St John Street London EC1M 4NN
T:020 7253 2893 E:studio@form-sd.com W:www.form-sd.com

Date	Scale	Drawn	Checked
SEPT 16	1:50 (A1)	HG	EH

Job No.	Drawing No.	Revision
162611	L(23)01	T4

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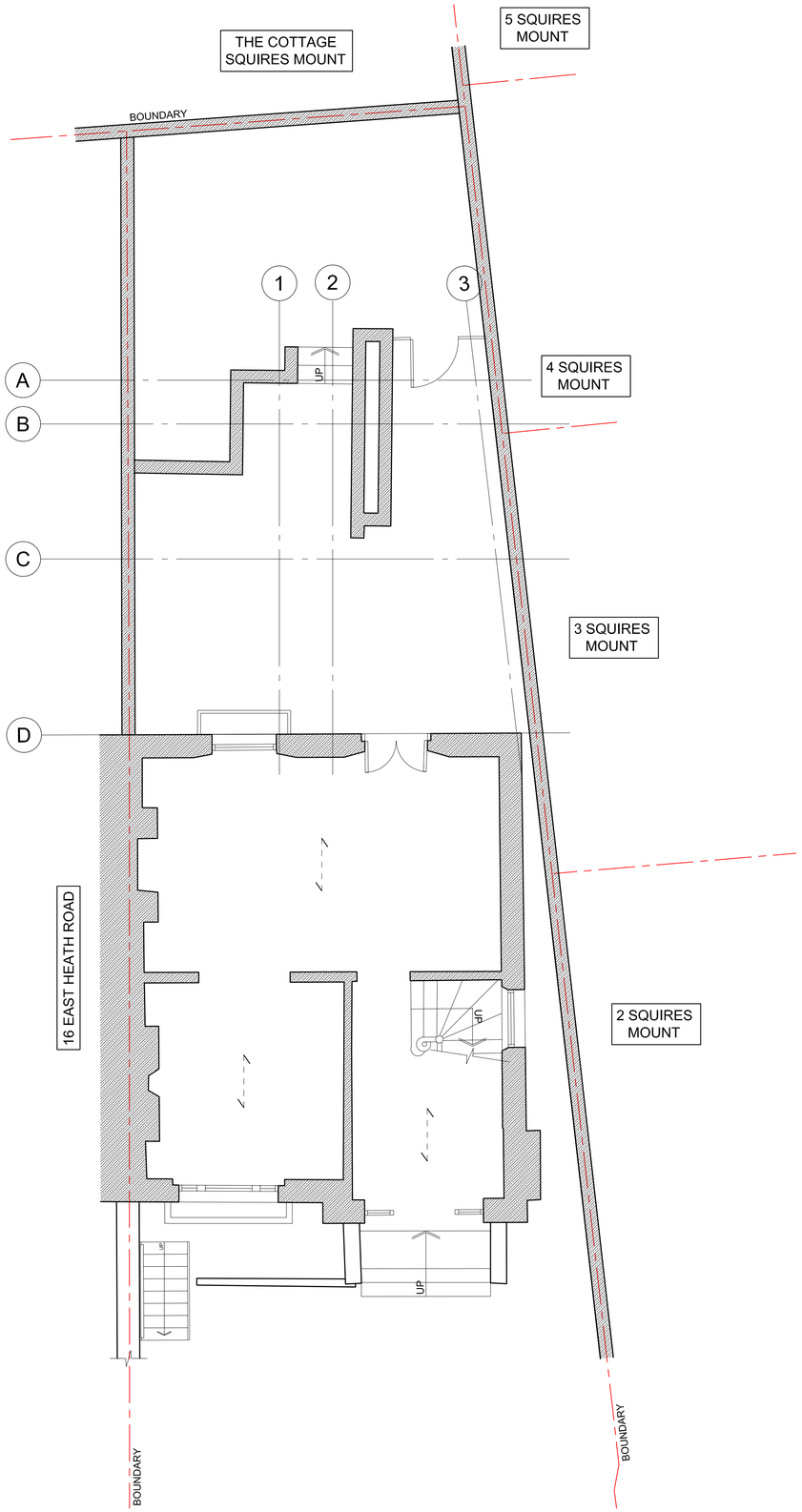
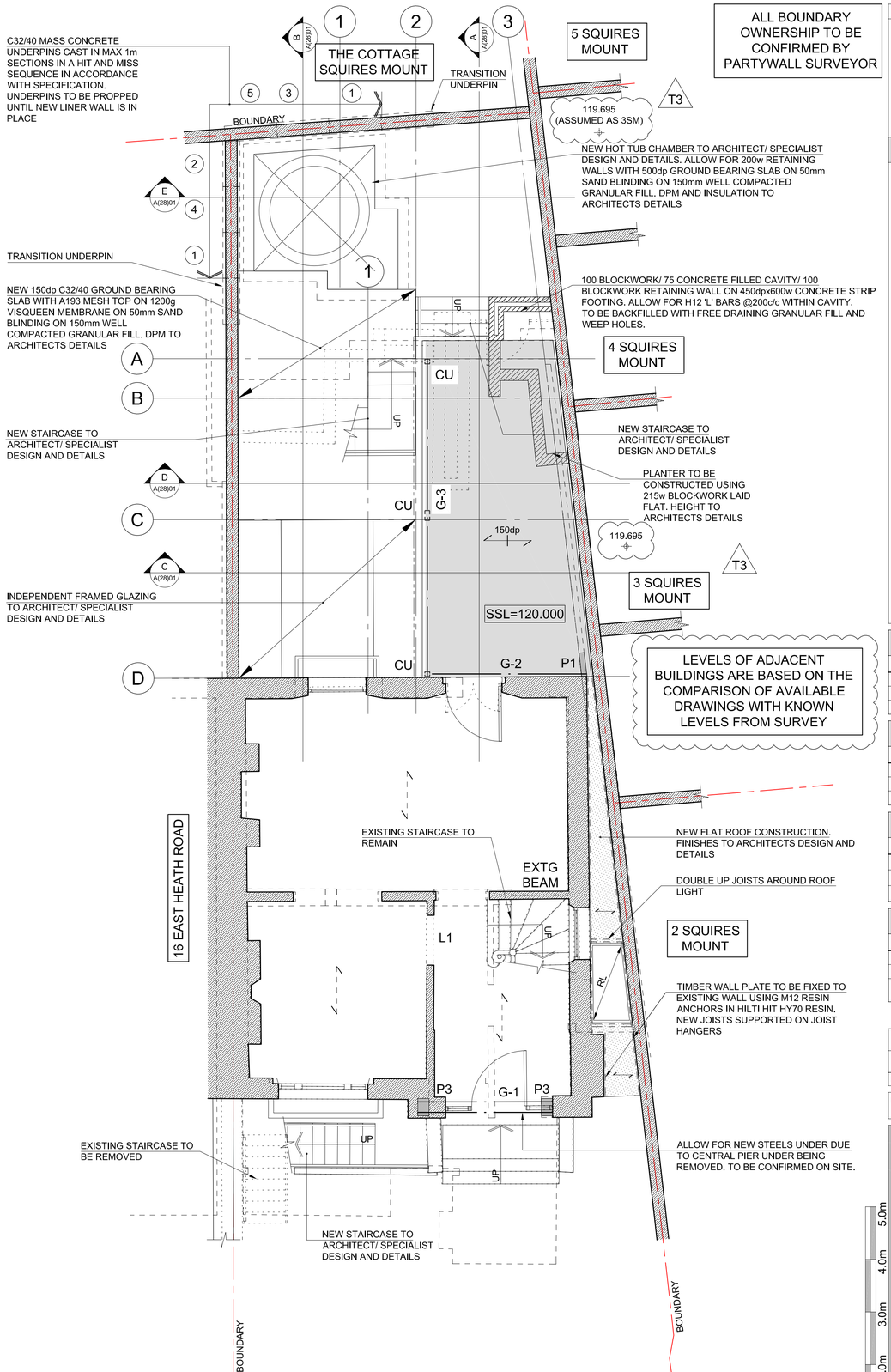


