installed on adjacent structures and the highway. This should be agreed under the Party Wall Act and as part of any asset protection agreements required.

Appendix 1 Site Location and Exploratory Hole Plan

Figure 1 Site Location

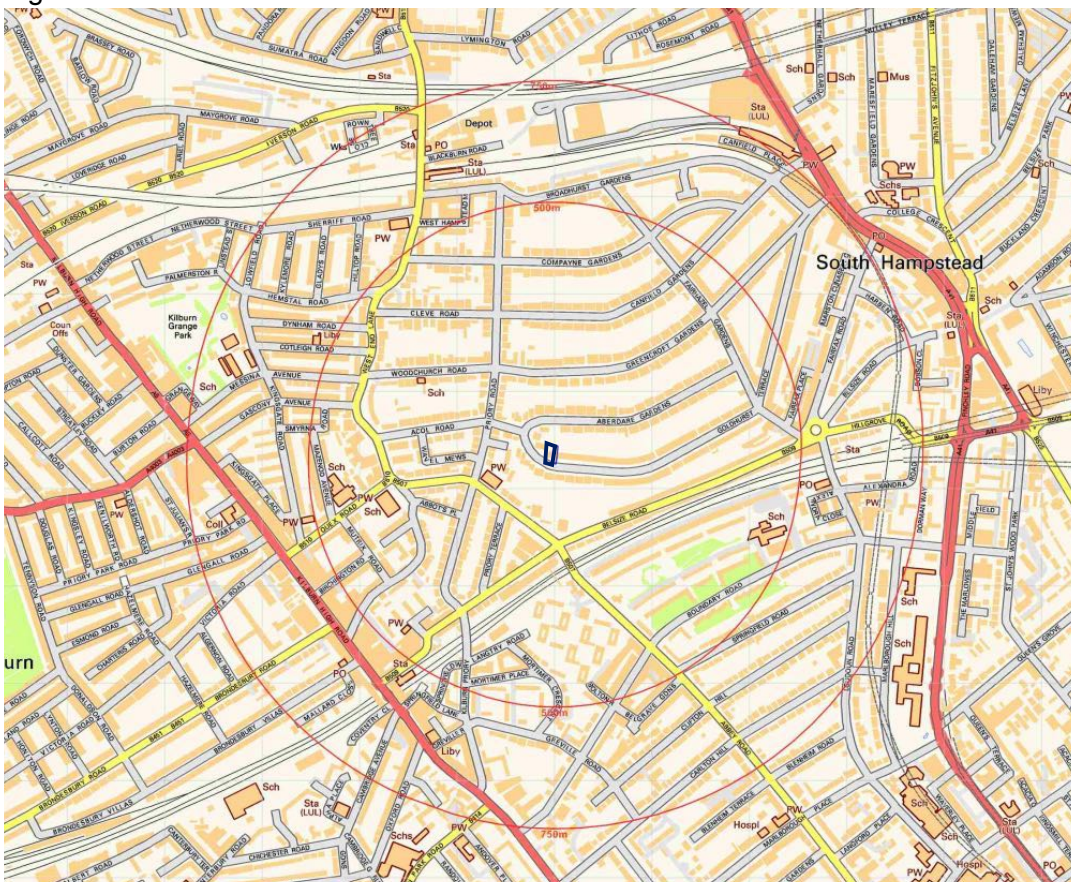
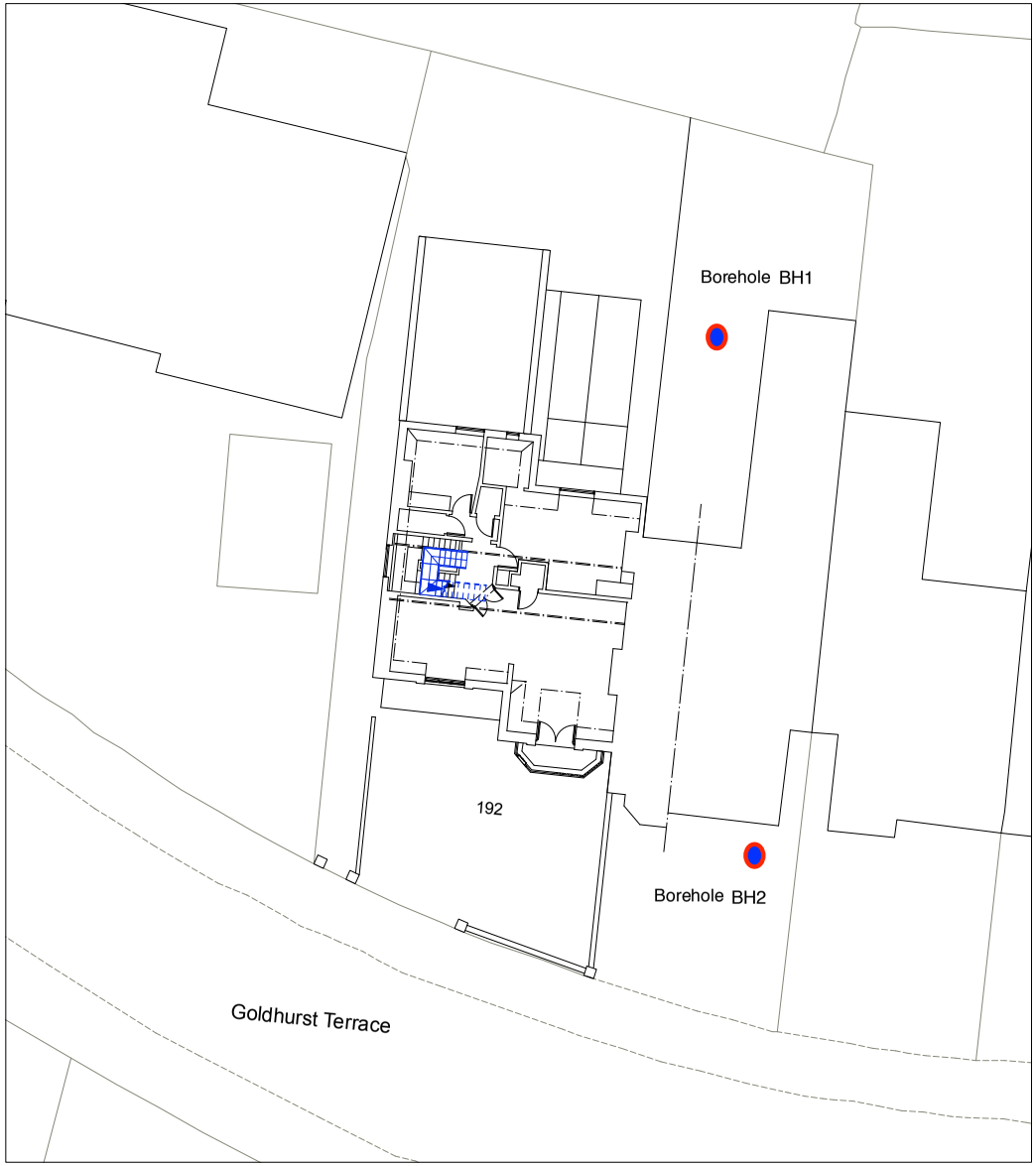


