PRICE & MYERS

49 Flask Walk
London NW3

Structural Engineering
Construction Method Statement for Planning

Prepared by: **Ben Sheterline MEng CEng MIStructE**

Job Number: **28439**

Date	Revision	Notes/Amendments/Issue Purpose
February 2020	1	For Planning
March 2020	2	Updates to reference GEA Report
April 2020	3	Updates following Planning comments

Consulting Engineers
37 Alfred Place
London WC1E 7DP

020 7631 5128
mail@pricemyers.com
www.pricemyers.com

Contents

1 Introduction

Price & Myers were appointed in August 2019 by Ian and Sarah Brungs to provide structural engineering consultancy services relating to the proposed alterations and extensions to their house at 49 Flask Walk in Camden, London.

This report is intended to provide an overview of the structural engineering considerations and design, and an outline construction method statement for how the works can be completed.

This report should be read in conjunction with the relevant Architects drawings and with GEA Basement Impact Assessment Report, reference J20020 (March 20).

Scoping of Issues

The proposed works involve the internal alterations to the existing terraced house, along with a new infill rear extension.

The new infill rear extension involves enclosing part of the existing garden between the existing outrigger and Party Wall, which requires some modest lowering of the ground levels to allow a level floor throughout the internal parts of the house.

The rear garden is also reconfigured to better relate to the rear extension works, which will require some adjustments to the existing levels. New retaining walls will be required to suit to new external ground levels, and the existing garden boundary party walls will require underpinning.

This report focuses on the works associated with the rear infill extension and alterations to the rear garden, both of which involve minor alterations to the existing site levels.

2 The Site

Location

The site is located at 49 Flask Walk, London NW3 1HH; OS Grid Reference TQ 26500 85852. Flask Walk runs in a northeast direction from Hamsptead High Street, sloping downwards towards Hampstead Heath. The site is located within the London Borough of Camden, and within the Hampstead Conservation Area.

The site is located on the north side of Flask Walk; the pavement raised and is separated from the road with a wide planted zone containing mature Lime trees and smaller shrubbery. The site is accessed from the pavement.

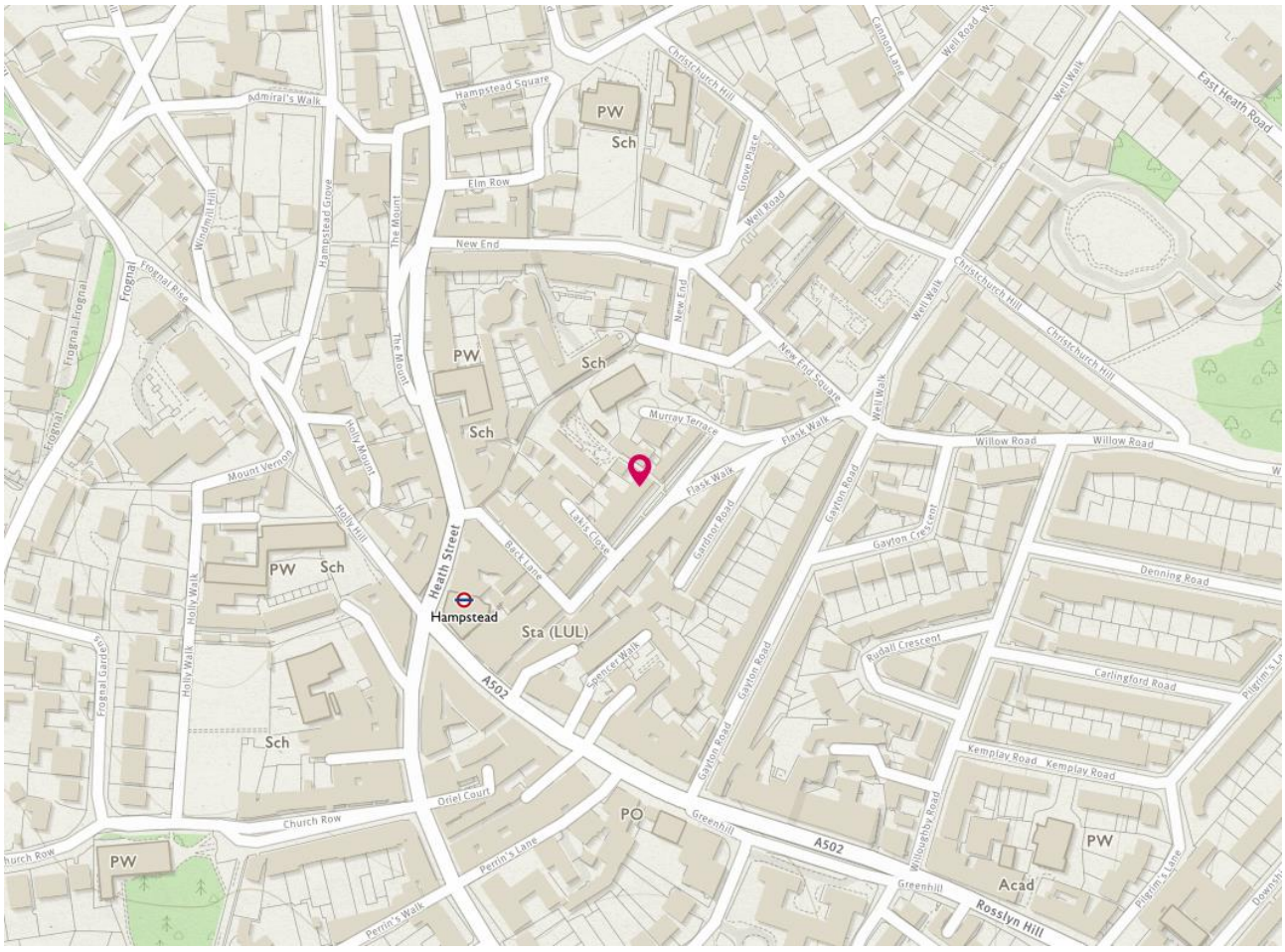


Figure 1: Extract from OS Online Map showing site location

Existing Building

The site it occupied by a three-storey terraced house; the adjoining house to the south set back from the front elevation of 49 Flask Walk. The house has a small front garden, which bounds the pavement

to Flask Walk. The rear garden is bounded on all three sides by neighbouring buildings, or their garden walls. The building is of traditional load bearing masonry with timber joisted floors

The existing building is thought to have been built sometime between 1879 and 1895. The original outrigger was extended around the 1970s. The building is not listed, but the adjoining house to the south is Grade II Listed and understood to date back to the early 18th century. The adjoining house to the north appears to have undergone significant alterations in the past, including part rebuilding of the alteration, a flat roof added and a rear infill extension.

Historic Maps

The earliest Ordnance Survey (OS) map reviewed dated 1850 shows Flask Walk but does not illustrate the buildings along it. The 1871 OS Map shows the site occupied by a large end of terrace house, but does match the footprint of the current building. It is not until 1895 that the maps show 49 Flask Walk in its current form; presumably the earlier, possibly 18th century buildings, cleared for the two Victorian terraced houses at 49 and 51 Flask Walk. Subsequent OS maps show the site largely unchanged.

Figure 2: Extract from OS Historic maps. Clockwise from top left; 1850, 1871, 1895 and 1974

The World War II bomb damage maps do not indicate any damage recorded at the site, and the Lost Rivers of London maps do not indicate any historic rivers in the site's location.

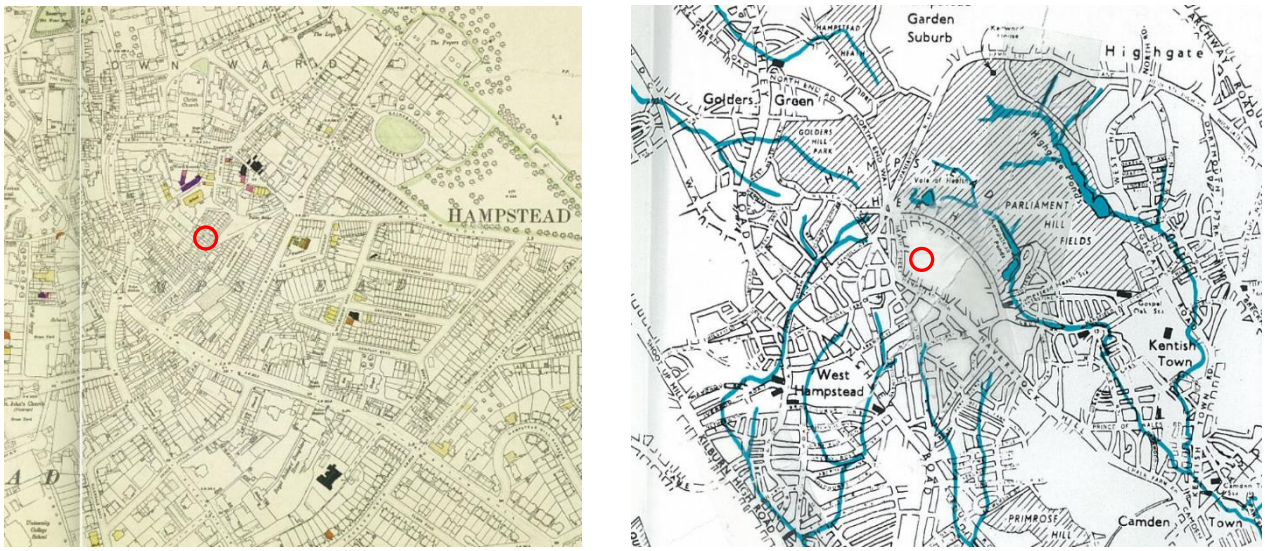


Figure 3: Extract from World War II Bomb Damage Map and Lost Rivers of London Map (left to right)

Public Assets and Infrastructure

There are no London Underground tube lines or National Rail Tunnels beneath the site.

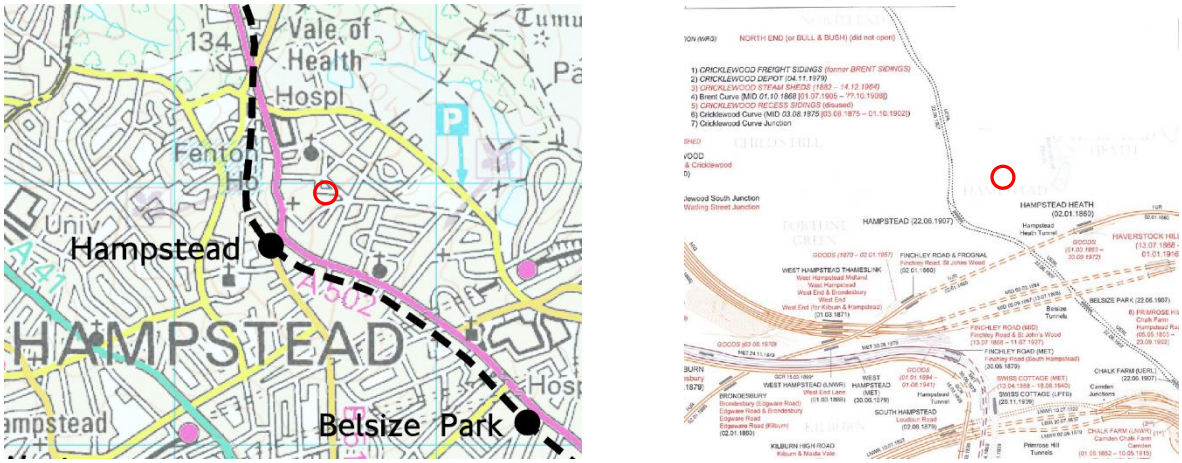


Figure 4: Extract from London Underground Route Map and London Railway Atlas(left to right)

3 Ground Conditions

Geology

The British Geological Survey map indicates that the site is underlain by the Claygate Beds, a finely laminated brown sand and silt, which in turn is underlain by the London Clay.

Figure 5: Extract from British Geological Survey Map; Solid and Drift Edition

Physical Investigation

To help better understand the site's specific ground conditions and the details of existing foundations, some local shallow trial pitting was completed within the rear garden. This generally confirmed a modest thickness of Made Ground on a yellowy-orange sandy clay, thought to be the Claygate Beds. Existing foundations were generally found to be shallow brick corbelled footings.

The map findings and trial pit findings are supported by the desk study information in the GEA Basement Impact Assessment report.

Flood Risk

The site is shown as being in Flood Zone 1; an area of low probability of flooding

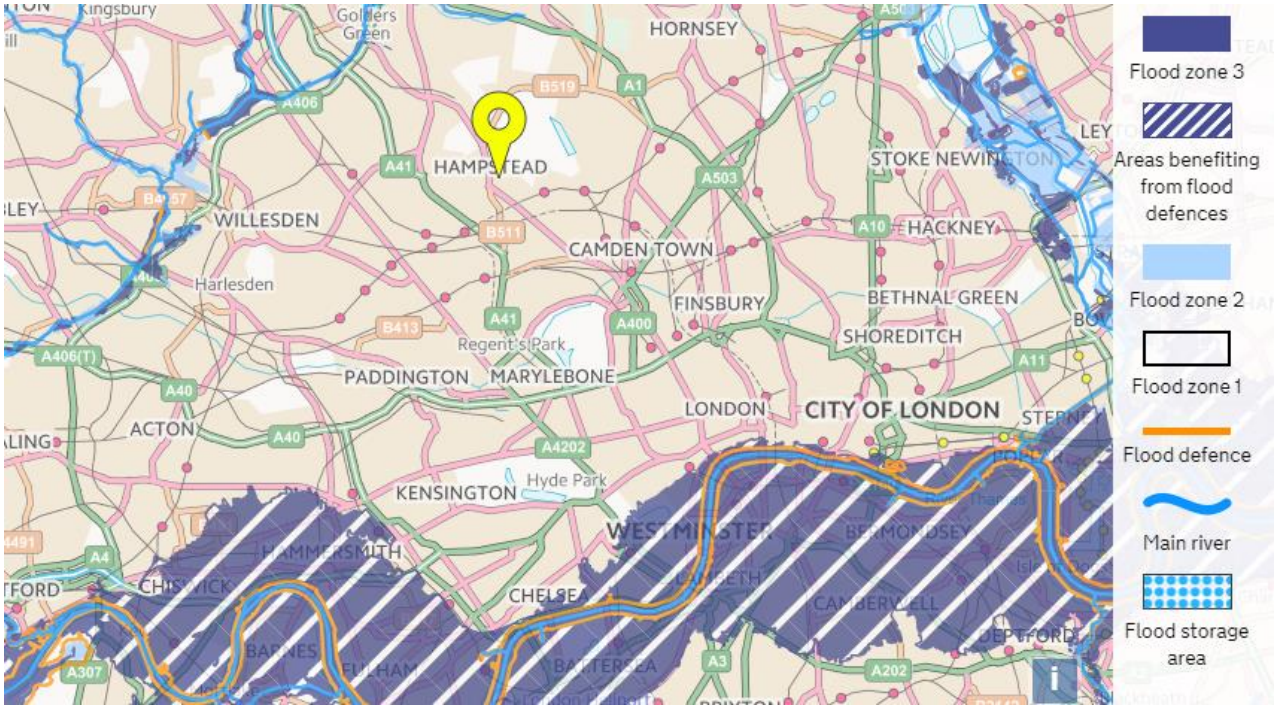


Figure 6: Extract from Flood Map for Planning

Figure 7: Extract from Surface Water Flood Risk Map

4 Proposed Structure

Introduction

The proposals include internal alterations to the house and a new infill rear extension, along with related alterations to the rear garden.

The works to both the rear extension and rear garden involve some modest alterations to the current site levels. These are discussed in more detail below.