EXISTING GROUND FLOOR PLAN

SCALE 1:50 @A1 1:100@A3



PROPOSED GROUND FLOOR PLAN

SCALE 1:50 @A1 1:100@A3

ALL BOUNDARY OWNERSHIP TO BE CONFIRMED BY PARTYWALL SURVEYOR

Notes

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MARK	DESCRIPTION
C1	100x100x10 SHS
C2	200x100x10 RHS
CU	COLUMN UNDER

PADSTONE SCHEDULE

MARK	DESCRIPTION
P1	450x100x225dp MASS CONCRETE
P2	215x215x215dp MASS CONCRETE
P3	330x215x215dp MASS CONCRETE

LINTEL SCHEDULE

MARK	DESCRIPTION
L1	WALL CONSTRUCTION TO BE CONFIRMED
L2	203x203 UC46 OVER, P2 AT EACH BEARING
L3	2No. 152 UC37 OVER, P3 AT EACH BEARING

BEAM SCHEDULE

MARK	DESCRIPTION
G-1	3No. 152x152 UC37's T.B.C ON SITE
G-2	152x89 UB16
G-3	152x152 UC37 WITH 220wx10mmthk MS PLATE WELDED 200/200 HIT & MISS

NOT FOR CONSTRUCTION

Rev.	Date	Amendment	Drawn	Chkd
T3	14.03.17	ADJACENT LEVELS ADDED	HG	EH
T2	21.11.16	REVISED TO SUIT ARCHITECTS COMMENTS	HG	EH

Drawing Status: TENDER

Form

Job Title
17 EAST HEATH ROAD
LONDON
NW3 1AL

Drawing Title
EXISTING AND PROPOSED GROUND FLOOR PLANS GENERAL ARRANGEMENT

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Job No.	Drawing No.	Revision
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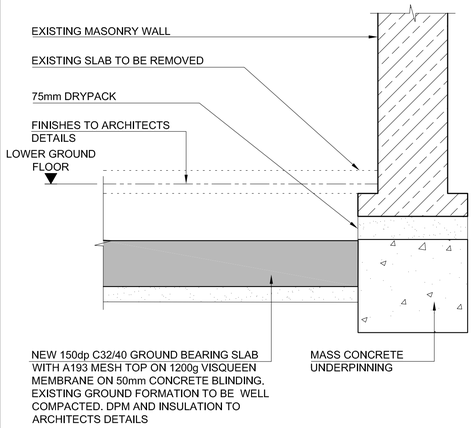

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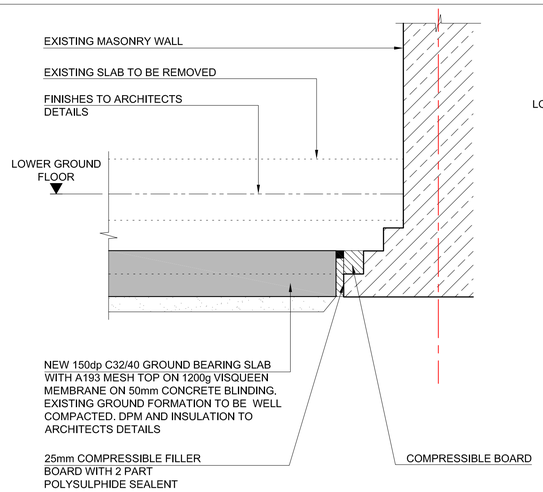

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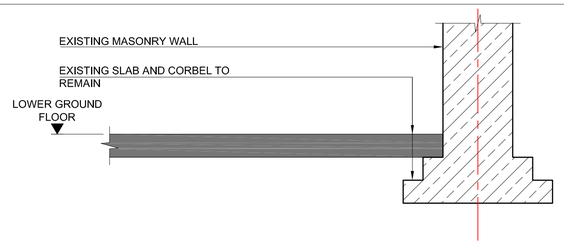

SECTION 03

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Rev.	Date	Amendment	Drawn	Chkd
T1	09.11.16	ISSUED FOR TENDER	HG	EH
P1	03.11.16	ISSUED FOR PLANNING	HG	EH