Figure 2: Exploratory Hole Plan (over page)



1 Block Plan
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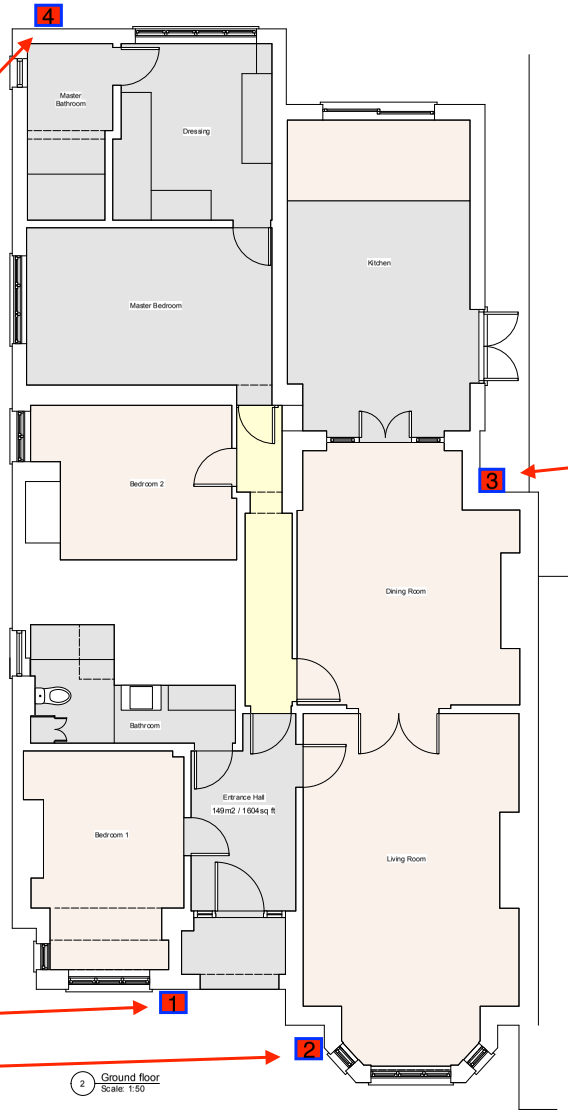
D'SOTO ARCHITECTS 75 CANFIELD GARDENS LONDON NW6 3EA **T:** + 44 020 7278 5100 **EMAIL:** info@dsoto.com