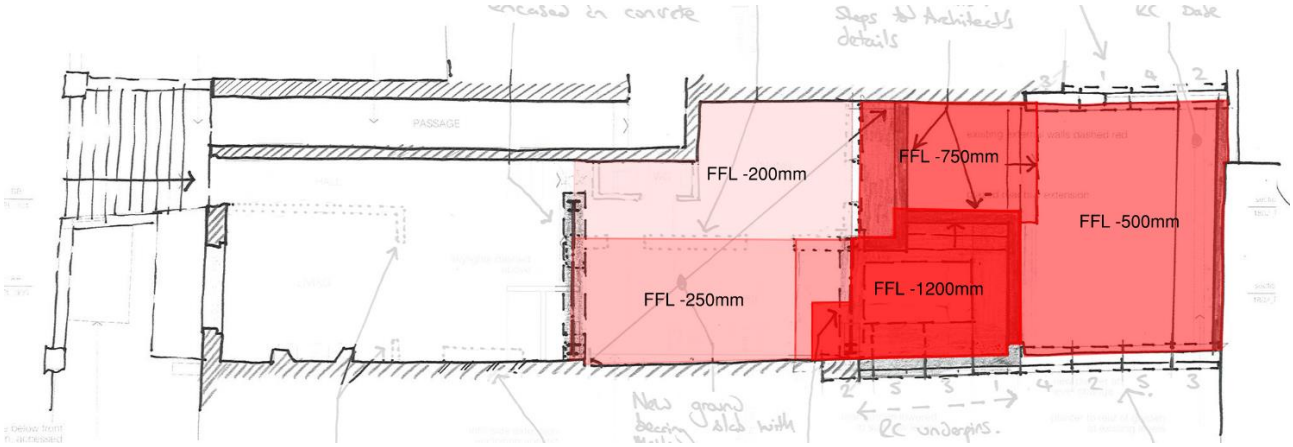


Figure 8: Diagram illustrating proposed lowering of finished floor levels to rear of house

Substructure

The existing foundations are traditional brick corbelled foundations.

The alterations to the existing house and construction of new rear infill extension will require new load bearing structure. These will be designed to either redistribute their load into existing foundations or as new simple pad or strip foundations. Where existing foundations are reused loadings will be limited to no more than a ten percent increase of their original load. New foundations will be designed based on a safe bearing capacity of 100kN/m^2 in the Claygate Beds.

The adjustments to the rear garden levels will require some new retaining structures to be constructed. These will be designed as insitu reinforced concrete walls, or solid masonry retaining walls, depending on the height of earth they are retaining.

Some underpinning of the existing boundary walls will also be required to allow for the reduced garden levels. Shallow underpins will be constructed in mass concrete. Underpins that will also act as retaining structures will be constructed as reinforced underpins. All underpins will be detailed to mimic, as a minimum, the width of the existing foundations over.

The depth of new foundations will consider the volume change potential of the soils, and the proximity of any trees.

The construction details of new foundations will be agreed with the Building Inspector and as part of any Party Wall Agreements needed as part of the works. Reinforced underpins are considered 'special foundations' under the Party Wall Act. The face of the reinforced underpins may need to move in to the site if the detail of these cannot be agreed.

With reference to the Arup Camden Geological, Hydrogeological and hydrological study, specifically Appendix D, which describes the effects of excavation on foundation strength, the effect of the proposed excavations on existing foundations are considered negligible due to the clays soil. The Arup report concludes that with a 1.5m excavation in clay there is a 10% reduction in foundation capacity that is likely to have little adverse effect on a structure being support.

Superstructure

At this stage it is expected that new steel box frames will be installed to resupport the existing load bearing masonry structures, and also the roof of the new infill extension.

Alterations to the existing internal structure of the building will require new isolated steel beams to resupport existing elements.

External Works

Changes in levels to the rear garden will require new retaining structure. This is discussed in the substructure above.

The external finishes will be detailed by the Architect.

Hydrogeological Assessment

Data from the trial pit investigation and from the desk study in the GEA Basement Impact Assessment confirm that there is no groundwater at a depth within metres of any excavations proposed.

Further discussion of the hydrogeological impacts are contained in the GEA Basement Impact Assessment.

5 Construction Methodology

Construction Method

The Main Contractor will be responsible for providing a full method statement for the proposed works before commencing with the site activities. The outline sequence of work is expected to be:

1. Establish secure site hoarding
2. Demolish portion of existing outrigger; install temporary restraint where existing removed
3. Underpin boundary structures for all underpins labelled 'A' in a five pin sequence (1-4-2-5-3)
4. Construct new retaining structure to rear of garden
5. Underpin boundary structures for all underpins labelled 'B' in a five pin sequence (1-4-2-5-3).
6. Construct new retaining structures between higher and lower levels of garden
7. Remaining ground levels reduced
8. Install new steel box frame to outrigger
9. Install temporary works and new steel box frame to rear elevation.
10. Install temporary works and new steel beam supporting outrigger flank walls
11. Cost new ground floor slab
12. Reconstruct outrigger; remove temporary restraint as new walls and floors constructed

Note: Internal alterations to existing building not included in this outline sequence of work.

A pictorial sequence of the construction method is included in Appendix C.

Temporary Works

Temporary works will be required to provide temporary support to existing structures where existing walls are demolished and structures above require re-supporting on new permanent structure. Temporary support will need careful coordination with the permanent works.

The contractor will be required to engage a temporary works designer during the works to develop the temporary works design and to provide a full Method Statement prior to the works beginning. Careful planning will be required for the temporary support and sequencing of the works during demolition, excavation and installation of the new structural elements. The main areas of work that will require special consideration are:

- Part removal of the existing outrigger
- Underpinning sequence and methodology
- Earthwork support when forming RC walls and underpins
- Re-support of existing outrigger (where retained) and rear elevation on new steelwork
- Re-support of chimney on new steelwork
- Removal of spine wall at ground floor level

A competent builder who has experience of this sort of work must be employed to carry out the works. They will be required to engage a competent designer to prepare detailed temporary works proposals and ensure that work on site is well supervised.

During excavation if the contractor encounters any water or unstable ground they are to cease works immediately and inform the engineer.

Underpinning

Both mass concrete and reinforced underpins are proposed, however the method for constructing both will remain largely the same.

Underpins are to be formed in maximum 1.0m lengths and in a five pin sequence (1-4-2-5-3). The five pin sequence is to ensure only a limited width of excavation is completed at anyone time, and therefore only a limited length of existing wall will be undermined at anyone time. Restricting the length of the underpins to 1.0m will allow the brickwork to the walls to temporary arch of the excavation and redistribute its load to the remaining sections of walls and foundations either side. Similarly, the earth is expected to arch the excavation in the temporary case. Notwithstanding this, the contractor must provide temporary shoring and strutting to the sides of all excavations to resist any earth movements during the construction of the underpins.

On completion of the excavation, the contractor should make sure the underside of the existing foundations are clean and free of any debris or earth.

Mass concrete underpins will be cast 75mm short of the existing foundations. The next day these will be dry packed tight to the underside of the existing foundations, and the dry pack left to cure for at least 24 hours before beginning the next underpin in the sequence.

The bases of excavations for reinforced underpins will first be blinded with concrete before installing the reinforcement cages. The base will first be cast, followed by the stem, which will be cast 75mm short of the existing foundations. The next day these will be dry packed tight to the underside of the existing foundations, and the dry pack left to cure for at least 24 hours before beginning the next underpin in the sequence.

Adjacent underpins with be dowelled together with a minimum of four 16mm diameter reinforcing bars. No shutters will remain to the rear face of the underpins, and they will be cast directly against the excavated face of the earth to help ensure no voids are left behind them.

Also refer to Section 6 of this report, which describes the outline specification for the underpinning

Movements

As with any structural intervention, as the structure adjusts to its new form some movements may occur. Providing the builder takes care during the construction, any movements should be limited but some making good should be expected.

As excavations to the garden area are modest and localised, no significant movements are expected, but the need for any movement monitoring will be agreed as part of the Party Wall Agreement process.

Health & Safety

Health & Safety is an important consideration on all construction sites. Where possible, risks will generally be designed out, and where this is not possible any residual risks will be conveyed to the contractor.

In addition to the usual health and safety considerations in construction, such as falls from heights/falling objects, inhalation of dust, prolonged exposure to vibration etc., the more significant risks associated with this site will relate to the collapse of excavations or loss of stability to the retained structure during the main structural works. The contractor will need to engage competent temporary works designers and provide method statements before carrying out the works.

Site Logistics

The site is accessed off Flask Walk. It will be necessary for the contractor to apply for parking suspensions during the works to allow for the loading and unloading of materials and waste

Site Hoardings and Security

The contractor will be expected to provide a solid hoarding, with access restricted only to those associated with the work.

6 Design Criteria

Codes and Standards

The design will be developed in accordance with the Building Regulations and based on the current relevant British Standards or Eurocodes.

Loadings

The building will be designed for imposed floor loadings as described in the relevant standards. Based on British Standards the relevant imposed loadings are:

Self contained dwelling 1.5kN/m^2

Retaining structures will be designed to accommodate imposed surcharge loadings from neighbouring gardens of 5.0kN/m^2

Underpinning

The outline specification for the underpinning is set out below:

110 Before starting the work the Contractor is to check for any services that could be damaged by the underpinning work.

120 The Contractor shall be responsible for ensuring that their operations do not in any way impair the safety or condition of the building both before and during the execution of the work. They shall immediately inform the Engineer if they consider that more stringent procedures than those specified are necessary.

130 Underpinning is to be carried out in short sections of about 1 metre in length. Sequence of underpinning to be as shown on drawings which is generally a 1,4,2,5,3 sequence. All sections marked 1 to be excavated, cast and dry packed before starting excavation of section marked 2 and all sections marked 2 to be complete before excavation for sections marked 3 etc

140 The Contractor is to submit proposals for method of forming back shutters, where these are required.

150 The Contractor is to provide the Building Inspector and Engineer with at least 24 hours notice of when underpinning will be ready for inspection.

160 The formation level shall be inspected and approved by the Engineer and the Building Inspector before concrete is poured. The underpinning is to be carried out to the satisfaction of the Engineer and the Building Inspector.

170 Projecting portions of the existing footings are to be carefully cut off where directed and the underside of the footings are to be cleaned and hacked free of dirt, soil or loose materials before dry packing.

180 The body of the underpinning is to be constructed in a 1:2;4 mix concrete. Pins are to.be cast to the widths shown unless otherwise directed by the Engineer. Excavation and concreting of any section of underpinning shall be carried out on the same day.

190 The concrete is to be stopped off 75mm below the underside of the existing footing and the final pinning up over the whole of the footing is to be carried out with 1:3 mix cement to sharp sand dry pack mortar, well rammed in the day after the concrete has been poured.

200 Excavation to any section of underpinning shall not be started until at least 48 hours after completion of any adjacent sections of the work.

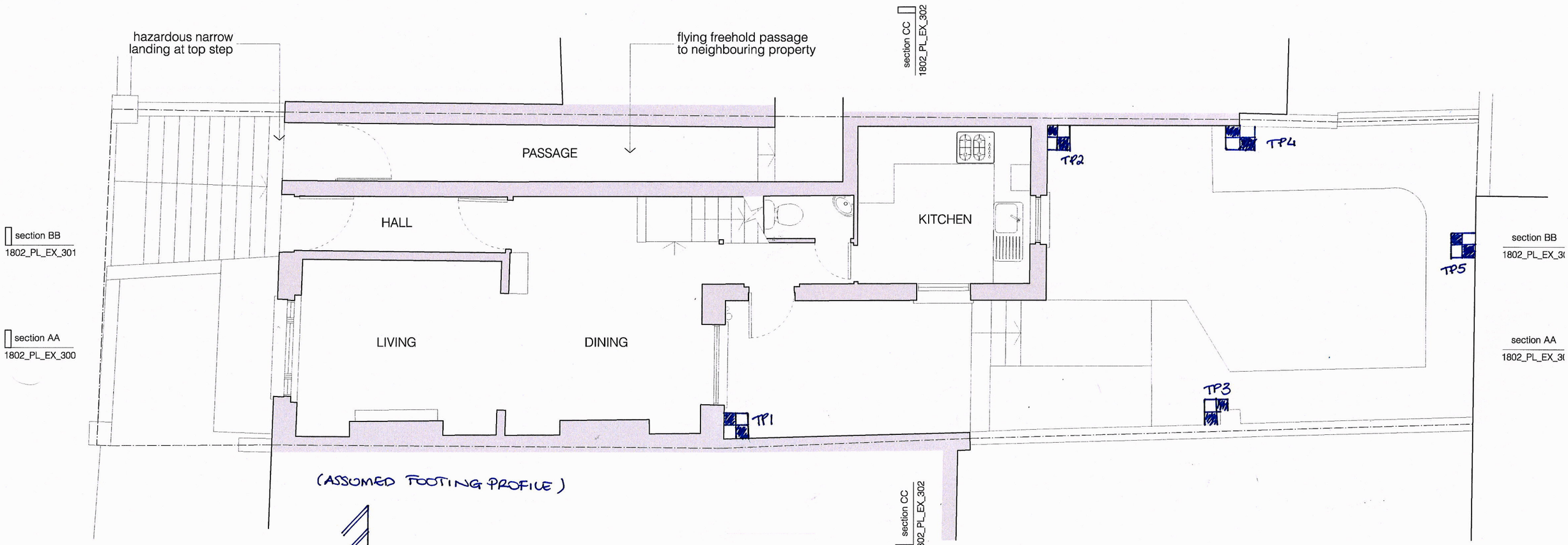
210 The sides of the previous underpinning bays are to be roughened or keyed to the satisfaction of the Engineer and Building Inspector.

220 Excavated material intended for backfilling is to be kept protected from drying out or wetting and is to be placed in maximum 150mm layers, carefully compacted with a pneumatic or electric percussion tool with compacting plate.

230 The Contractor is to keep a record of the sequence and dimensions of the underpinning actually carried out, including details of excavation, casting concrete and pinning up for each section.

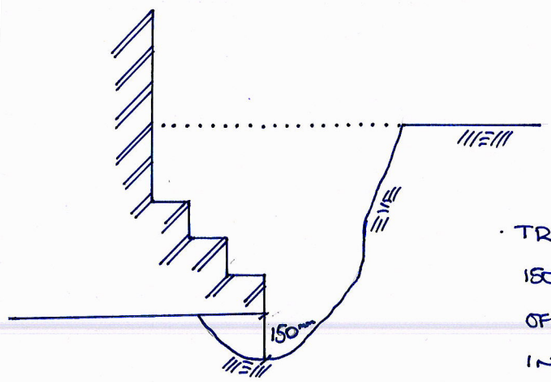
Appendix A
Structural Investigations

28439-INV01-1	Trial Pit Location Plan
28439-INV02-1	Trial Pit 1 Log Sheet 1
28439-INV03-1	Trial Pit 1 Log Sheet 2
28439-INV04-1	Trial Pit 2 Log Sheet 1
28439-INV05-1	Trial Pit 3 Log Sheet 1
28439-INV06-1	Trial Pit 4 Log Sheet 1
28439-INV07-1	Trial Pit 5 Log Sheet 1
28439-INV08-1	Trial Pit 1 Log Sheet 2



Existing Ground Floor Plan

(ASSUMED FOOTING PROFILE)



- TRIAL PIT TO BE EXCAVATED 150mm BELOW THE DEPTH OF FOOTING. MIN. 800x800mm IN PLAN.
- SCAN WITH CAT SCANNER & CHECK FOR SERVICES BEFORE EXCAVATING.