Drawing Status: TENDER

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Form

Job Title

17 EAST HEATH ROAD
LONDON
NW3 1AL

Drawing Title

PROPOSED SECTIONS AND DETAILS
GENERAL ARRANGEMENT

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Job No.	Drawing No.	Revision
162611	A(23)01	T1

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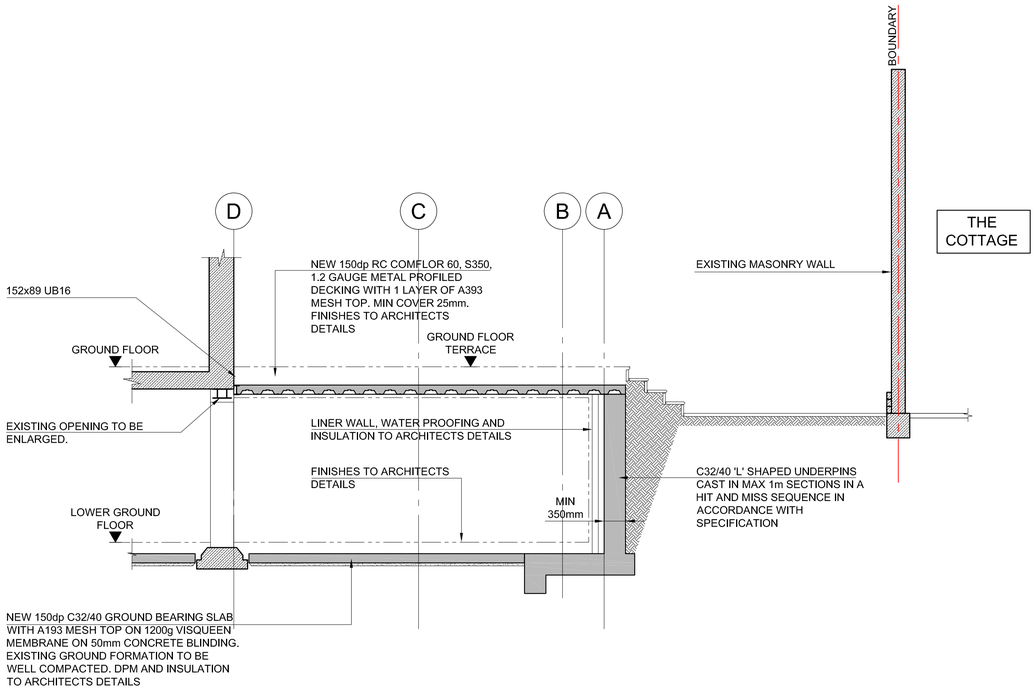

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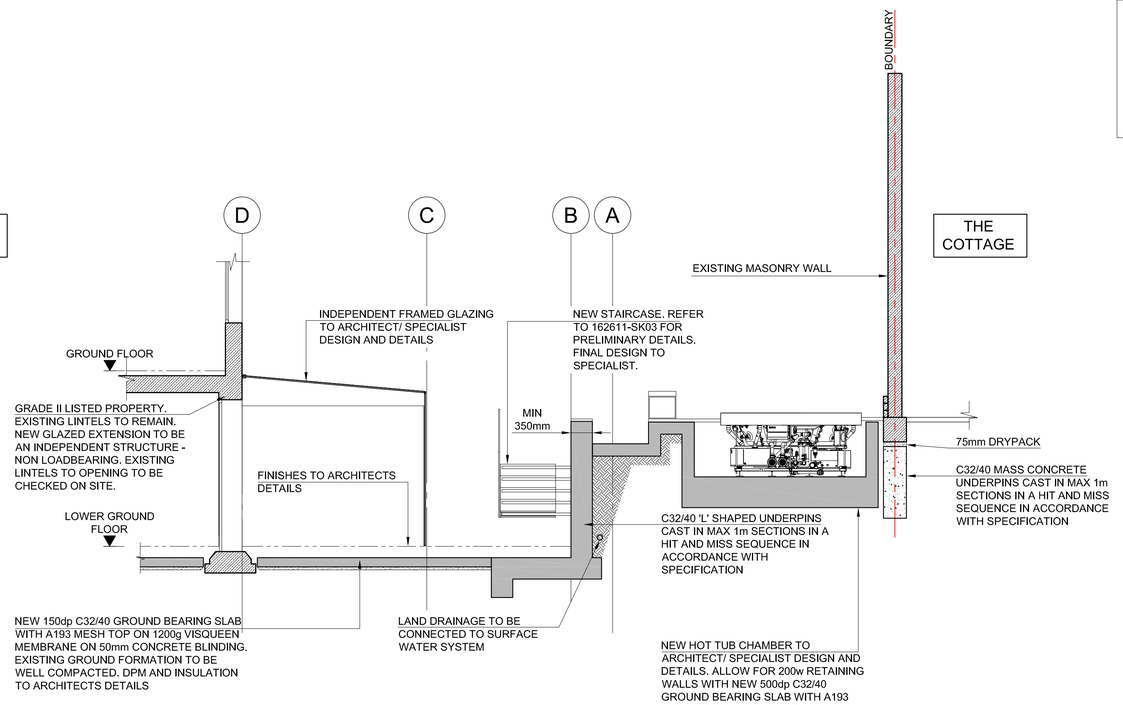

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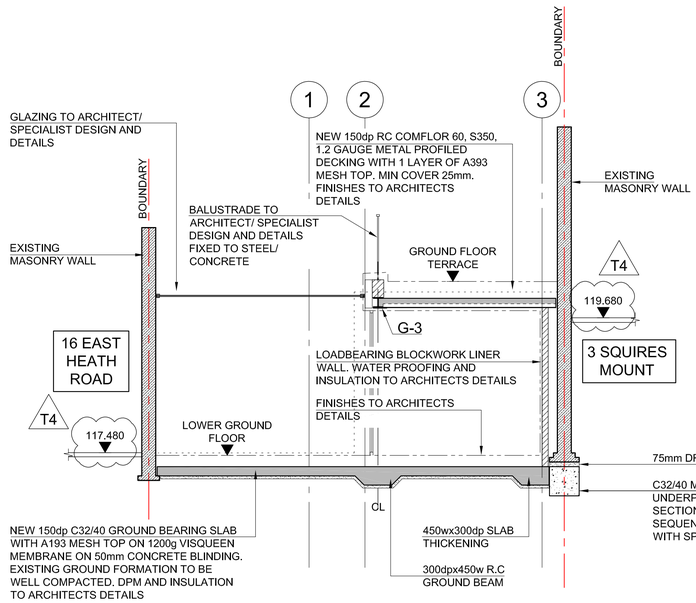