Job Title:	Flat 2, 192 Goldhurst Terrace NW6	**Date:**	Feb 2022	**Scale:**	1/200@A3
Drawing Title:	Block Plan	**Drwg No:**	DS169-02P	**Revision:**	A



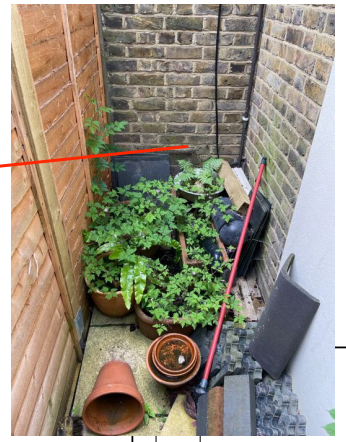
2 Ground floor
Scale: 1:50

Suspended timber floor

Solid floor

To be assessed

TP Locations



No.	Date	Revision Notes

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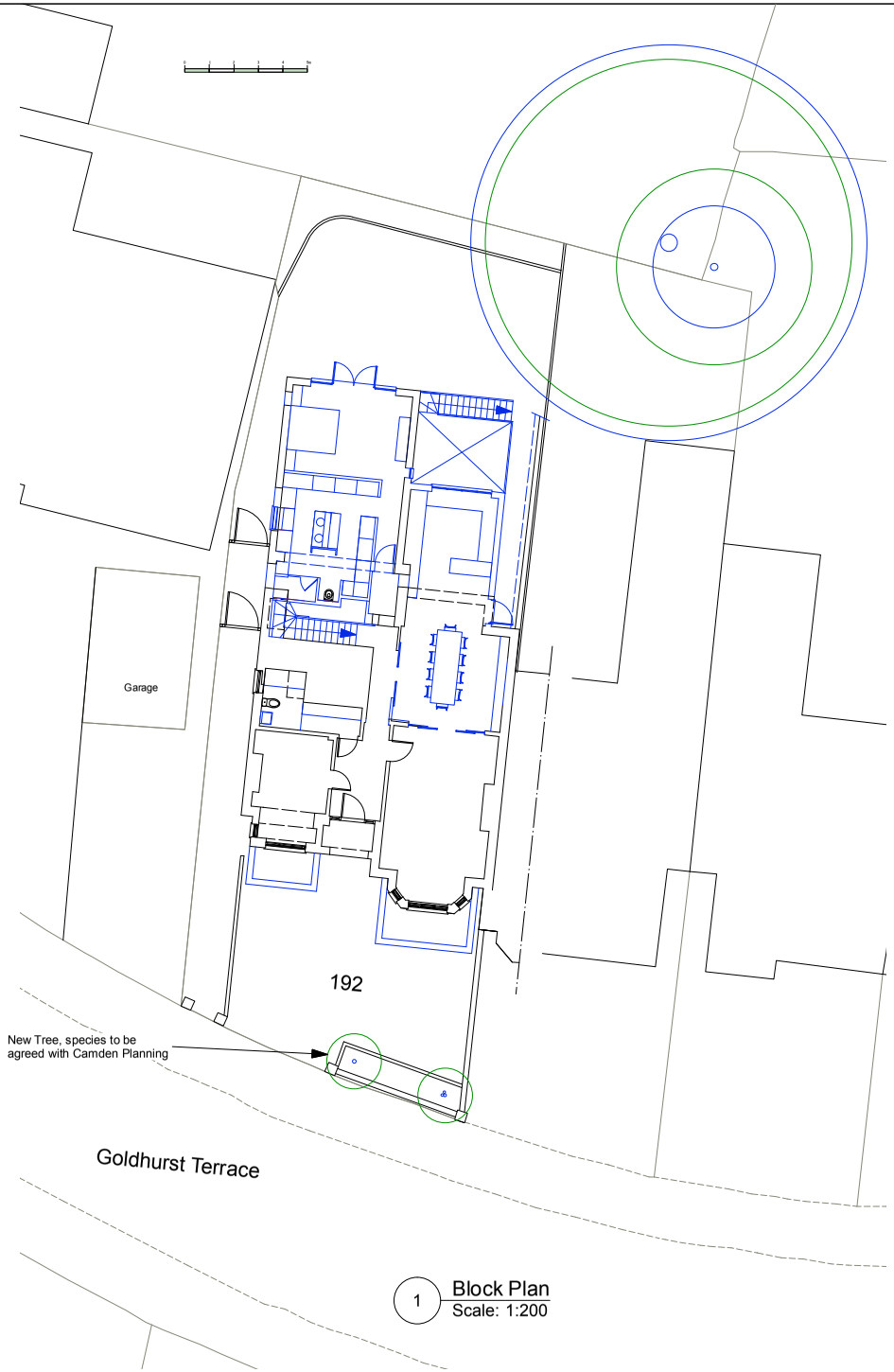
Project Title: Flat 1, 192 Goldhurst Terrace
London NW6