TP = TRIAL PIT

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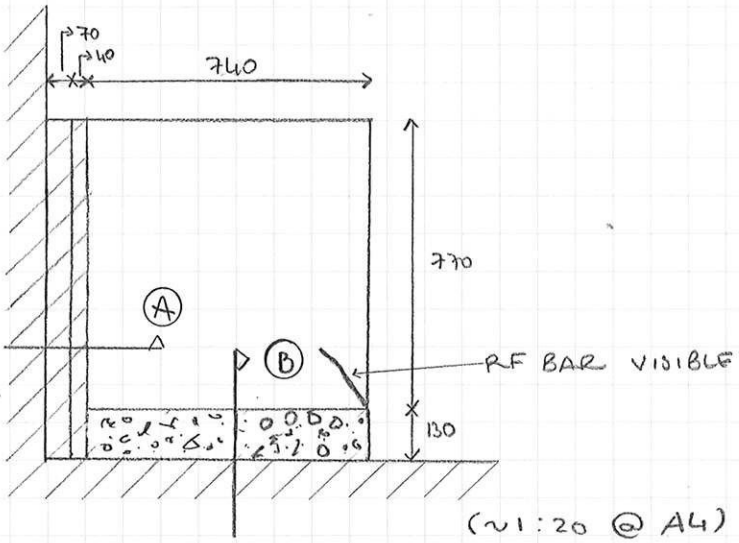
Job No 28439 Page INV.02 Ver 1

Date SEP2019 Eng MA Chd BS

Job 49 FLASK WALK

TP1



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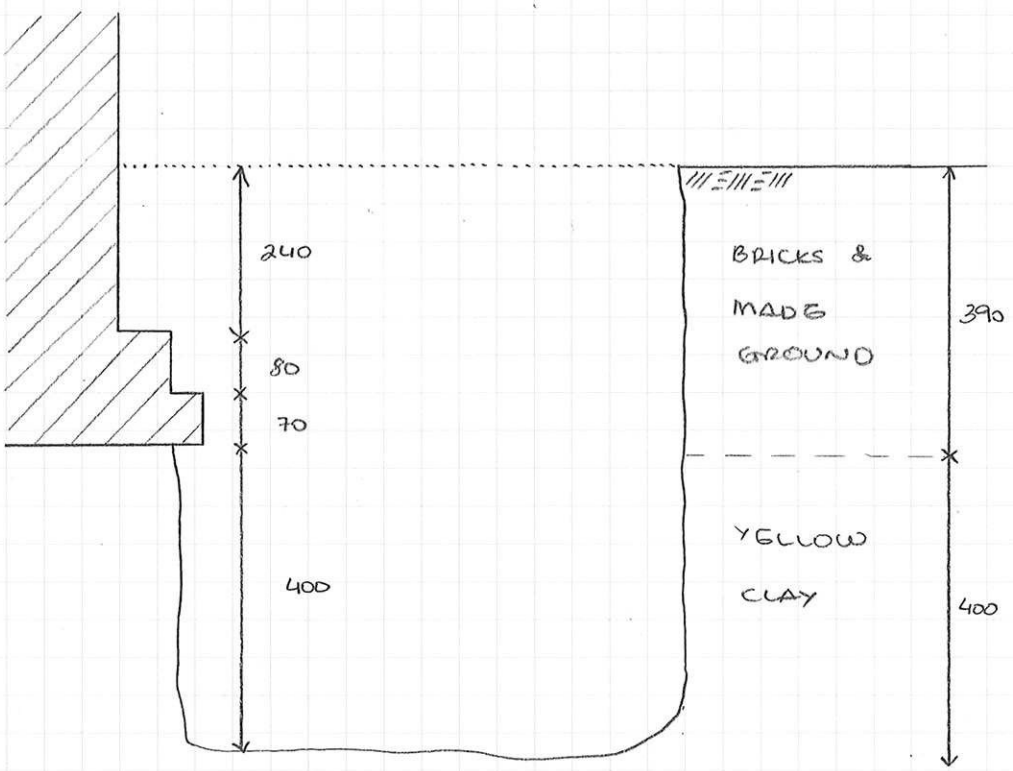

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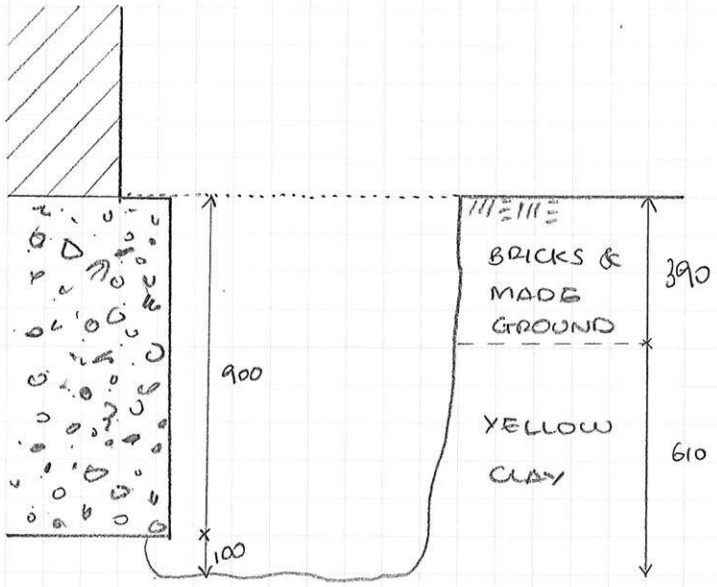

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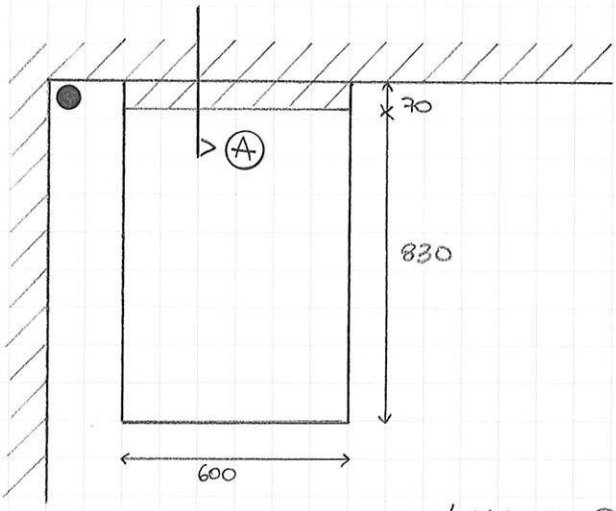
TP2



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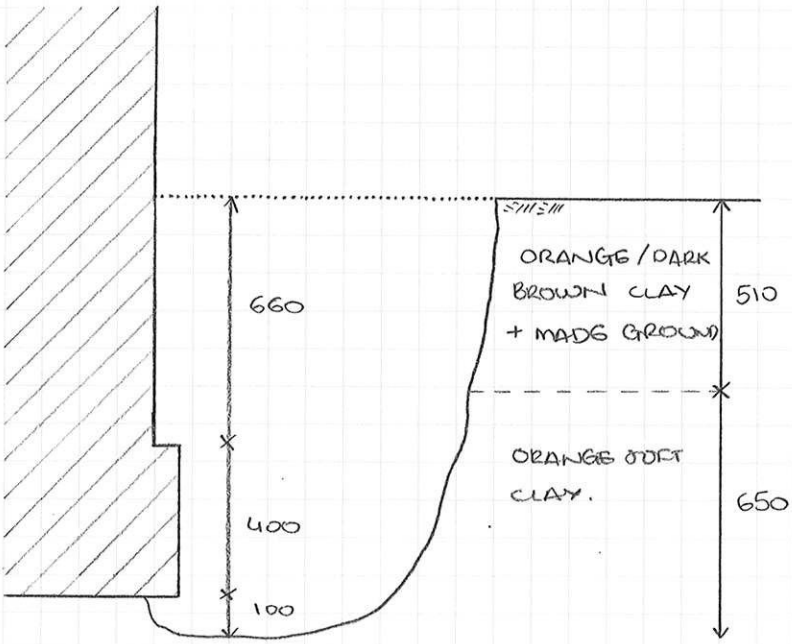

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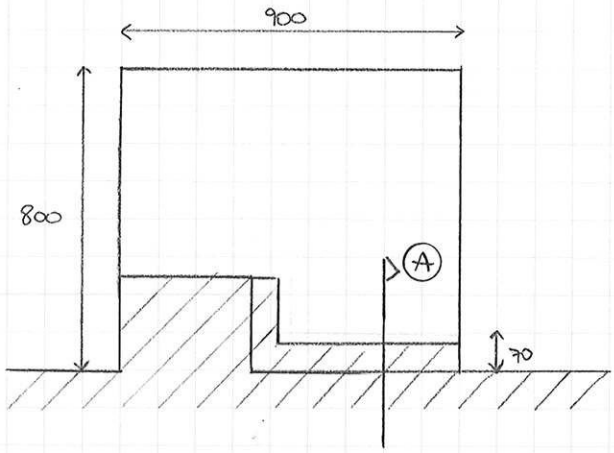

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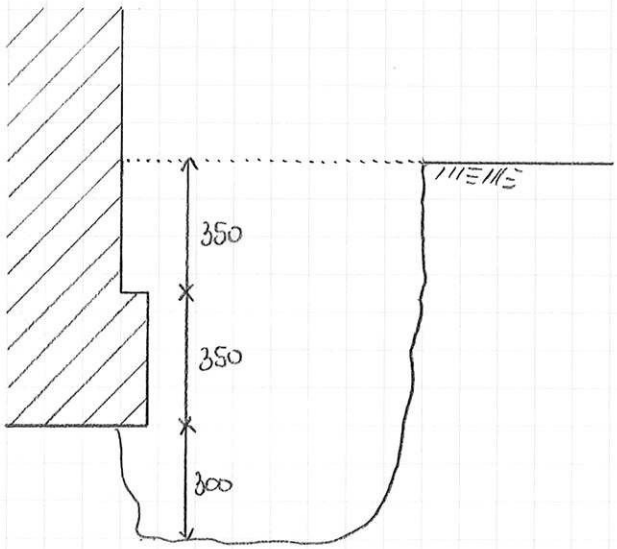

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Job 49 FLASK WALK

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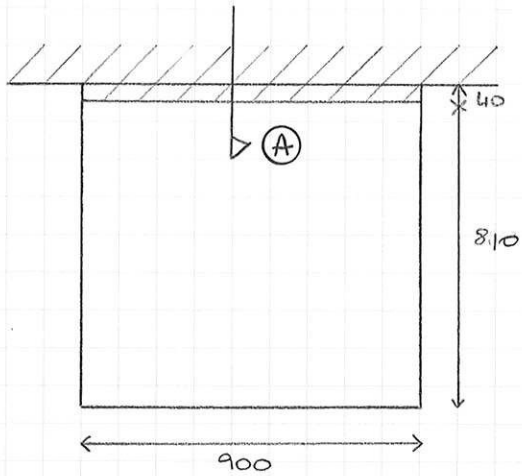

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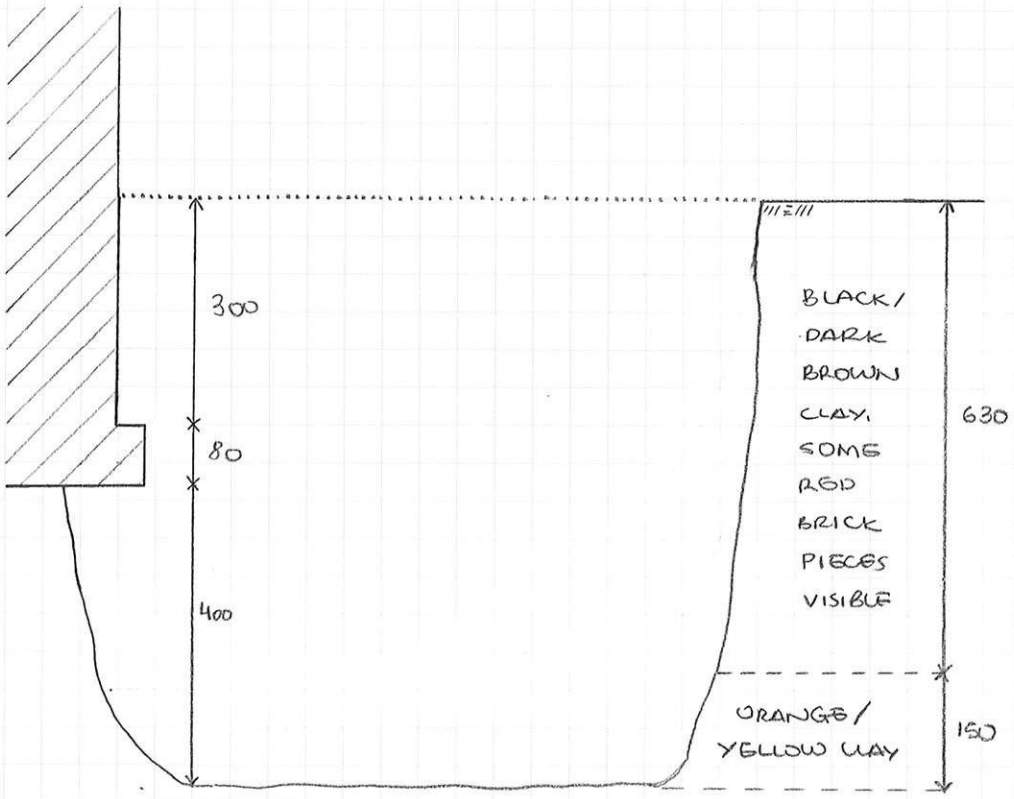

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Job 49 FLASK WALK

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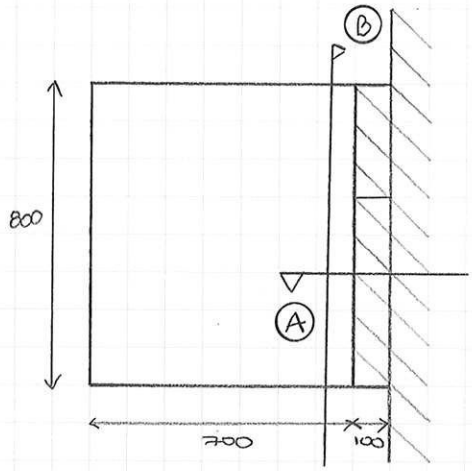

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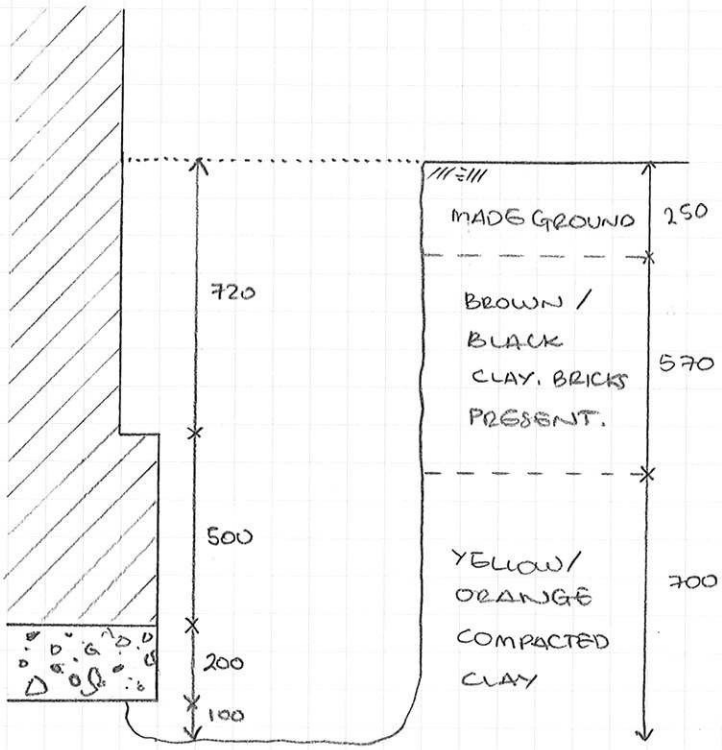

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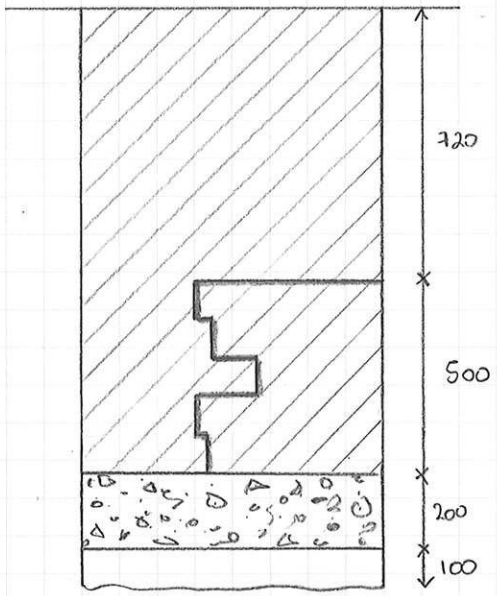

SECTION B (~ 1:20 @ A4)

Appendix B
Proposed Structural Drawings

28439-010-2	Ground Floor Plan
28439-020-1	First Floor Plan
28439-030-1	Second Floor Plan
28439-040-1	Roof Plan
28439-101-1	Section 101
28439-102-1	Section 102
28439-103-1	Section 103
28439-104-1	Section 104
28439-105-1	Section 105
28439-106-1	Section 106
28439-107-1	Section 107

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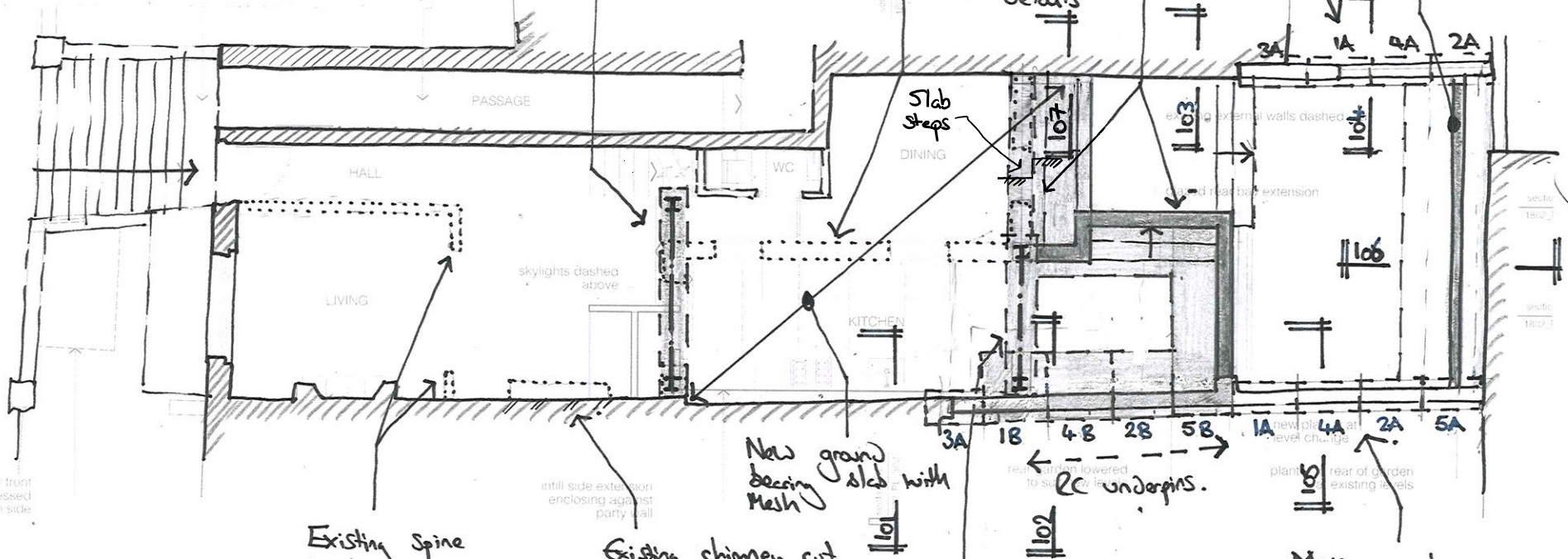

Existing Spine wall removed. Contractor to provide temporary support to structure over.