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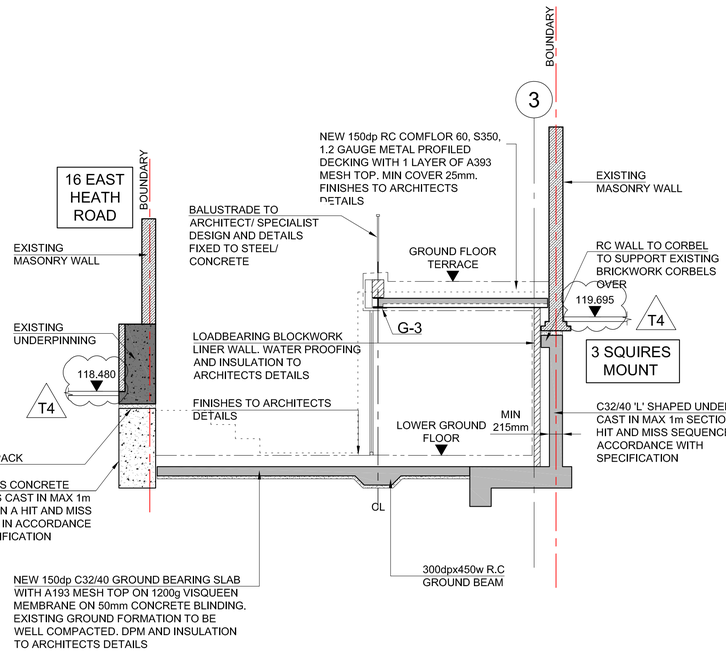

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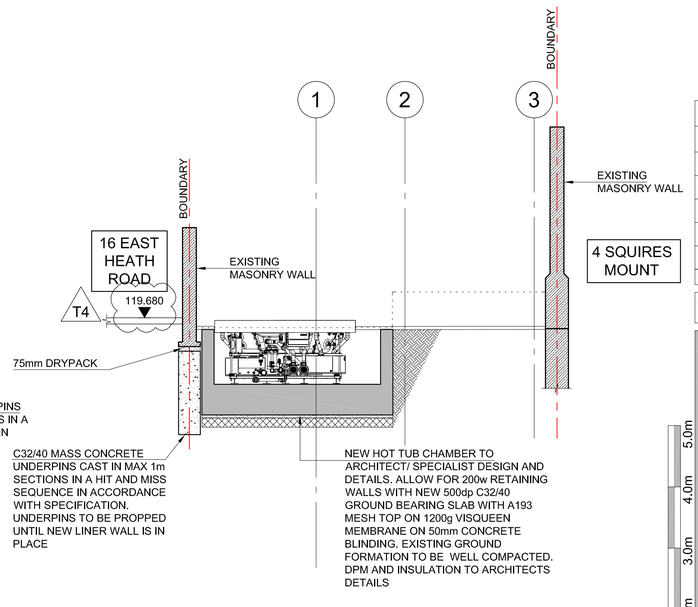

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Rev.	Date	Amendment	Drawn	Chkd
T4	14.03.17	ADJACENT LEVELS ADDED	HG	EH
T3	19.01.17	PARTYWALL 16/17 REVISED TO SUIT PWS COMMENTS	HG	EH
T2	21.11.16	REVISED TO SUIT ARCHITECTS COMMENTS	HG	EH
T1	09.11.16	ISSUED FOR TENDER	HG	EH
P4	03.11.16	ISSUED FOR PLANNING	HG	EH
P3	13.10.16	SECTION E-E ADDED	HG	EH
P2	07.10.16	REVISED TO SUIT ARCHITECTS COMMENTS	HG	RJM

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Job Title
17 EAST HEATH ROAD
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NW3 1AL

Drawing Title
PROPOSED CROSS SECTIONS A-A, B-B, C-C, D-D & E-E
GENERAL ARRANGEMENT

5.0m
4.0m
3.0m
2.0m
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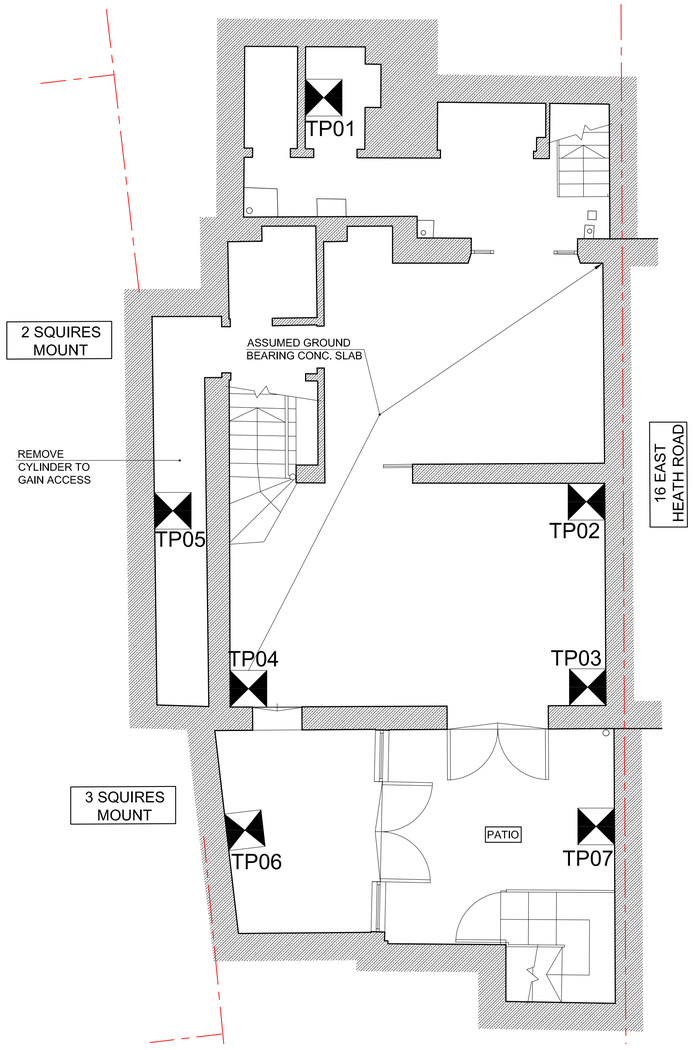
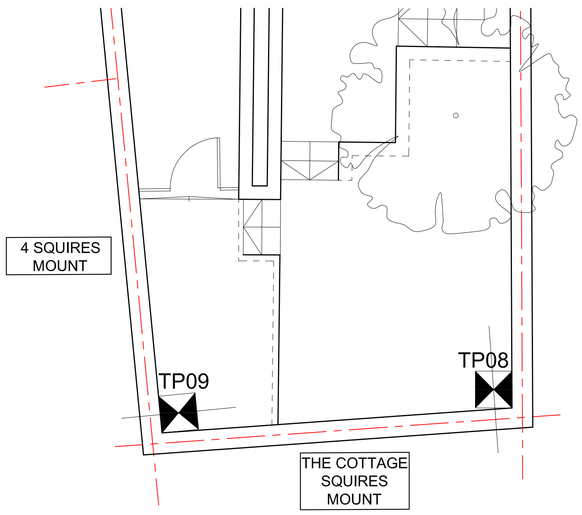
Date	Scale	Drawn	Checked
SEPT 16	1:50 (A1)	HG	EH