Drawing Title: Ground Floor
as
Existing

Date	May 2022	Drawing No.	DS172-A100SK
Scale	1:50	Revision	

Appendix 2 Proposed Development Drawings

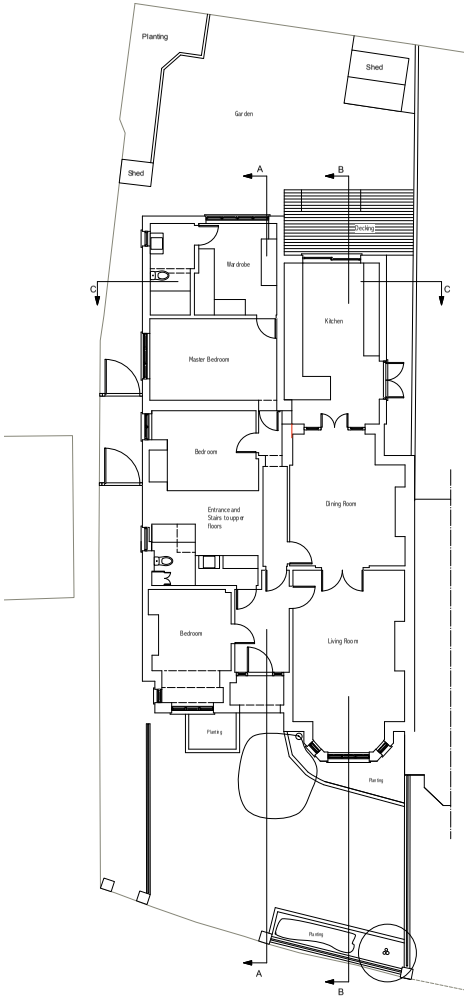


1 Block Plan
Scale: 1:200

N

D'SOTO ARCHITECTS 75 CANFIELD GARDENS LONDON NW6 3EA **T:** + 44 020 7278 5100 **EMAIL:** info@dsoto.com

Job Title: Ground Floor Flat, 192 Goldhurst Terrace NW6		**Date:** July 2022	**Scale:** 1/200@A3
Drawing Title: Block Plan	**Drwg No:** DS172-A101P		**Revision:**