Existing chimney cut back + resupported at roof level. Brickwork make good

New ground slab with Mesh

New box frame; ground beam on Mass concrete strip + encased in concrete

Mass concrete underpins cast in Maximum 1.0m lengths and in sequence as agreed with Engineer. Typical U.N.O.

Ground Floor Plan 1:100@A4

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Date 10.02.20 Eng BS Chd

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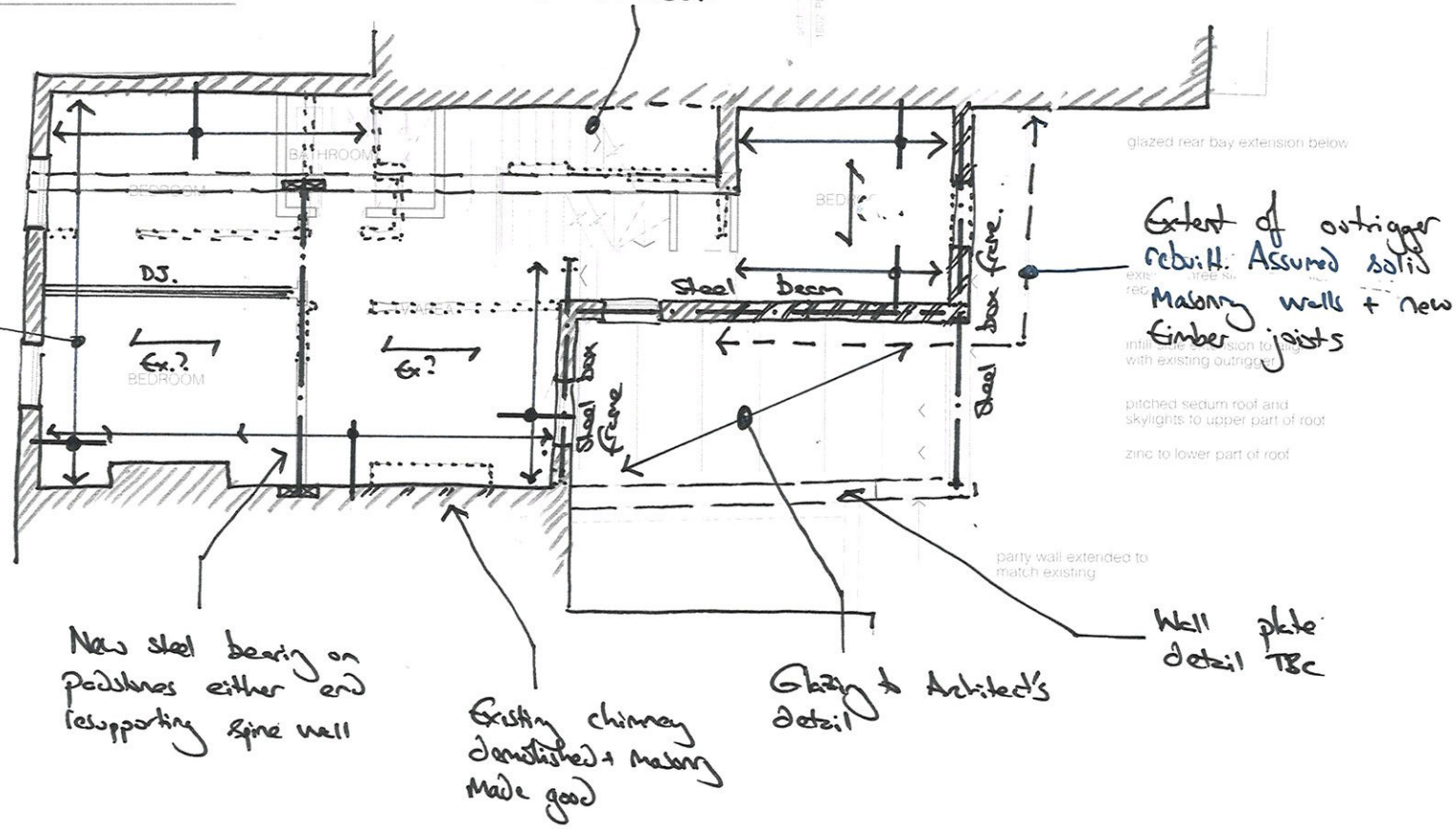

First Floor Plan ~1:100@A4

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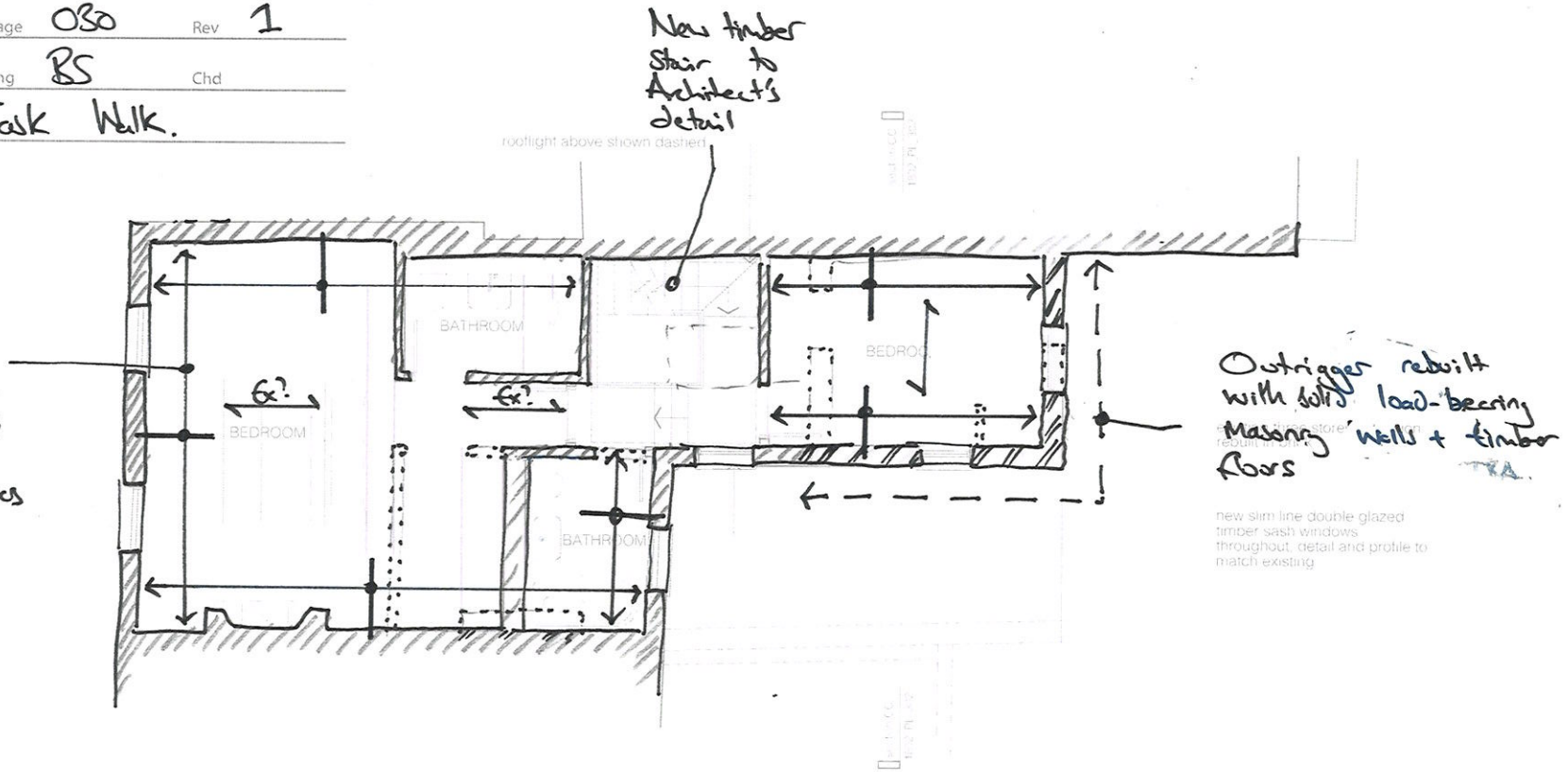

Second Floor Plan @1:100@A4

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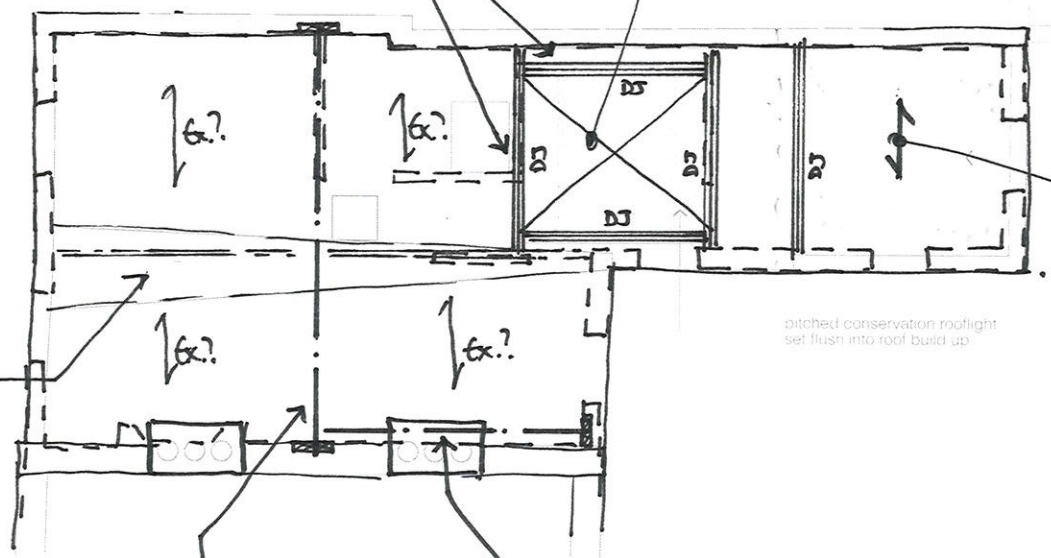
Date 10.02.20 Eng BS Chd

Job 49 Flask Walk.



Double timber trimming rooflight

New rooflight to Architect's detail

New timber joists with 18mm plywood diaphragm over

Existing valley beam TBC. Possible strengthening

New steel resupporting valley beam + ceiling joists; bearing on padstones

New steel resupporting chimney.

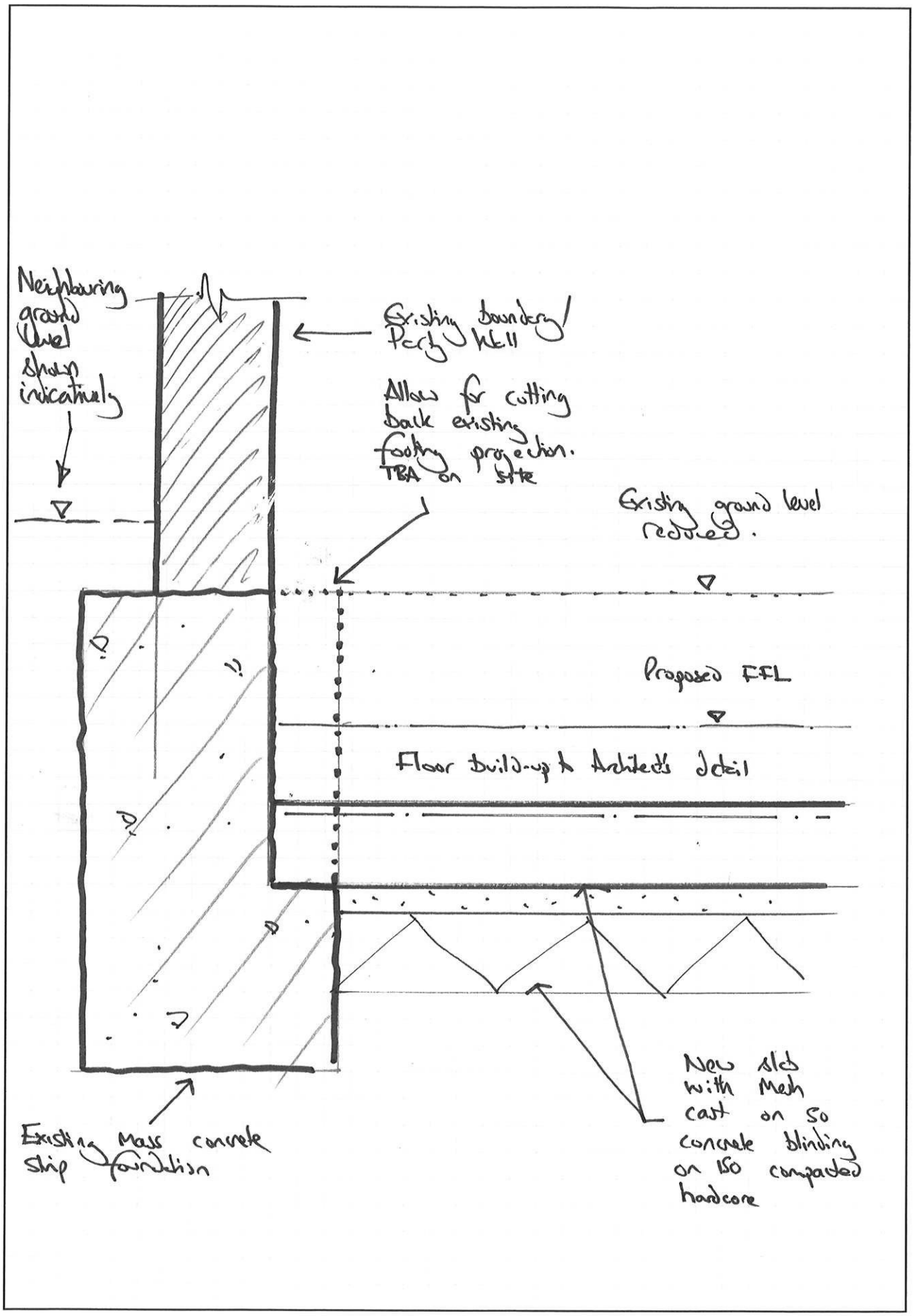
Roof Plan @1:100@A4

PRICE&
MYERS

Job No. 28459 Page 101 Rev 1

Date 11.02.20 Eng BS Chd

Job 49 Flask Walk.