Job No.	Drawing No.	Revision
162611	A(28)01	T4



LOWER GROUND FLOOR KEY PLAN
SCALE N.T.S



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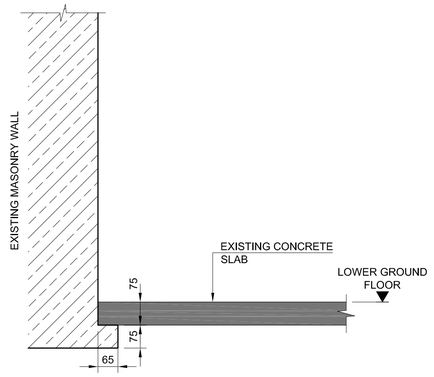

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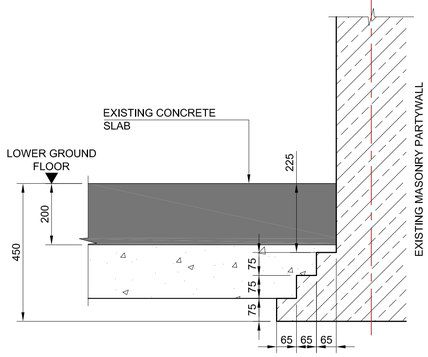

TRIAL PIT 02 & 03 (PARTYWALL ONLY)
REAR ELEVATION & INTERNAL WALLS AS PER 04
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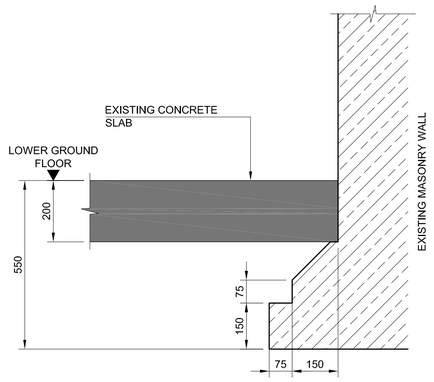

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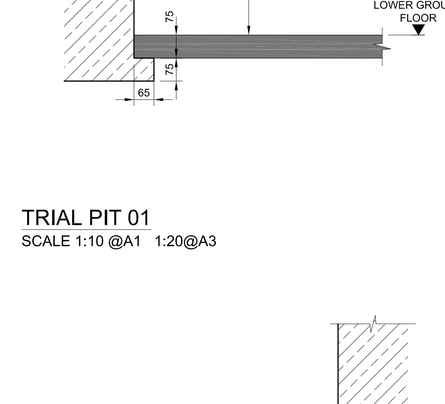

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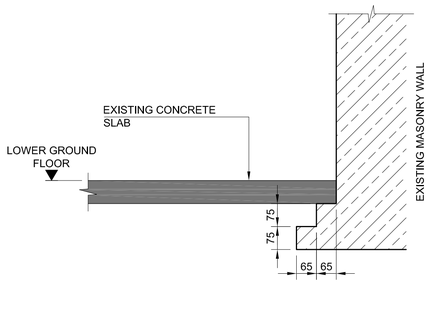

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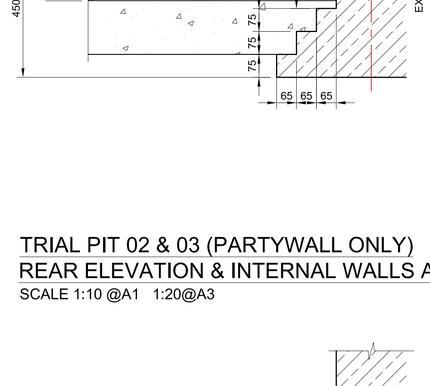

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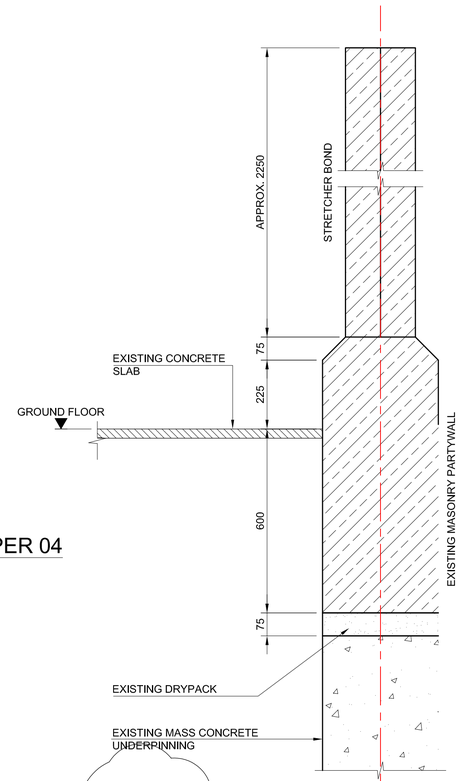