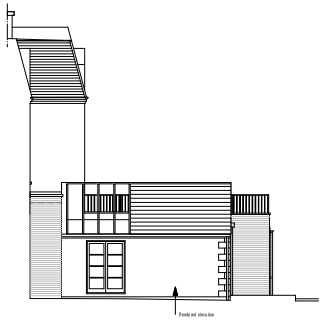


1 Ground Floor
Scale: 1:100

2 Front Elevation
Scale: 1:100

3 Side Elevation
Scale: 1:100

4 Rear Elevation
Scale: 1:100



5 Side Elevation/Rear
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No.	Date	Revision Notes

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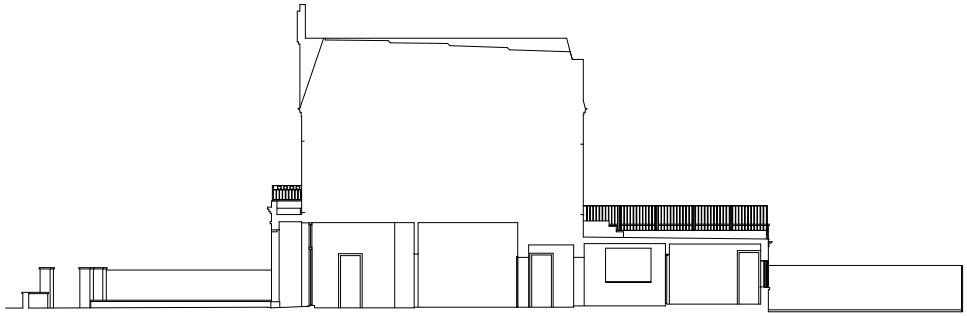
Project Title: Flat 1, 192 Goldhurst Terrace
London NW6

Drawing Title: Ground Floor and Elevations
as
Existing

Date	July 2022	Drawing No.	DS172-A103P
Scale	1:100	Revision:	



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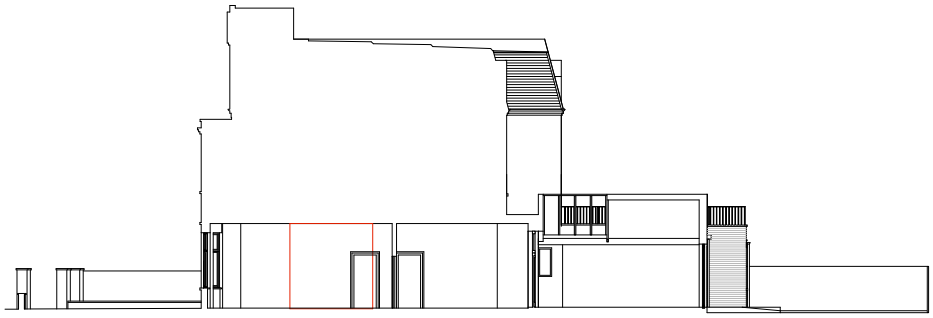

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Scale: 1:100

3 Section C-C
Scale: 1:100

No.	Date	Revision Notes

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Project Title: Flat 1, 192 Goldhurst Terrace
London NW6

Drawing Title: Sections
as
Existing

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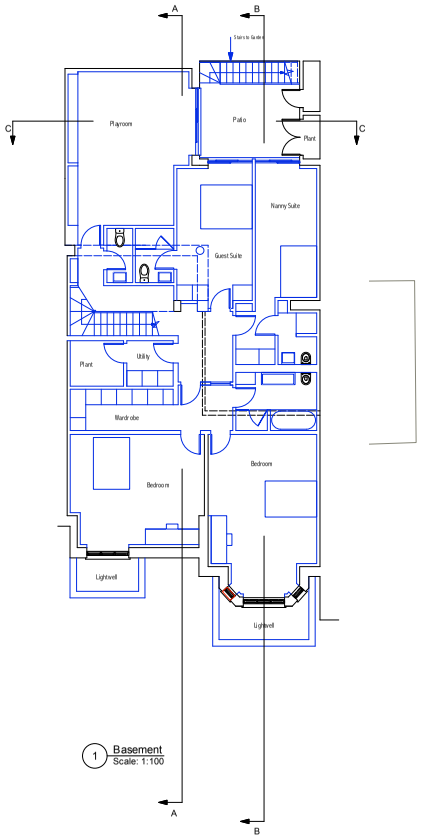
Scale	1:100	Revision:	



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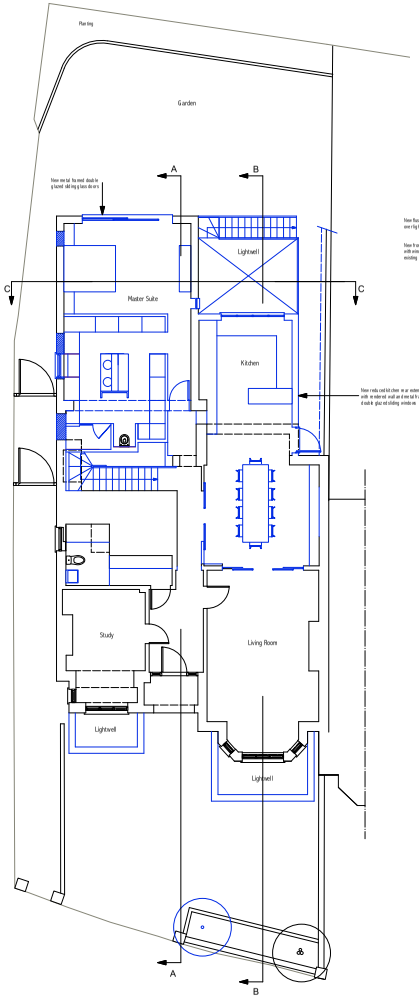