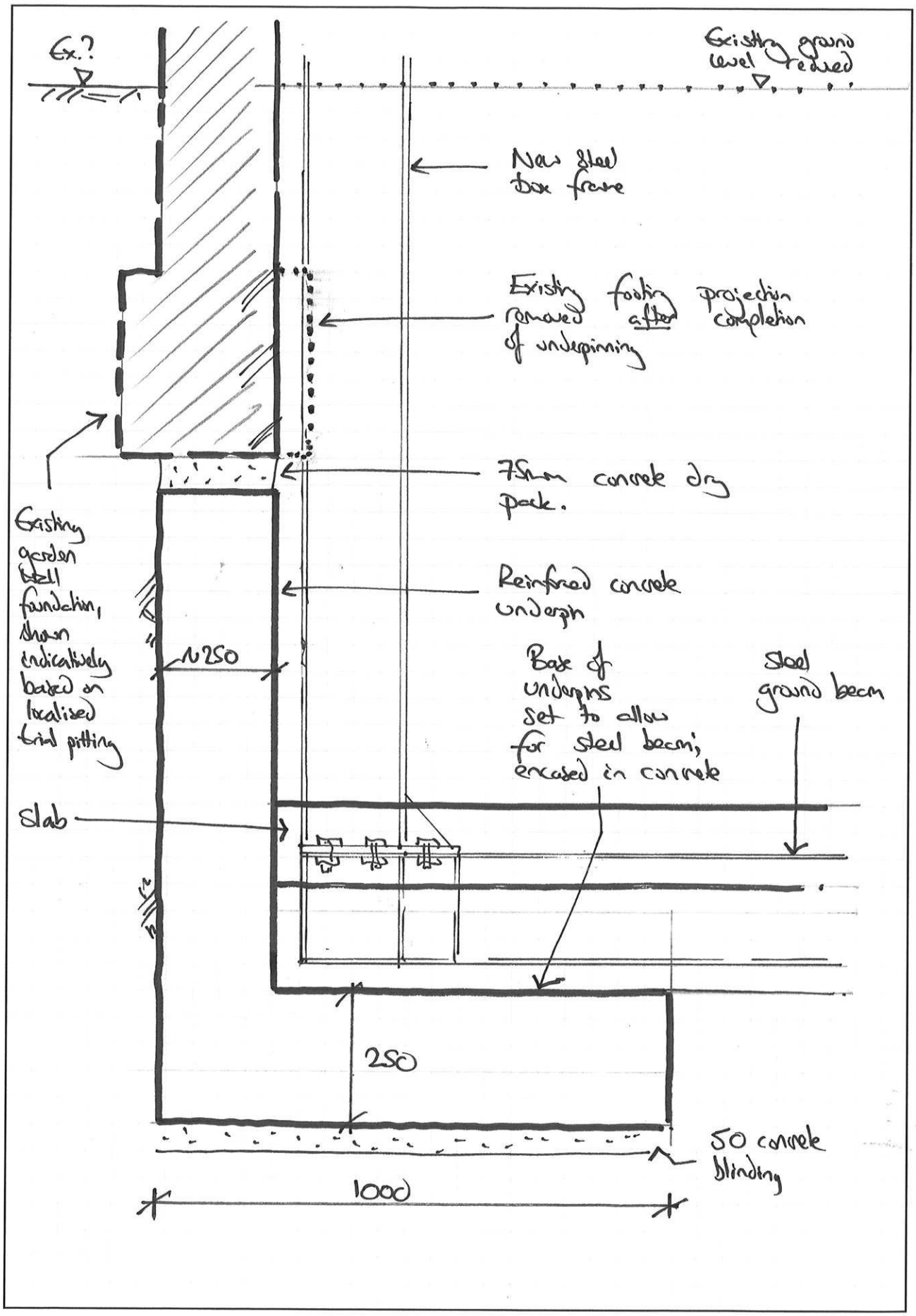


PRICE& MYERS

Job No. 28439 Page 102 Rev 1

Date 11.02.20 Eng BS Chd

Job 49 Flask Walk

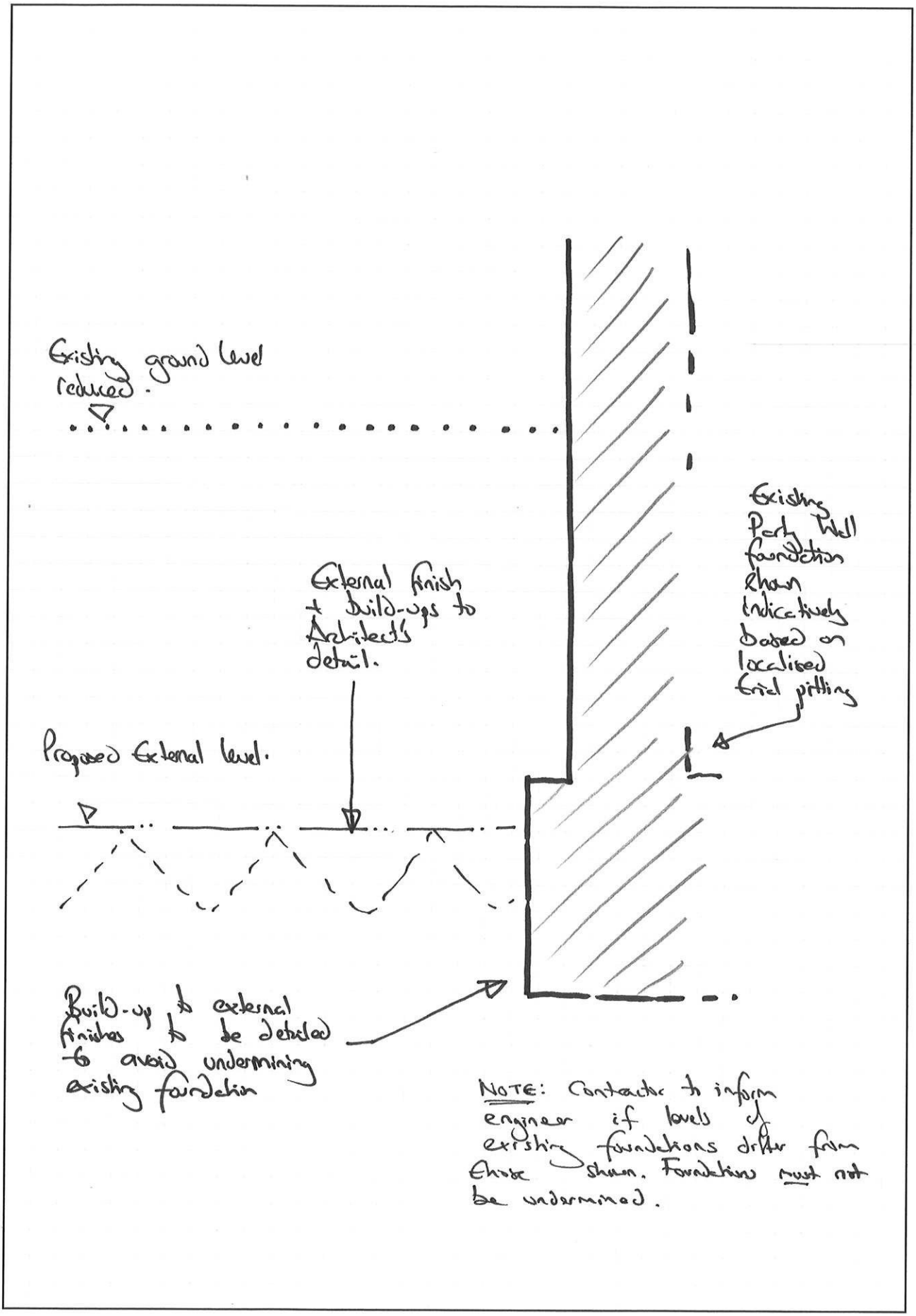


PRICE&
MYERS

Job No. 28439 Page 103 Rev 1

Date 11.02.20 Eng BS Chd

Job 49 Flask Walk.