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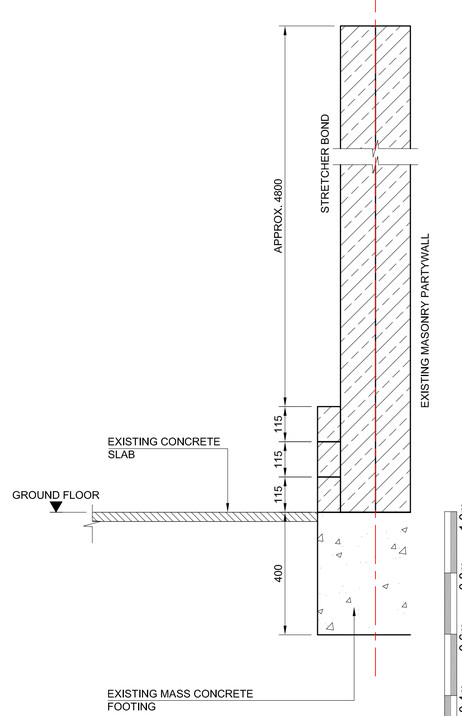

TRIAL PIT 08
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Notes

THIS DRAWING IS COPYRIGHT OF FORM.

DO NOT SCALE FROM THIS DRAWING WORK ONLY TO FIGURED DIMENSIONS.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK. ALL ERRORS AND OMISSIONS ARE TO BE REPORTED TO THE ENGINEER.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SERVICES ENGINEERS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

NOT FOR CONSTRUCTION

Rev.	Date	Amendment	Drawn	Chkd
P2	07.04.17	TP 8 & 9 RE-LABELLED	EH	EH
P1	31.08.16	PRELIMINARY ISSUE	HG	EH

Drawing Status: PRELIMINARY

Form

Job Title
17 EAST HEATH ROAD,
LONDON,
NW3 1AL

Drawing Title
EXISTING TRIAL PITS
LOCATION PLAN & DETAILS

Form Structural Design Ltd 77 St John Street London EC1M 4NN
T:020 7253 2893 E:studio@form-sd.com W:www.form-sd.com

Date	Scale	Drawn	Checked
JUNE 10	1:50 (A1)	HG	EH

Job No.	Drawing No.	Revision
162611	A(00)01	P2

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Form

17 East Heath Road, London, NW3 1AL

Job No: 162611

General Structural Specification

Revision No: T1
Date: 09.11.16

Prepared by: Ed Hollingum

Document Verification

Job title:	17 East Heath Road, London, NW3 1AL	Job number: 162611
Document title	General Specification	File reference
Document ref		

Revision	Date	Filename / Description	Prepared by	Checked by	Approved by
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		Name	EH	RJM	
		Signature			
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		Description			
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CONTENTS

		Page
1.	GENERAL	4
2.	TOLERANCES	4
3.	MATERIALS AND WORKMANSHIP	4
4.	TEMPORARY WORKS AND STABILITY	4
5.	DEMOLITION	5
6.	EXCAVATING AND FILLING	5
7.	INSITU CONCRETE	6
8.	STRUCTURAL TIMBER	7
9.	STEELWORK	8
10.	LINTELS	9
11.	MASS CONCRETE UNDERPINNING AND REINFORCED CONCRETE "L" SHAPED UNDERPINNING	10
12.	MASONRY AND LATERAL RESTRAINT STRAPS	11
13.	STRUCTURAL RENDER	12

1. GENERAL

This specification is to be read with Preliminaries/General Conditions.

Do not scale drawings. The Contractor is to check all dimensions on site before carrying out any works.

This specification together with the Structural Engineer's drawings are to be read in conjunction with Architect's and all other Consultant's drawings and specifications, which should be used to verify layout, setting out, finishes etc.,. Any discrepancies are to be reported to the Architect before proceeding with the works.

The Contractor must ensure that the Architect has agreed all necessary party wall notices prior to carrying out works under, on or adjacent to party wall.

Setting-out details are shown on the Architect's drawings unless noted otherwise on the drawings.

The Contractor is to inform the Architect and Structural Engineer if the existing fabric, including foundations, is opened up and found to be inadequate, unsuitable to support the proposed works, or at variance from the details shown on the drawings.

Items noted on the drawings "to be verified on site" are to be exposed by the Contractor for inspection by the Structural Engineer at the earliest opportunity.

When carrying out refurbishment projects due allowance should be made in terms of cost and programme for carrying out a post strip out survey to verify the existing layout and structural are still compatible with the Architects proposed design intent and layout drawings.

Holes or chases must not be cut through any structural members without the written consent of the Structural Engineer.

The Contractor is to ensure that the Building Control Officer is notified to carry out his inspections prior to concreting new foundations, slabs etc., and other structural items prior to them being covered up.

Fixings for lifts, signs, balustrades etc., which have been designed by others, are to be installed in accordance with the manufacturer's details and specifications.

Nothing included or omitted from this outline specification will relieve the Contractor of his duty to carry out the works in accordance with current standards of safety and good building practice.

2. TOLERANCES

All tolerances are to be agreed with the Architect, and the Contractor will be responsible for ensuring that sufficient tolerances are provided and integrated throughout all elements of the works.

The Contractor is to take account of tolerances detailed elsewhere in the drawings, appended specifications, and British Standards when complying with the above clause.

3. MATERIALS AND WORKMANSHIP

All articles, materials and goods shall be new and of good quality, suitable for the required purpose and shall conform to the appropriate British Standard where such exists. Where references to the above are made it shall be inferred that the latest edition applies, together with subsequent amendments, unless otherwise specified.

4. TEMPORARY WORKS AND STABILITY

Temporary works commensurate with typical building structures of this type are expected and it is the contractor's responsibility to maintain stability of the structure at all times during the works. The contractor will need to have designs prepared by a competent person for the propping and stability systems for comment by the engineer. Due allowance should be made for the costs of preparing such temporary works designs.