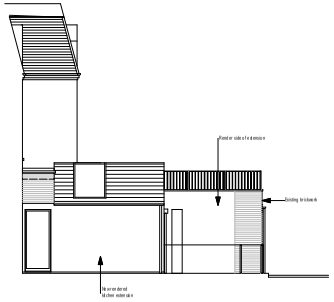
2 Ground Floor
Scale: 1:100

3 Front Elevation Lightwells
Scale: 1:100

4 Front Elevation
Scale: 1:100

5 Side Elevation
Scale: 1:100

6 Rear Elevation
Scale: 1:100



7 Side Elevation - Rear
Scale: 1:100

No.	Date	Revision Notes

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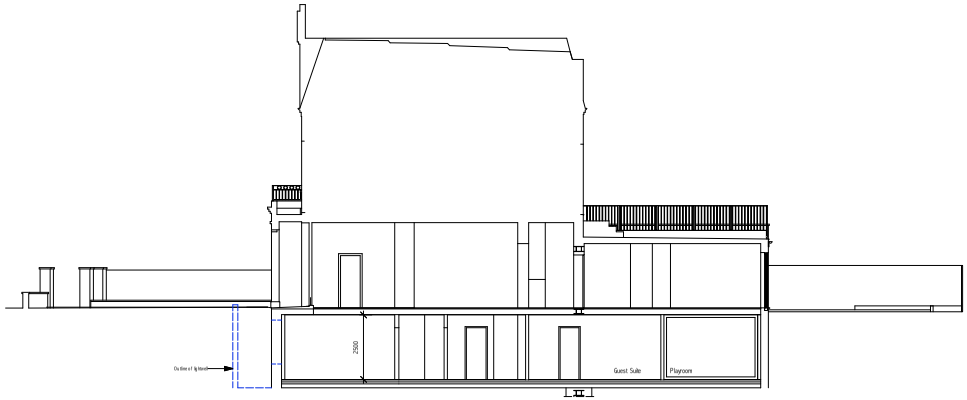
Project Title: Flat 1, 192 Goldhurst Terrace
London NW6

Drawing Title: Ground Floor, Basement Elevations as Proposed

Date	July 2022	Drawing No.	DS172-105P
Scale	1:100	Revision:	



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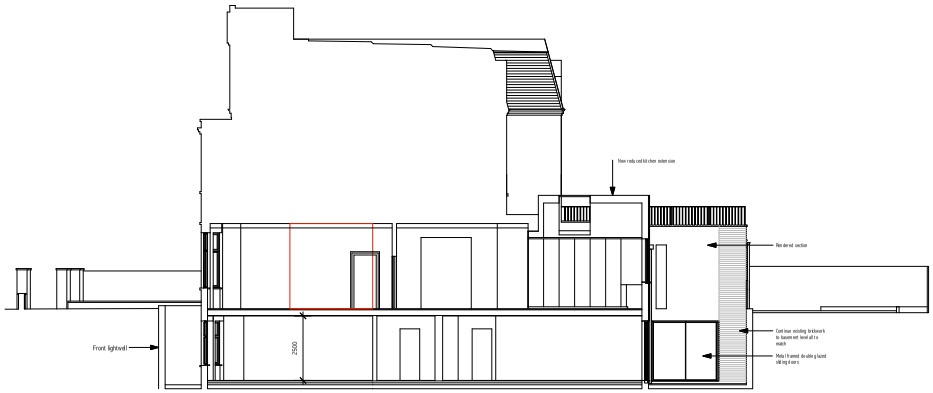

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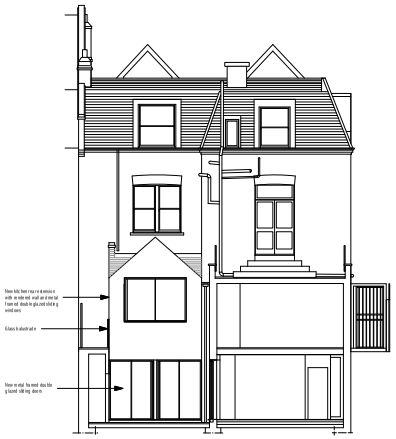