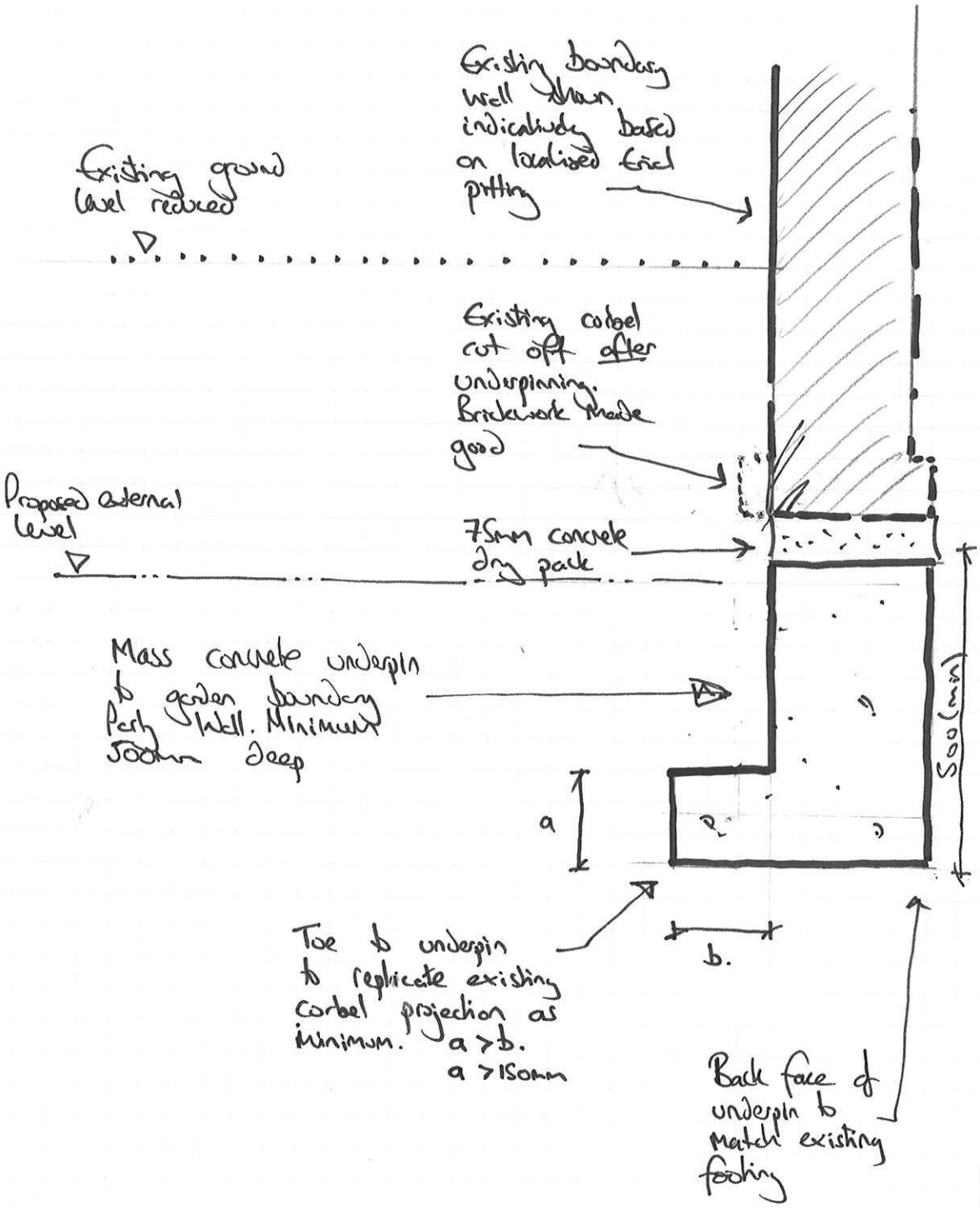


PRICE& MYERS

Job No. 28489 Page 100 Rev 1

Date 11.02.20 Eng BS Chd

Job Hask Walk

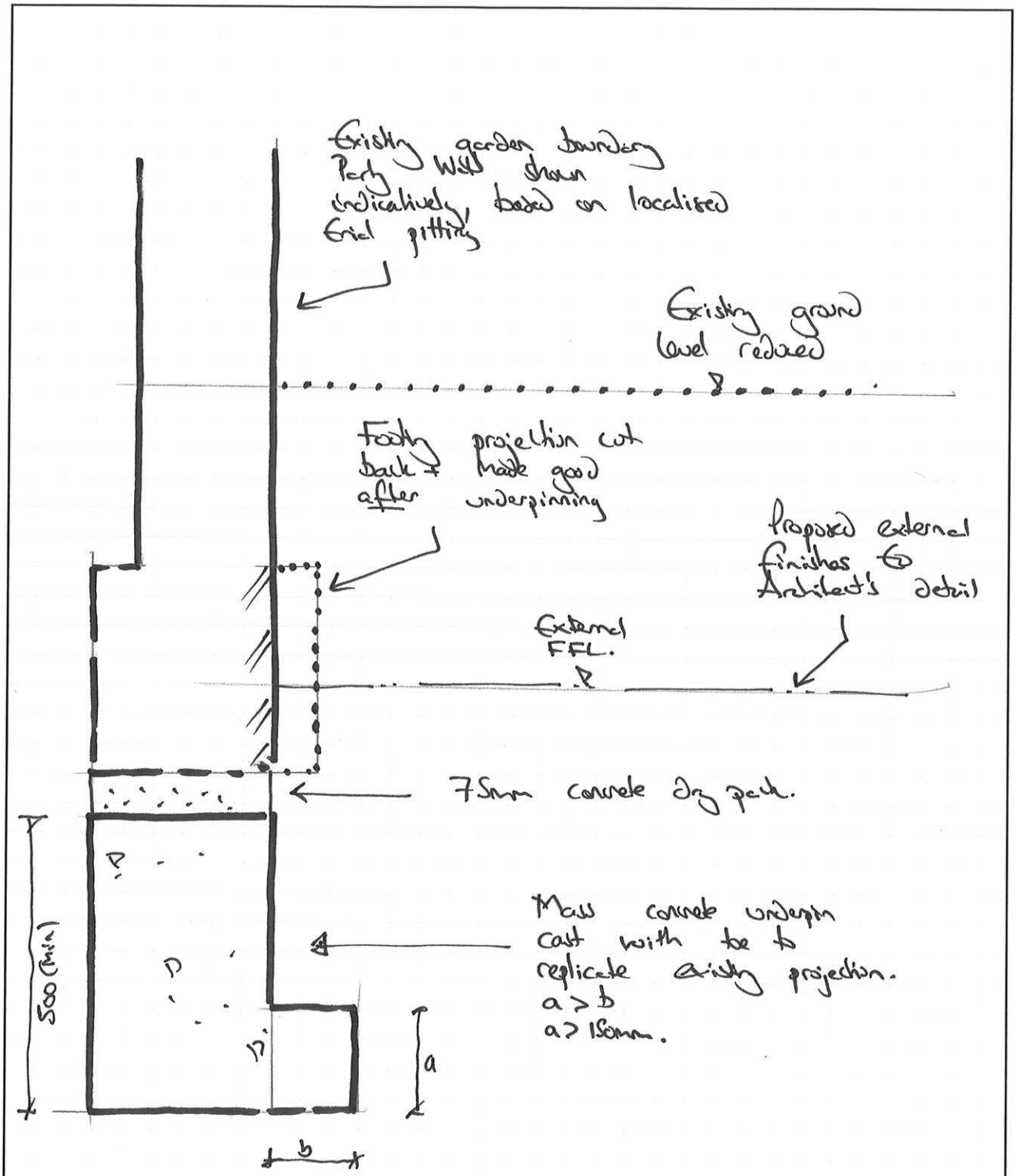


PRICE&
MYERS

Job No. 2839 Page 105 Rev 1

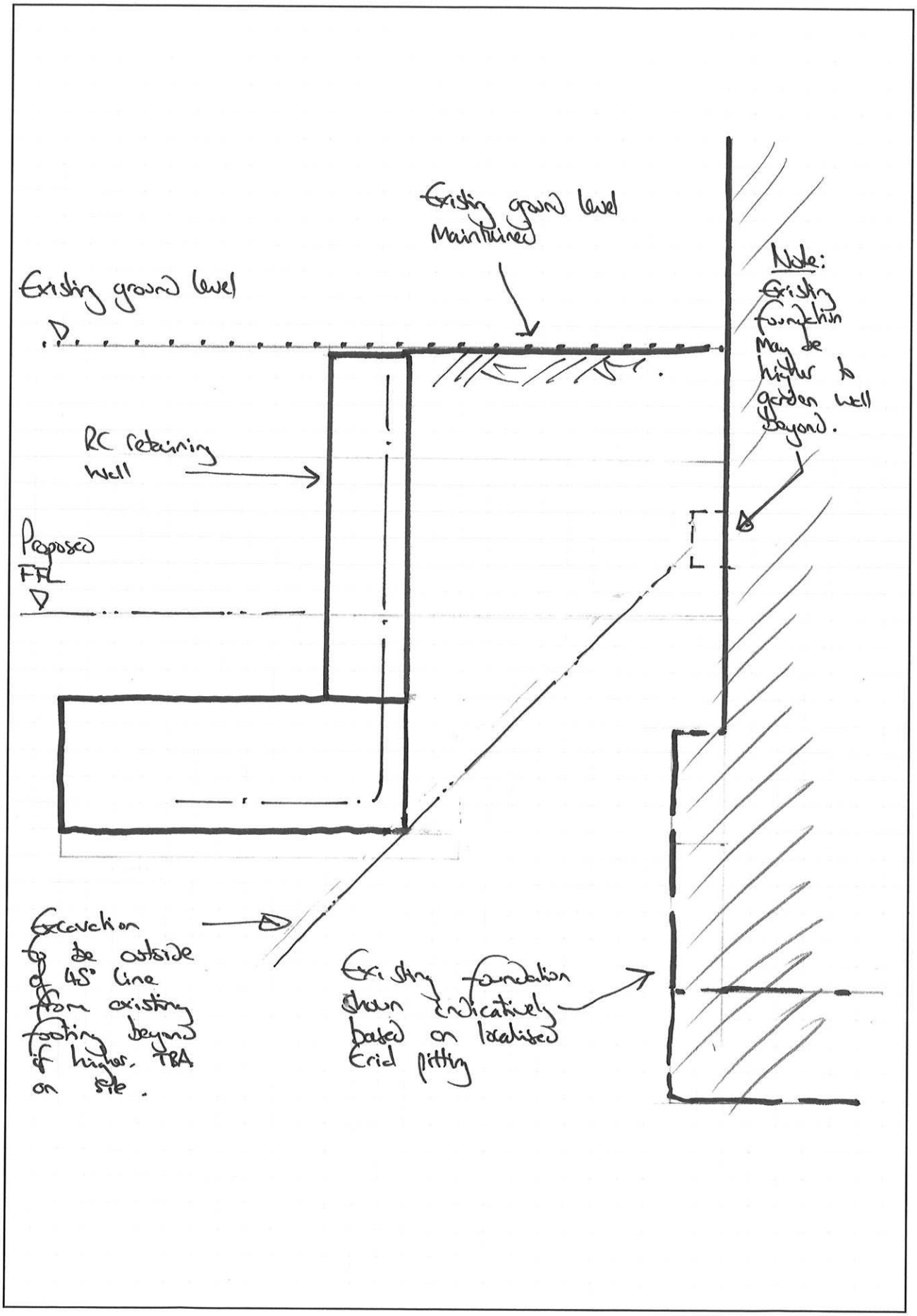
Date 11.02.20 Eng BS Chd

Job 49 Flask Walk



PRICE& MYERS

Job No.	28439	Page	106	Rev	1
Date	11.02.20	Eng	BS	Chd	
Job	49 Flask Walk				



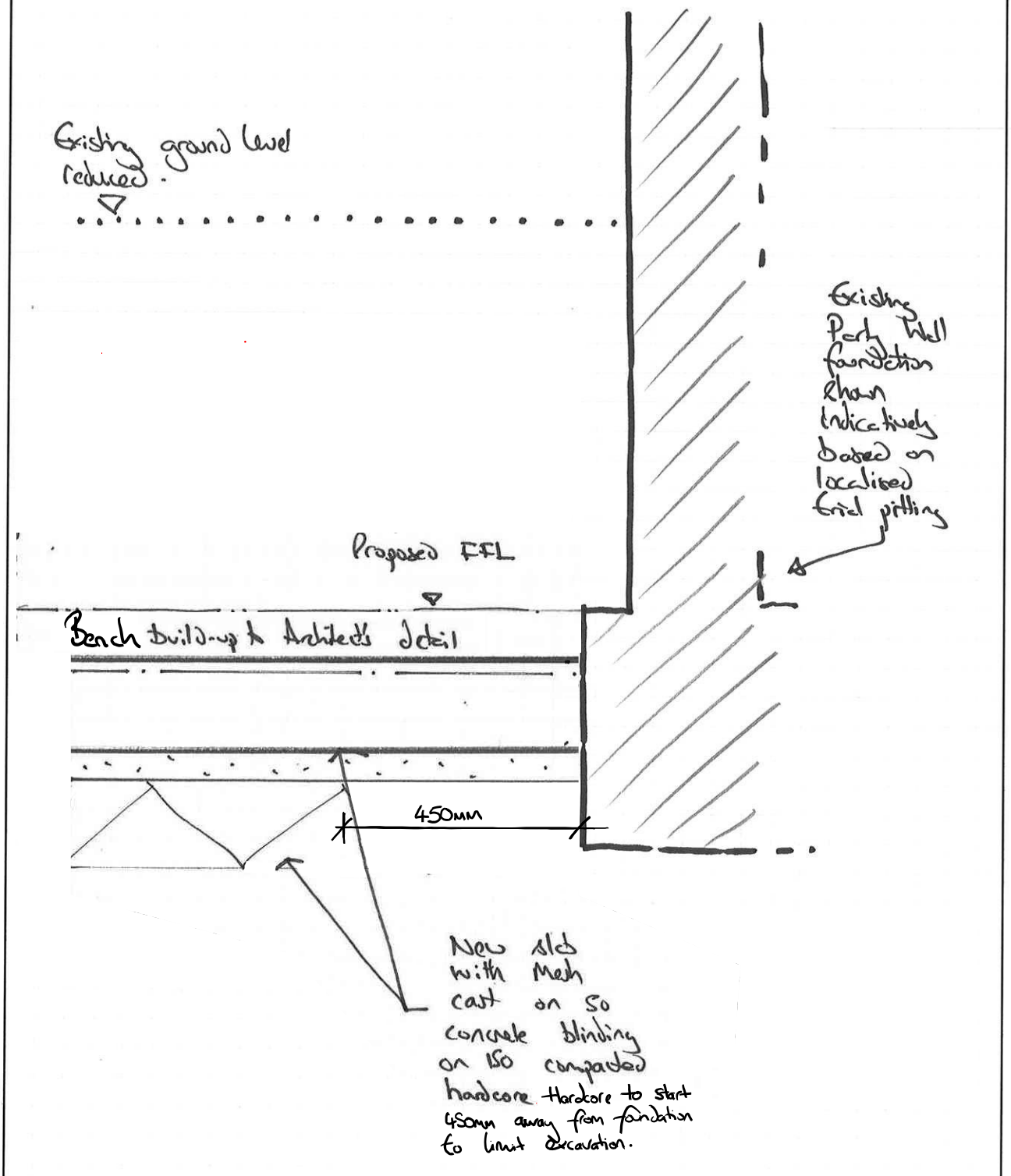
PRICE& MYERS

Job No. 28439 Page 107 Rev 1

Date 23.04.20 Eng BS Chd

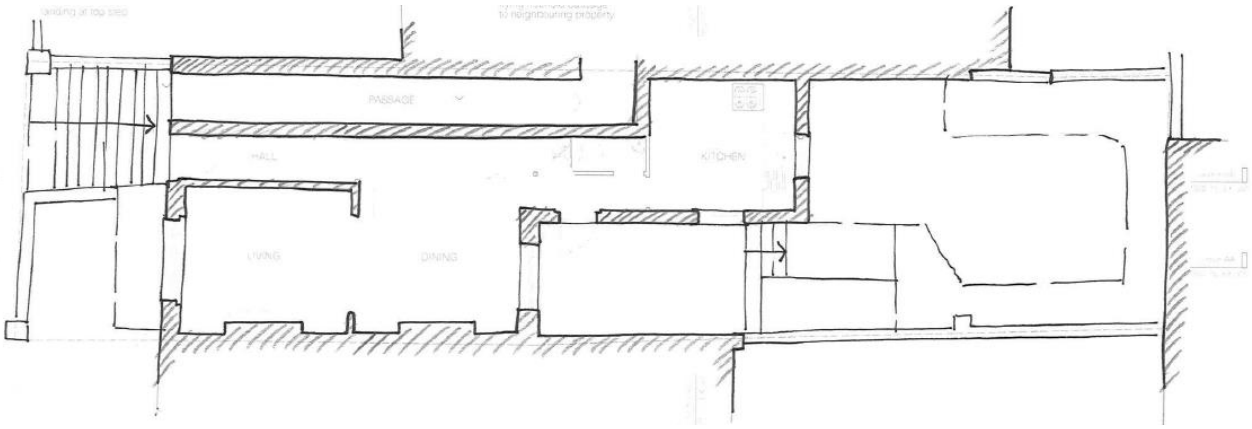
Job 49 Flask Walk.

NOTE: Contractor to inform engineer if levels of existing foundations differ from those shown. Foundations must not be undermined.



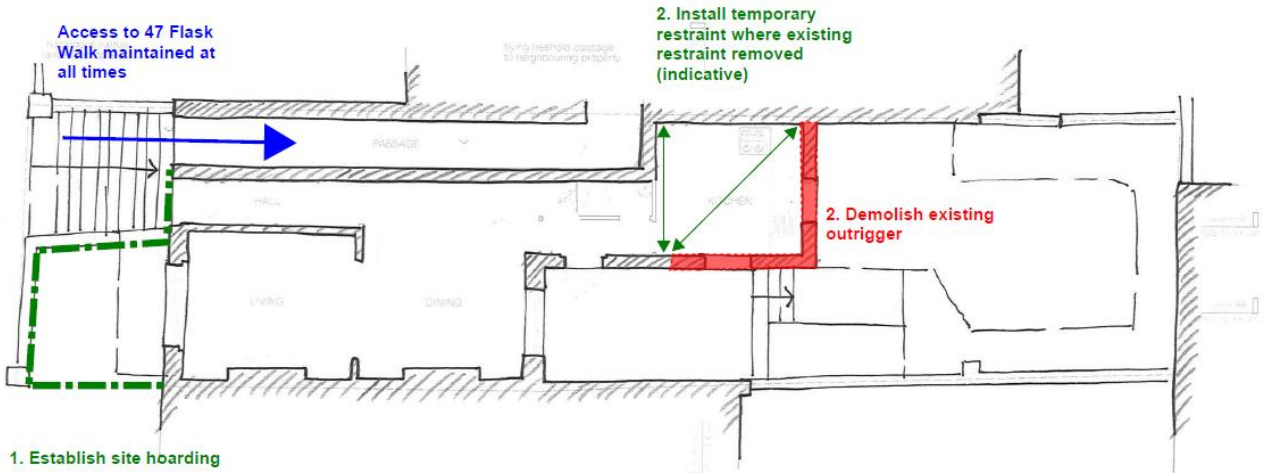
Appendix C
Proposed Construction Sequencing

Stage 0 - Existing

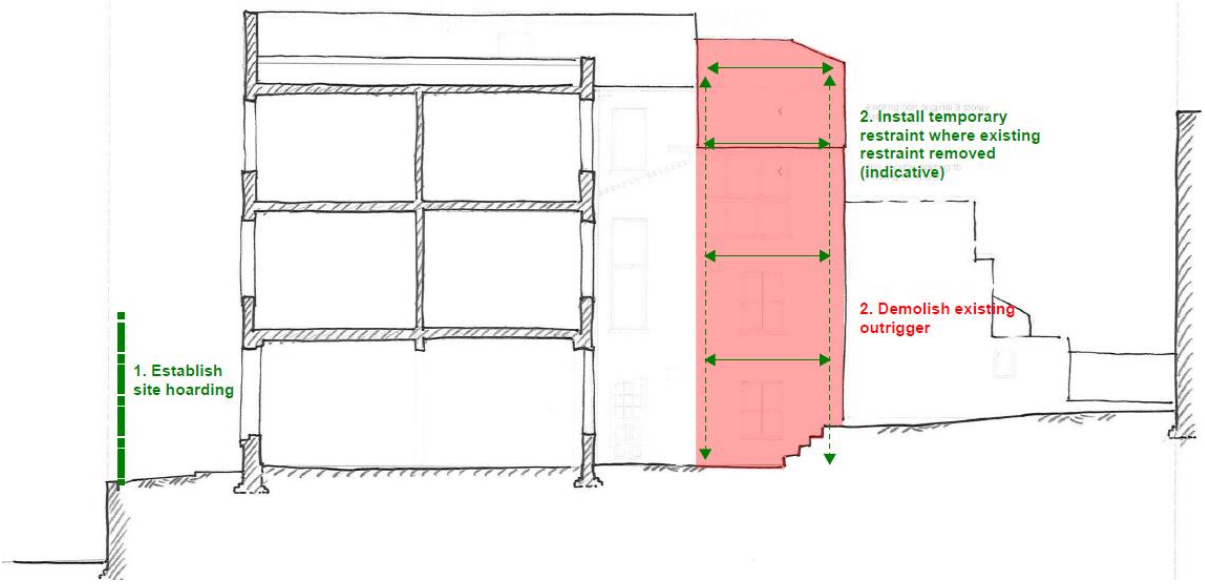


Plan

Stages 1 & 2

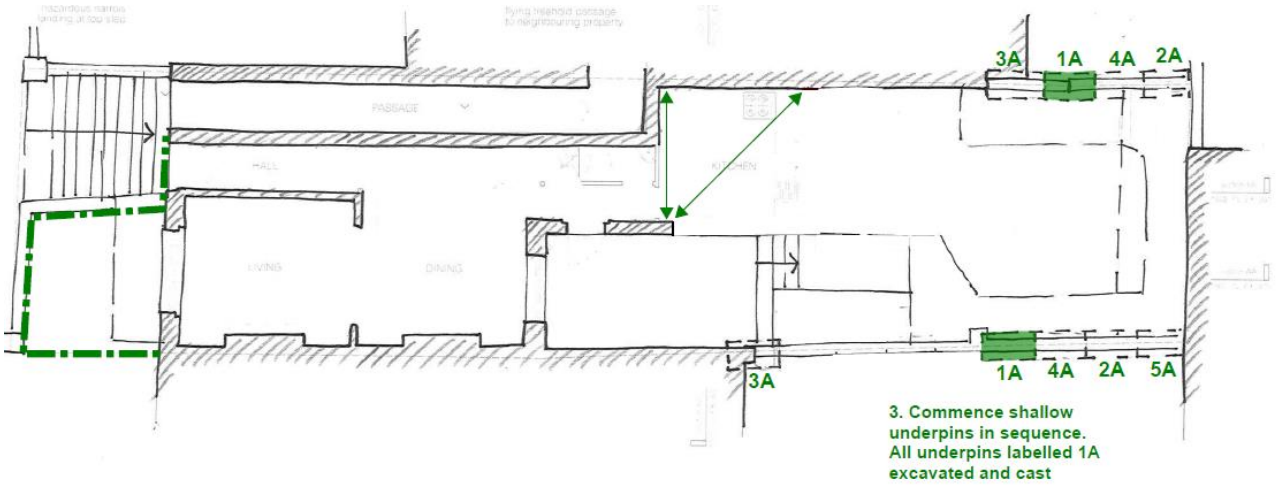


Plan

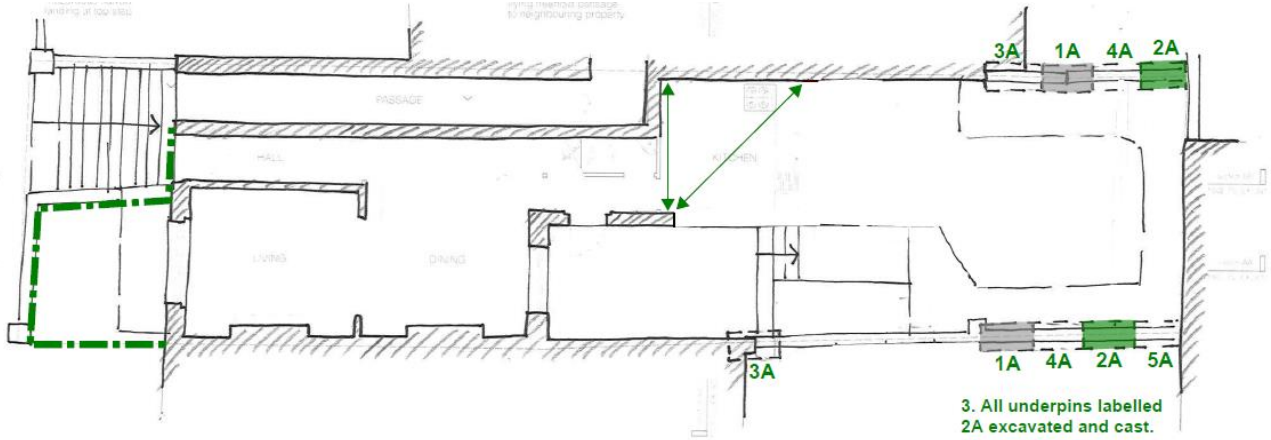


Long Section

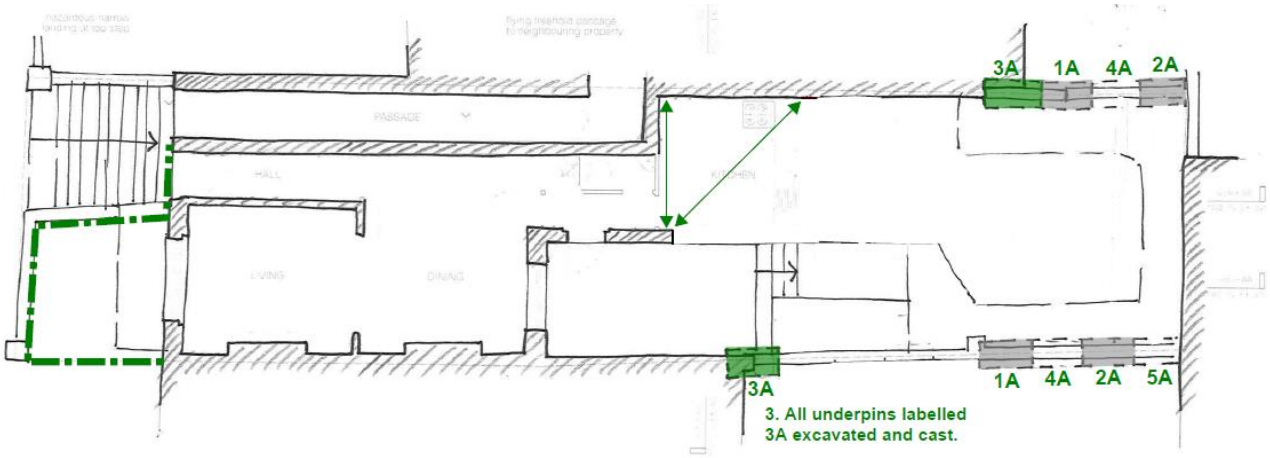
Stage 3(i)