The Contractor is entirely responsible for maintaining the stability of all existing buildings and structures, within and adjacent to the works, and of all the works from the date of possession of the site until practical completion of the works.

The Contractor shall design, install and maintain all necessary temporary works and shall advise both the Architect and Structural Engineer at least ten working days from commencement of the works, of his proposals for temporary supports and sequence of construction for the works. These proposals shall be supported by design calculations as required.

Under no circumstances will any structural alterations be carried out prior to the Structural Engineer commenting on the Contractors temporary works proposals.

The design of temporary works shall include an assessment of the loads to be resisted and is to be undertaken by a competent person. Due regard shall be given to lateral stability as well as to the support of vertical loads and hydro-static pressures.

The contractor is to make due allowance for dewatering the excavation and is to ensure that an appropriate pumping system is in place so as to maintain integrity of the formation and prevent loss of fines from the surrounding area.

The Contractor is to familiarise himself with the building and its structure so that he is aware of the nature and magnitude of the loads to be supported.
Particular care is to be taken to ensure that temporary props remain adequately seated and tightened so that support to the structure above is not allowed to yield during building operations.

The Contractor is to ensure that temporarily propped structure is adequately wedged, pinned or packed off the permanent works prior to removal of any temporary supports.

The Contractor shall ensure that any completed or partially completed structural element is not overloaded. Details of design loads may be obtained from the Structural Engineer.

All temporary works to support the sides of excavations for new foundations shall be designed in accordance with BS 8000 Part 1: 1989 and any other approved documents.

Excavations shall in no circumstances encroach within 45° of the bottom near side of any existing footing.

5. DEMOLITION

Demolition is to be carried out to and in accordance with BS 6187: 2000, Health and Safety Executive Guidance Note GS 29/1 paragraph 32, and any other relevant statutory undertakings or regulations.

Demolition is to be undertaken in the reverse order of construction. No part of the structure is to be left in an unsupported condition overnight or for long periods.

Demolition is to be undertaken in a manner which avoids excessive noise and nuisance.

All work is to be well-watered to minimise dust. All material is to be carted away from site as soon as practicable.

6. EXCAVATING AND FILLING

Inspect all available drawings and make enquiries about existing services on site. Verify positions and depth of all services before commencement of work on site. Services which are being retained during any phase of the works are to be protected.

The contractor shall allow for design of all temporary land drain systems to prevent damage to the formation during the works.

Before starting work verify with the Architect which existing fences, gates, walls, paved areas, trees, shrubs, hedges, bushes and any other site features are to be removed. Materials arising are to be removed from site.

Before commencing excavations or works adjacent to party walls, the contractor shall confirm with the Building Owner/Architect/Engineer that all party wall awards are in place and that condition schedules have been carried out by a Party Wall surveyor.

Workmanship for excavating to comply with BS 8000: Part 1, sections 3.1, 3.2 and 3.3.

Where an excavation encroaches below a line drawn at an angle of 45° from the horizontal from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto must be completed before the higher excavation is made.

Make advance arrangements with the Building Control officer and/or Architect for inspection of foundations and trenches requested at the beginning of the works. Unless noted otherwise foundations should be priced for as follows: a minimum of 1200mm below existing ground level in clay soils and 750mm for gravel/ballast type soils.

Remove the last 150mm of excavations just before inspection. Trim excavations to required profiles and levels, and remove all loose materials.

Unless otherwise instructed seal formations within four hours of inspection with concrete or other specified fill.

Backfill any excavations for foundations taken deeper than required with lean mix concrete. Excavations other than foundations taken deeper than required may be backfilled with well graded granular material.

Hardcore to be granular material, free from harmful matter, well graded, passing a 75mm BS sieve and one of the following:
Crushed concrete, brick or tile free from plaster or gravels.
Spread and level both backfilling and general filling in layers not exceeding 150mm. thoroughly compact each layer with a vibratory roller, vibrating plate compactor, vibro-tamper, power rammer or other suitable means appropriate to the area being worked.

Hardcore underground bearing concrete slabs to be as above and not less than 150mm thick, unless noted otherwise on the drawings.

Excavate extra material as necessary. Increase thickness of hardcore as necessary to make up levels from stripped site levels to underside of slabs.

Surfaces over hardcore to receive sheet overlays or concrete to be blinded with sufficient sand or fine gravel to fill interstices and provide a close smooth surface (50mm min thickness), unless noted otherwise on the drawings. Permissible deviations on surface level to be +0 -15mm.

Ground bearing slabs to comprise the following unless noted otherwise on the drawings:

- Minimum 150mm thick with A142 mesh placed central and adequately supported on plastic spacers- not pieces of masonry. 300 laps minimum for mesh.
- 1200 gauge visqueen on sand/concrete blinding on
- Minimum 150mm type 2 granular fill material or hardcore as described above.

All footings adjacent to existing footings shall have a dispersal angle of 45 degrees to the underside of the footing at the same level as the existing, on no account shall the footings surcharge the existing footings or drains- if this does occur refer to Engineer for further instructions.

7. INSITU CONCRETE

Materials and Workmanship are to comply with BS 8110.

Concrete for reinforced concrete structures, including ground bearing slabs, is to be designated mix C32/40 to BS 8500, unless noted otherwise on the drawings.

Concrete for the encasement of steel beams and for padstones is to be C16/20 to BS 5328 with 10mm maximum aggregate and 260 kg/m³ of cement.

Ready mix concrete is to be used unless otherwise allowed by the Structural Engineer. This must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mix Concrete. Details of cement type, aggregate grading and sources, with chloride and sulphate content of mixes to be submitted to the Structural Engineer for his approval prior to ordering any concrete.

The use of site mixed concrete for structural elements may only be used following the written approval of the Structural Engineer. Batching and mixing equipment will need to comply with BS 1305 and BS 4251. Sufficient cubes with compressive tests at 7 and 28 days are to be carried to demonstrate design strength is achieved.

The Contractor is responsible for the design and installation of all formwork. Design and striking of the formwork is to be in accordance with BS 8110.

Do not place concrete when the ambient air temperature is less than 5℃.