3 Section C-C
Scale: 1:100

No.	Date	Revision Notes

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Project Title: Flat 1, 192 Goldhurst Terrace
London NW6

Drawing Title: Sections
as
Proposed

Date	July 2022	Drawing No.	DS172-A106P
Scale	1:100	Revision:	

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CONSTRUCTION METHOD STATEMENT

22107_CMS

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Document Control

Project:	192 Goldhurst Terrace
Site Address:	192 Goldhurst Terrace, London NW6 3HN
Document Title:	Construction Method Statement
Project No.	22107
Document produced for (Client):	DVP Structures/Piledesigns Ltd (internal use only)

Issue Register

Rev	Date	Issue Status / Description	Prepared By	Checked By
P0	15/07/2022	First Issue – For Planning	Val Pseneac MIStructE	Mike Johnson MIStructE CSSW

Contents

1.0 Introduction

This report has been produced by DVP Structures in conjunction with Milvum Engineering Services Ltd and Piledesigns Ltd to summarise the structural and geotechnical aspects relating to the proposed basement redevelopment works at 192 Goldhurst Terrace, London NW6 3HN (hereafter referred to as the site); and to provide an overview of the new basement construction methodology and sequence.

It is noted that this is document is only intended to be used for planning purposes. It should not be used for costing, procurement or construction purposes.

2.0 Existing Building Description

The existing property is a 3-storey end-of-terrace which benefits from a loft conversion and single storey extensions to the rear.

The site is bound by Goldhurst Terrace to the south; and neighbouring gardens and properties to the north, south and west.

It is noted that no. 192 and no. 190 Goldhurst Terrace share a party wall. It is understood that the owners of 190 also have the intention of constructing a single storey basement.

No. 192 has been constructed using traditional materials and techniques. The external walls are largely of loadbearing solid masonry of varying thickness (215-330mm) depending on location. Cavity wall construction has been used with the rear single storey extensions.

The ground floor structure primarily comprises suspended timber joists; there are limited areas which appear to comprise either a ground-bearing or suspended solid floor.

The upper floors construction comprise suspended timber joists with boarding on top.

The mansard roof is anticipated to comprise a combination of timber and steel construction, which transfer the loads down to internal and perimeter loadbearing masonry walls.

A site specific ground investigation has been undertaken. As part of the investigation, trial pits were dug at several locations to expose the existing foundations and establish the ground conditions. Boreholes previously sunk in the neighbouring site (i.e. 190 Goldhurst Terrace) have also been reviewed as part of the geotechnical assessment. Refer to Sections 6.0 and 7.0 of the main body of the BIA report for geotechnical information.

The trial pits confirmed that the existing wall foundations comprised either concrete strip footings or corbelled brick footings on concrete strip footings. The founding level varied between 950mm to 1,100mm bgl on-site.

3.0 Proposed Works

The redevelopment works include the construction of a single storey basement with lightwells to the front and rear elevation (Refer to the architect's dwgs; and Appendix 2 for structural dwgs)

Some internal remodelling is also proposed at ground level. The basement is proposed to be accessed via a set of stairs located to the west and set of steps to the rear, leading to the garden.

The level (SSL) of the new basement slab is proposed to be c. 3.0m below the existing ground level, whilst the basement formation level is anticipated to be no deeper than 3.5m bgl.

The basement walls are to be formed using reinforced concrete (RC) underpinning constructed in a non-consecutive sequence (i.e. traditional "hit and miss" sequence).

The basement slab is to be formed using RC construction. In addition to resisting vertical permanent and variable actions, the slab will act as a permanent prop to the basement walls.

The RC basement walls will be designed to resist the lateral forces arising from surcharge loadings, hydrostatic pressure and soil pressure. It is noted that the RC underpins will be dowelled in the existing perimeter wall foundations such that a robust shear connection is obtained.

The ground floor structure is to be modified such it comprises a grillage of steel beams with infill engineered timber joists. Steel beams will be provided to support any internal load-bearing masonry walls. The steel beams will be supported by the perimeter basement walls and several internal steel columns.