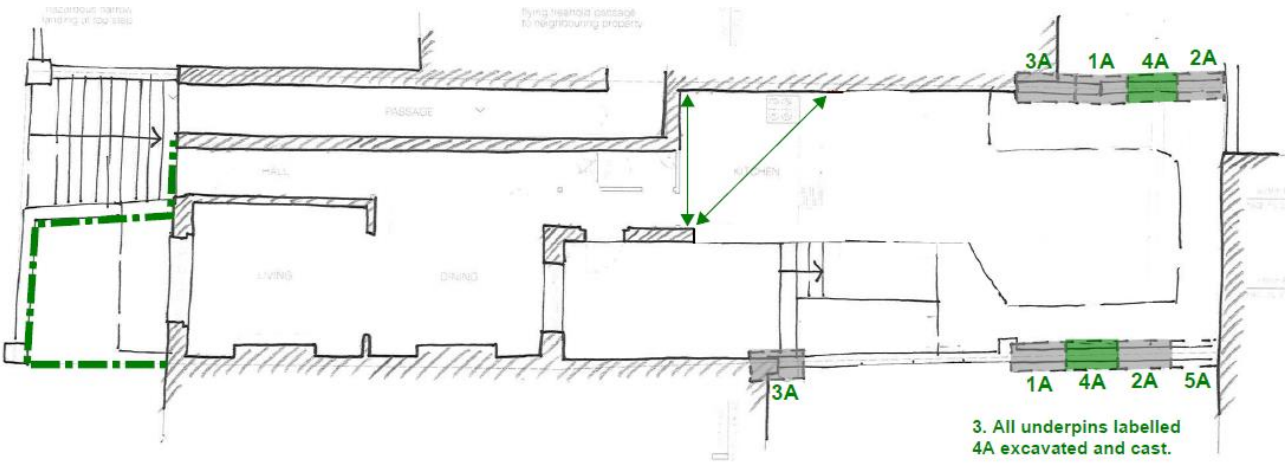
Stage 3(ii)



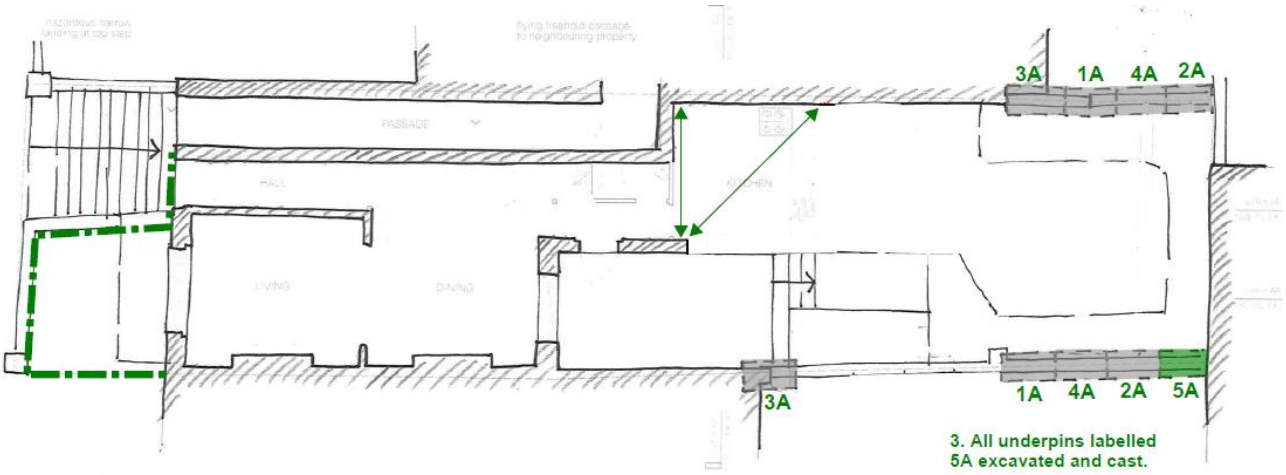
Stage 3(iii)



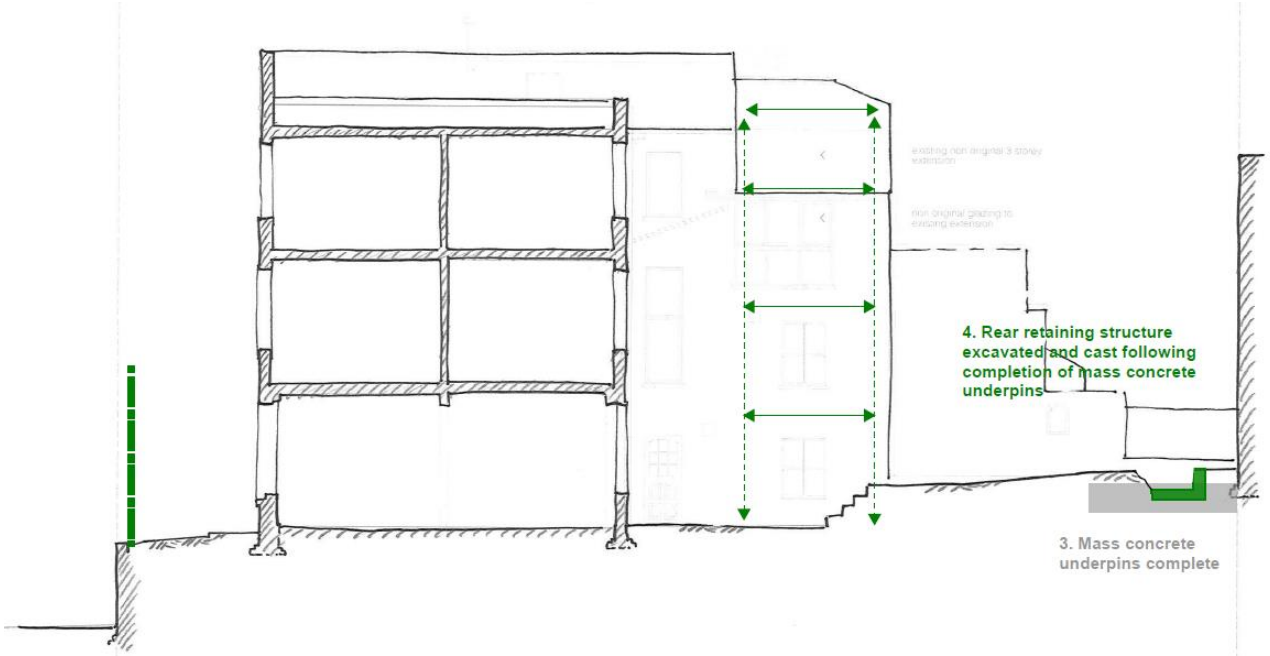
Stage 3(iv)



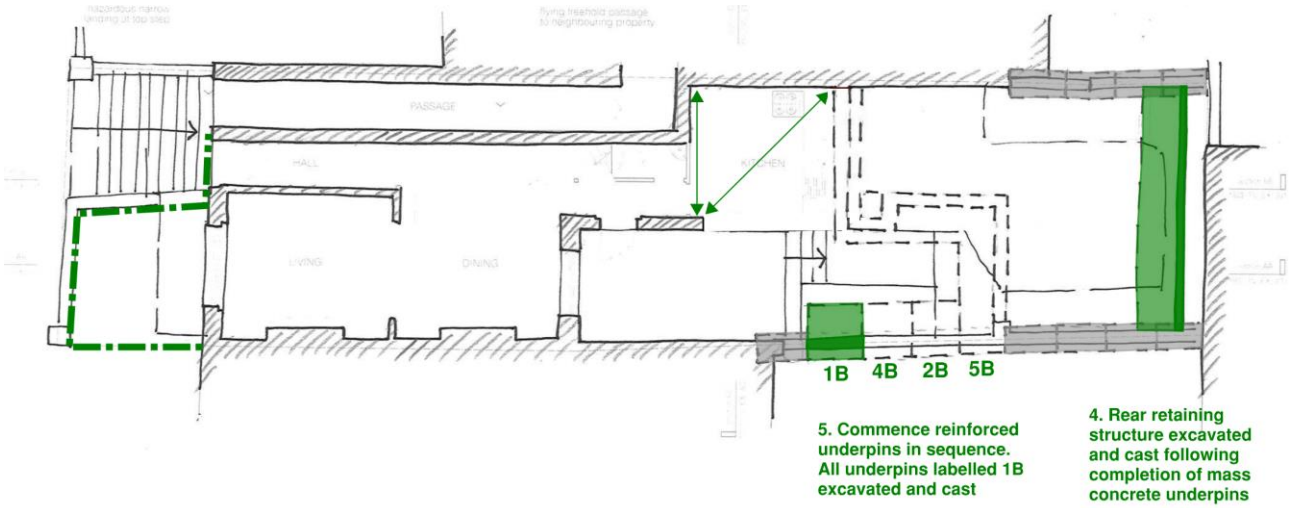
Stage 3(v)



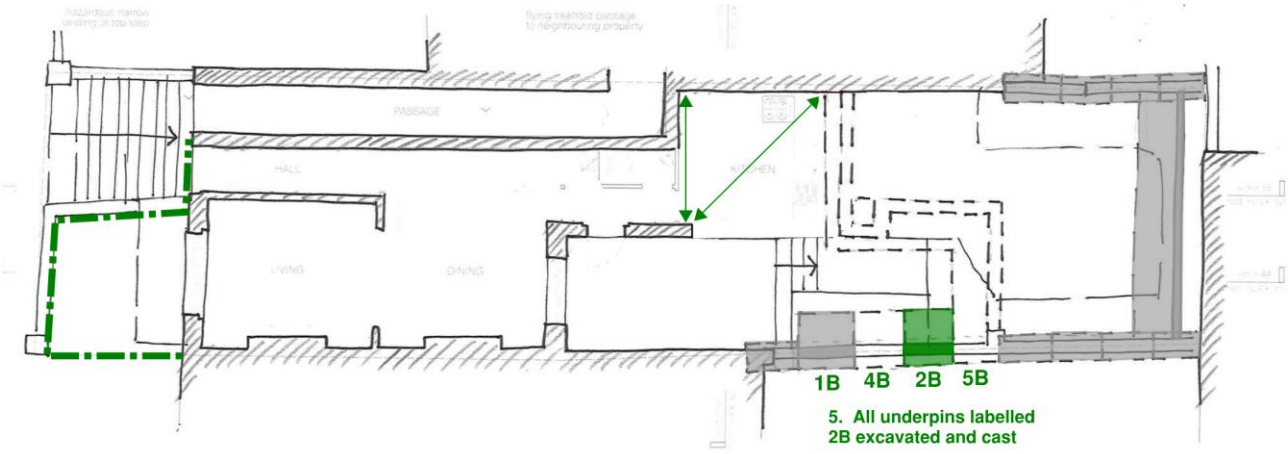
Stage 4



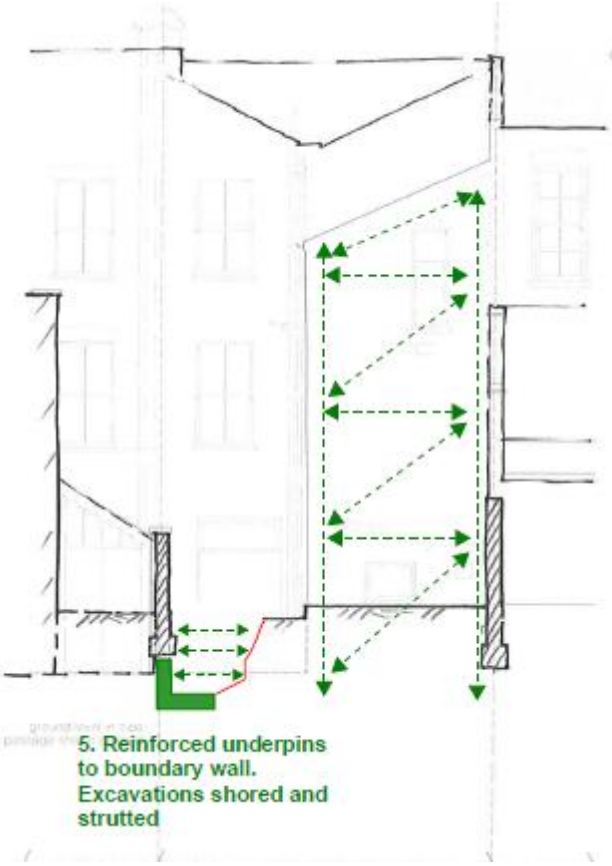
Stage 4 & 5(i)



Stage 5(ii)