All holes shall be formed and all inserts cast in at the time of pouring concrete. No part of the concrete works shall be drilled or cut away without the approval of the Structural Engineer.

Reinforcement shall be:

- plain bars to BS 4449, grade 250 (mild steel), prefix R on drawings and schedule.
- deformed bars to BS 4449, or BS 4461, grade 500 (high yield) type 2, prefix H on drawings and schedules.
- mesh to BS 4483.

Reinforcement shall be fixed adequately using tying wire or steel clips. Concrete cover is to be as specified on the drawings. Chairs and spacers are to be provided by the Contractor as necessary to maintain the specified cover. Unless noted otherwise on drawings, all reinforcement is to be lapped 50d (where d is diameter of the smaller bar).

The rate of sampling for compressive testing of concrete is to be agreed with the Structural Engineer prior to commencement of any concrete works.

Use mechanical vibration to fully compact concrete for structural elements. Compact concrete to full depth (until air bubbles cease to appear on the top surface), especially around reinforcement, cast-in accessories, into corners of formwork and at joints.

Before placing structural concrete (not blinding) on hardcore or other absorbent substrates provide a 1200g Visqueen slip membrane to prevent shrinkage cracking on pours of large bay sizes. This is not a DPM - see architect's details for this.

Reinforcement bar schedules are to be checked by the contractor prior to ordering of the reinforcing bars, refer any discrepancies or corrections back to the engineer.

Average Reinforcement Estimates (updated September 2016):

In the absence of any detailed information on the structural drawings the following amounts should be allowed for as provisional sums until bar schedules are available and steel weights confirmed.

- Retaining walls @ 300Kg/M³ of Concrete
- Pile Caps @ 200Kg/M³
- RAFT type Ground bearing Slabs @ 200Kg/M³
- Normal internal Suspended Slabs @ 175Kg/M³
- Suspended Basement roof slab carrying soil @ 275 Kg/M³
- Downstand Beams @ 225Kg/M³
- Transfer Beams supporting columns, shallow @ 375Kg.M³
- Columns @ 200Kg/M³

8. STRUCTURAL TIMBER

New timber in the works is to be selected structural timber not inferior to European Redwood/Whitewood grade C24 to BS 5268: Part 2, unless noted otherwise on the drawings.

New timber in the works is to be vacuum impregnated with preservative to BS 5268: Part 5 and the manufacturer's recommendations. Cut ends are to be thoroughly treated with brush applied coats of appropriate preservative before fixing. All preservatives are to be to the Architect's approval.

Structural timbers may only be drilled or cut for services as noted below.

Notches in the joists are to be at the top and located between 0.1 and 0.25 of the span from the support. Notch cannot be deeper than 0.125 of the joist depth.

Holes in the joists are to be along the centre with maximum diameter of 0.125 of the joist depth.

Sizes of new structural timbers noted on the drawings are sawn basic sizes.

All screws, nails, timber connectors, joist hangers, steel straps etc., are to be galvanised. Joist hangers, straps, connectors etc., shall be purpose made and of manufacture or performance stated on the drawings. All such items are to be fixed in accordance with the manufacturer's recommendations, unless shown otherwise on the drawings.

All existing timbers are to be inspected at the beginning of the works by a specialist sub-contractor for rot, damage and infestation. Details of replacing or strengthening any defective timbers recommended by the specialist are to be agreed on site. Embedded timbers that are to remain in-situ are to be agreed with the specialist and any warranty provider for the works.

When re-tiling existing roofs the Contractor must ensure that all the connections between rafter, ceiling joists and wall plates are re-nailed in order to enhance the original framed construction joints.

Trimmers to openings in floors and ceiling construction shall be jointed to the trimming joists with joist hangers unless noted otherwise on the drawings.

Double up joists under new partitions running parallel to the joist span. Doubled joists are to be bolted together at 600mm centres using M12 bolts and oversize washers, unless noted otherwise on the drawings.

Provide solid noggins under new partitions running perpendicular to the joist span- Refer to Masonry sections for details. If no reference is made on the structural drawings allow for providing a new 18mm ply deck fully screwed and glued to all new floor joists unless noted otherwise.

Existing floor boarding needs to be inspected on site to ensure they are still provide sufficient diaphragm action for stability. Allowance should be made for new 18mm plywood to be screwed and glued to existing joists if boards are noted as being in poor condition.

In all new timber floors full depth noggins 50mm wide are to be provided along lines of support and at mid span for spans exceeding over 2500mm and at 1/3 and 2/3 span positions for spans exceeding 4500mm, unless noted otherwise on the drawings.

In existing floors new noggins are to be provided as noted above unless otherwise indicated on the drawings.

New load bearing timber stud walls to be constructed using 50 x 100 studs @ 400 c/c with 100 x 50 head and sole plates, unless noted otherwise on the drawings. Solid noggins to be provided at 1/3 points in height of the wall

9. STEELWORK

All workmanship is to comply with BS 5950: Part 2.

Steelwork contractor should be familiar with the limitations on size and weight for transport of materials by public highway.

All structural steel sections are to be Grade S355 to BS 4360, unless noted otherwise on the drawings.

All bolts are to be grade 8.8 Precision Bolts to BS 3692. Bolts to have a class 1 sherardized finish to BS 4921.

All welding is to comply with BS 5135. Site welding shall not be permitted except with the written approval of the Structural Engineer. All site welds to be MPI tested in accordance with the National Structural Steelwork Specification, unless approved by the Structural Engineer.

All welds are to be 6mm fillet welds or full strength butt welds, unless noted otherwise on the drawings.

A minimum of 4M16 bolts are to be used at beam/beam connections. Minimum design capacity of any connection is to be 75kN ULS, unless noted otherwise on the drawings.

Splice connections and all other "moment type" connections are to incorporate HSFG bolts fitted in accordance with manufacturer's instructions. All HSFG bolts to have load indicating "coronet" type washers.

Design loads are as specified on the drawings in Ultimate Limit State (ULS), units: kN, KNm and will be provided at construction stage drawings.

Unless stated otherwise all connections are to be designed by the fabricator and due allowance shall be made at tender stage for the costs of appointing a Chartered Engineer to design such connections. Moment frames