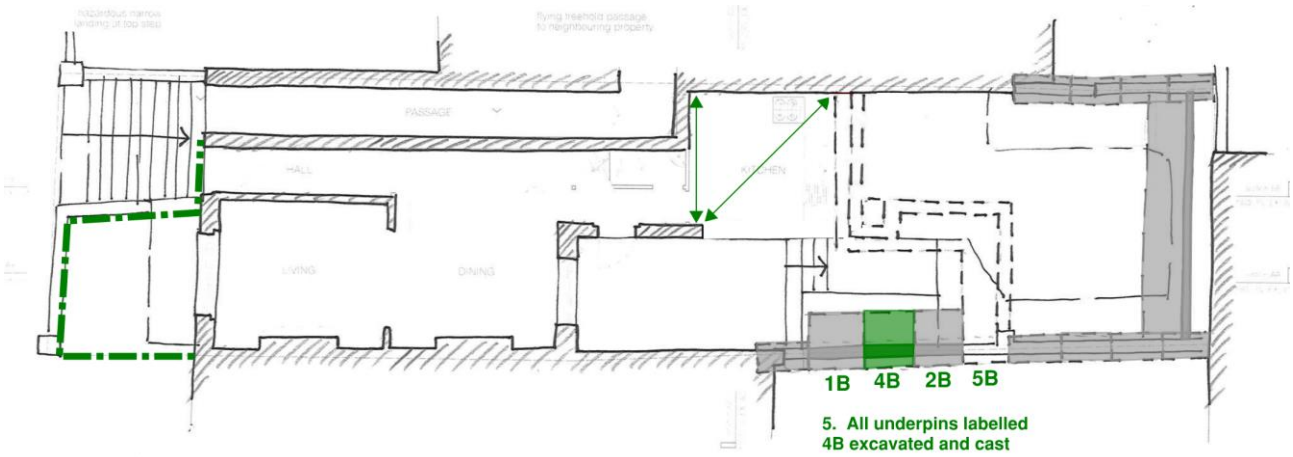


Plan

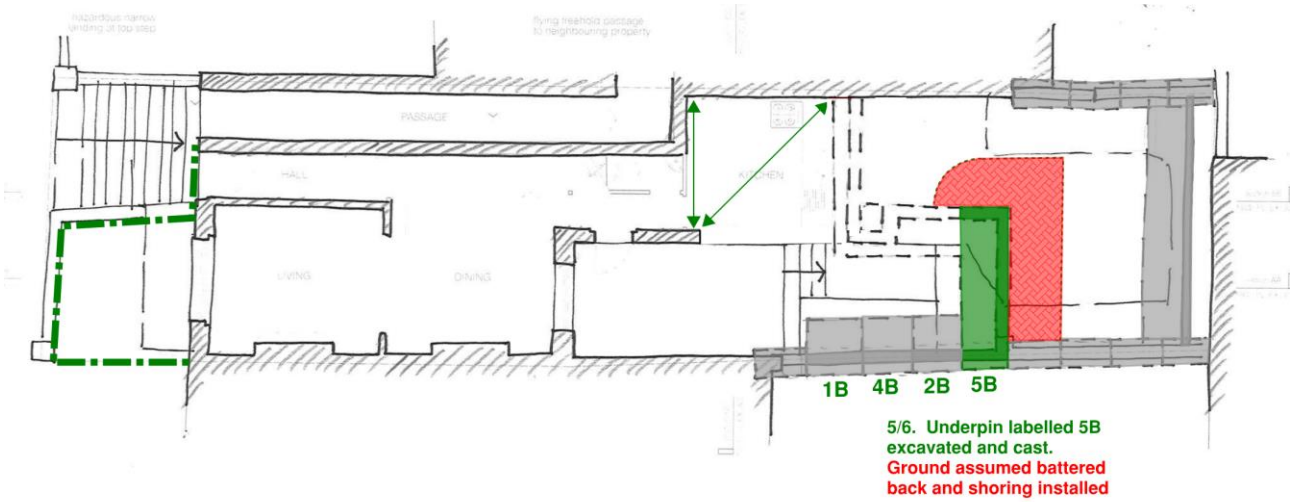


Short Section

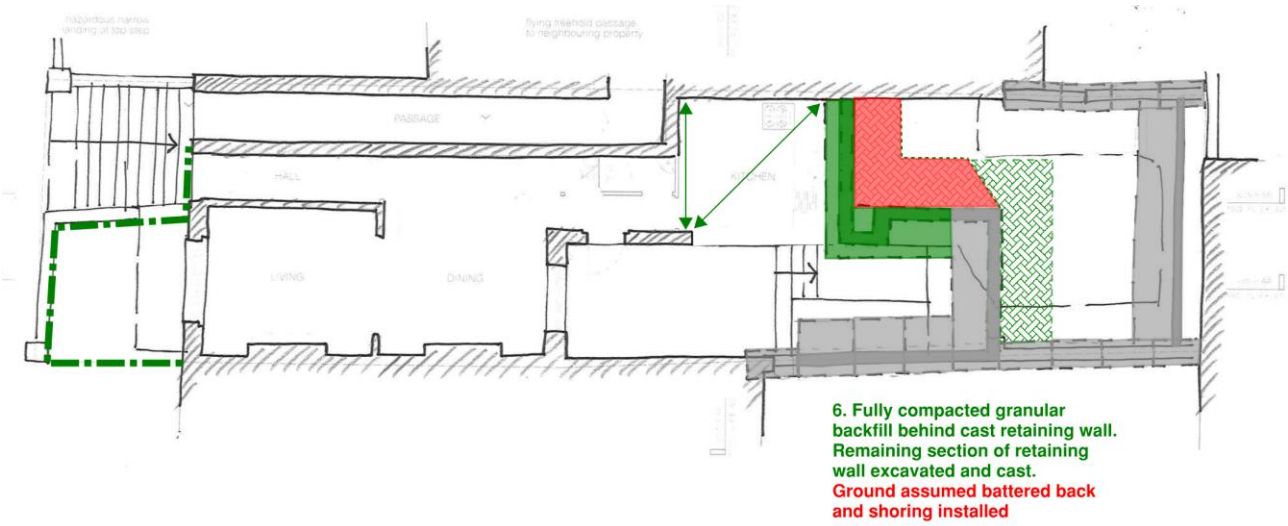
Stage 5(iii)



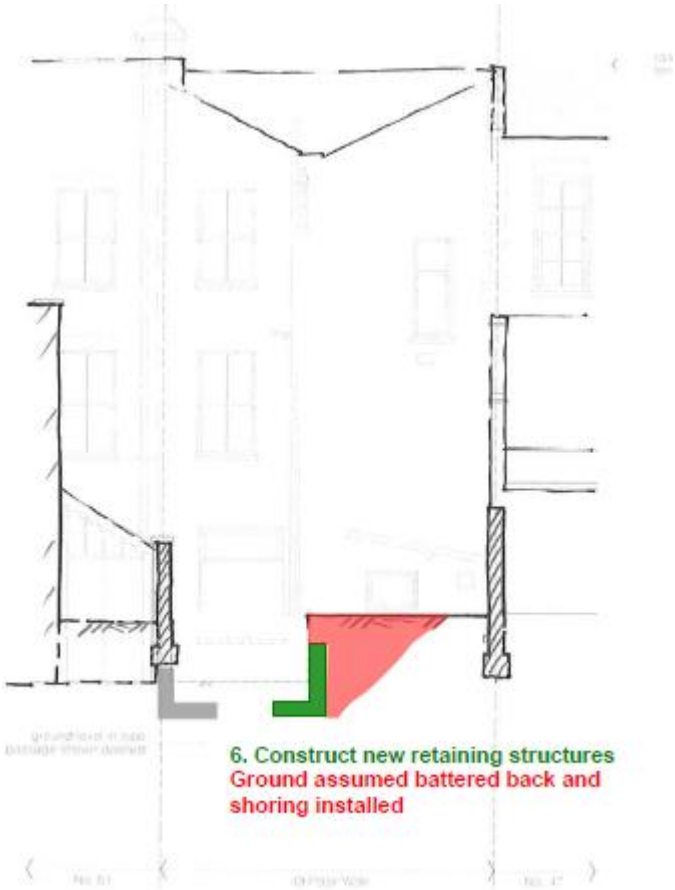
Stage 5(iv) & 6



Stage 6

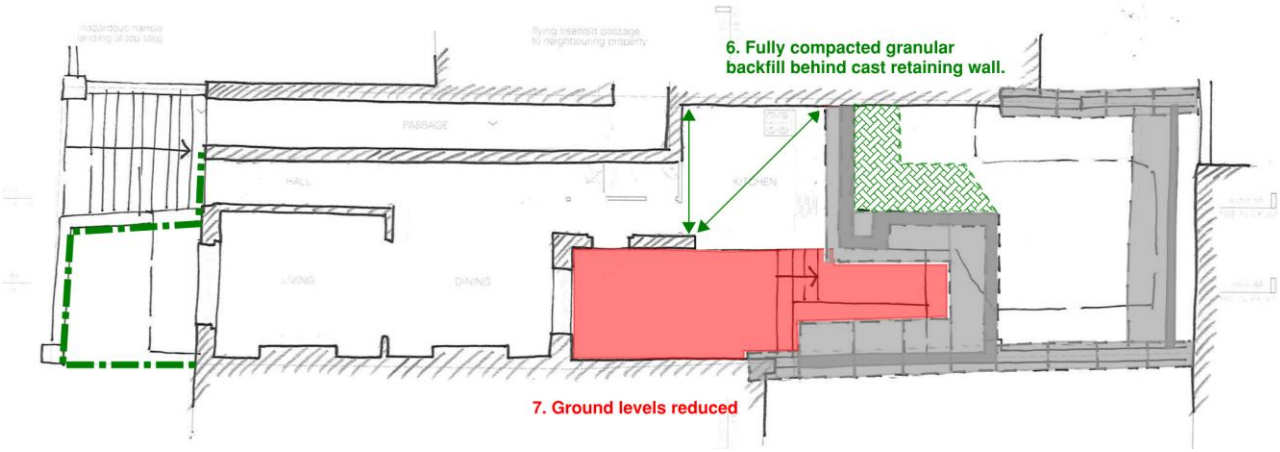


Plan

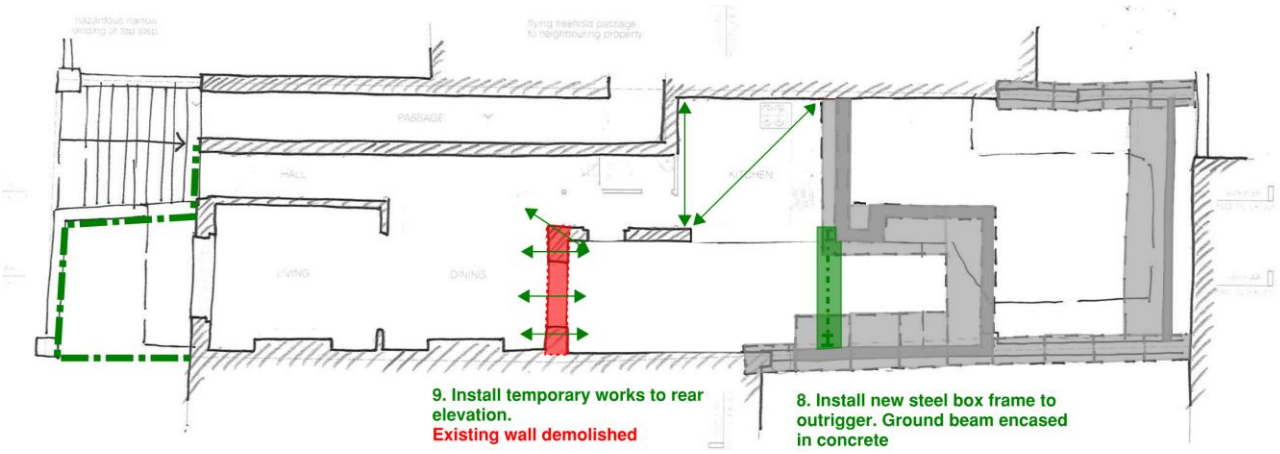


Short Section

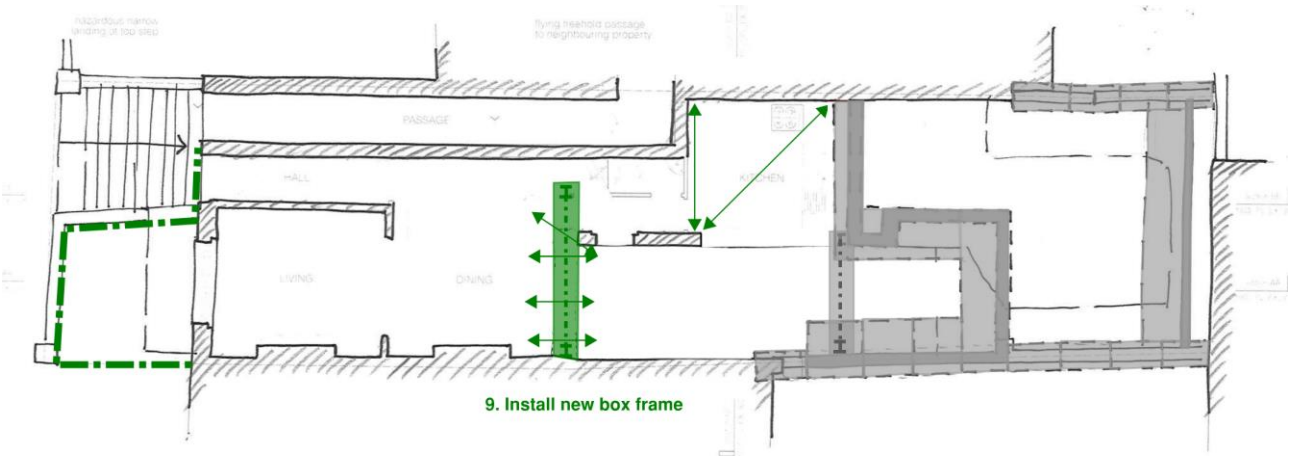
Stage 6 & 7



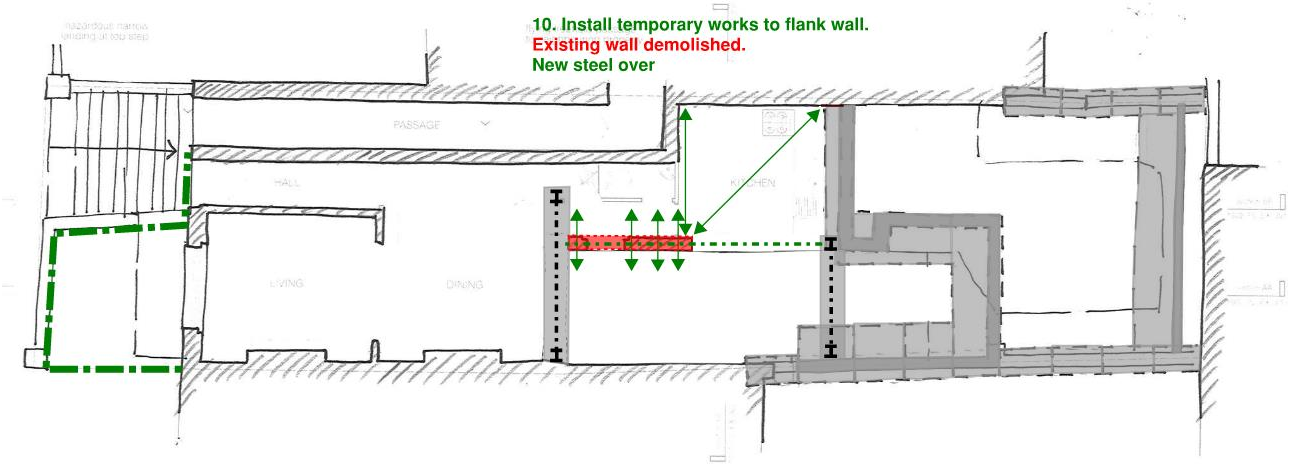
Stage 8 & 9



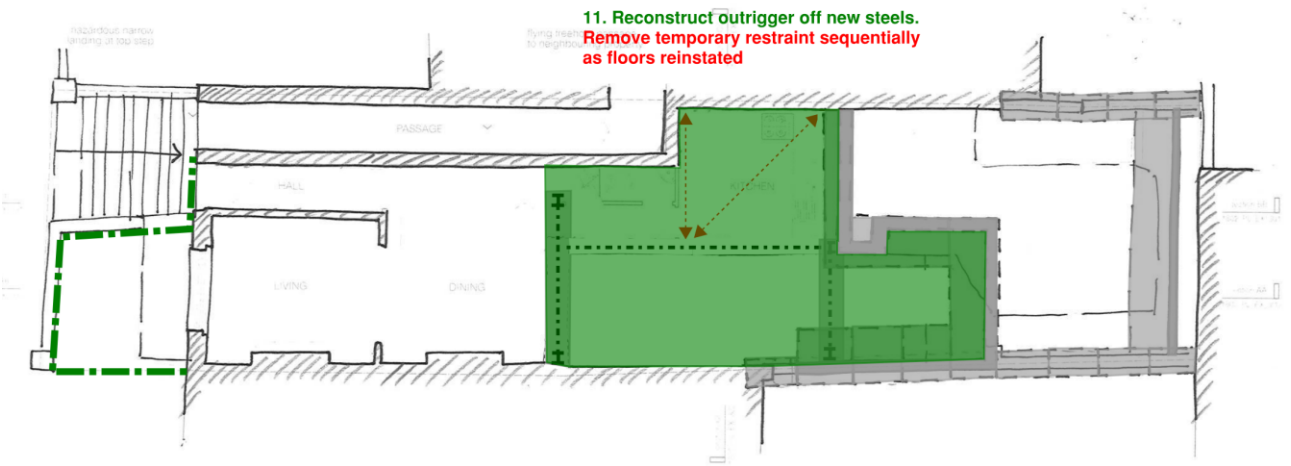
Stage 9



Stage 10



Stage 11



Stage 12 – Groundworks complete