The ground floor structure is to be designed as a stiff diaphragm such that it can provide an effective propping force to the top of the basement walls. Therefore, the basement walls will be designed as propped at ground and basement levels.

The internal walls at basement level are generally anticipated to be of lightweight construction. However, masonry walls built off the basement slab may be required by the Architect at specific locations (e.g. around the stairwell).

Extensive temporary works, in addition to those required for the basement excavation, will be required to enable the construction of the ground floor. Appendix 1 presents indicatively an option for temporary works; which could enable the installation of steel beam to the underside of existing internal masonry walls at ground level. It is noted that these will be agreed on and designed in conjunction with the appointed contractor at a later date.

The lateral movement due to excavation and other basement construction works, will be minimised by adopting high stiffness temporary propping (refer to Appendix 1 for the proposed construction sequence).

A Ground Movement Assessment (GMA- see Section 9.0 of the BIA Report) has been undertaken to estimate likely movements during basement construction. The results indicate that horizontal and vertical movements in the region of 5 to 7 mm are anticipated during construction.

A movement monitoring regime will be implemented in order to monitor displacement during construction and limit any neighbouring building damage to Category 1 on the Burland Scale.

It is anticipated that partial backfilling will be undertaken as the RC underpinning works are completed in a non-consecutive sequence. Once the RC underpins are fully constructed, basement excavation can be undertaken, with the temporary propping in place.

Two levels of temporary propping (steel props and waling beams) are proposed to be installed during construction. The first level of propping will be set out below the level of the ground floor slab; the second level of propping will be installed above the basement RC slab level (c. 500-750mm above SSL).

The lightwells are to comprise RC retaining walls constructed in a “hit and miss” sequence, similar to the main basement wall construction. In the temporary condition, propping is to be adopted throughout; whilst in the permanent condition the wall will span horizontally between the returns and cantilever off the stem base.

Reference can be made to Appendix 1 for a diagrammatic construction sequence of a typical RC underpin and temporary works typically employed with such construction; as well as possible temporary works associated with steel beam installation to support existing internal loadbearing walls at ground level.

Reference can be made to Appendix 2 for drawings outlining the indicative basement layout and sequence of underpinning; and basement construction sequence.

4.0 Design Considerations

This chapter outlines the loading requirements which will need to be accounted for as part of the structural design of the basement.

The design and relevant loadings are generally established in line with the relevant Eurocode design standard, including:

- BS EN 1990 Basis of Design
- BS EN 1991 Actions on Structures
- BS EN 1992 Design of Concrete Structures
- BS EN 1993 Design of Steel Structures
- BS EN 1997 Geotechnical Design

The retaining wall and slabs will have to be designed giving consideration to the following forces (variable and permanent actions):

- Soil Pressure
- Surcharge Loading
- Hydrostatic Pressure
- Heave Forces
- Dead, superimposed and imposed loads on ground and basement slabs
- Dead, superimposed and imposed loads acting on the main house (applies to the underpins)

The basement slab will require design verification taking into account likely heave and hydrostatic pressures. Approximate calculations have been undertaken to determine likely forces acting on the basement slab below.

For the purposes of concept design, the level of the ground water table has been taken as 1.0m below ground level, resulting in an approximate hydrostatic pressure of 25kN/m2 (c. 2.5m hydrostatic head).

London Clay formation has been assumed for the purposes of heave pressure estimate. The excavation of the basement could potentially result in a total maximum soil pressure of 61kN/m2 (3.2m of soil @ 19kN/m3; assumed 300mm void below the existing suspended ground floor). It can be assumed that 50% of the soil pressure dissipates upon excavation, thus resulting in a potential long term soil pressure of 30.5kN/m2.

Assuming that heave protection measures are not considered, the pressure on the basement slab may be expressed as an equation whereby:

Slab pressure = water pressure + soil heave pressure – any pressure dissipated during slab deflection

Given that the soil pressure exceeds the water pressure, the pressure dissipated equates to the water pressure plus a proportion of the excess heave pressure; the latter is dependent on the slab deflection.

It is noted that the slab deflection is a function of stiffness, with more flexible slabs allowing for more pressure dissipation compared to stiffer slabs.

Allowing for a relatively stiff slab, an “f” factor accounting for dissipation due deflection of 0.3 can be taken.

Assuming a soil pressure of 30.5kN/m2, a hydrostatic pressure of 25kN/m2 and a coefficient of slab stiffness of 0.3, the characteristic total pressure acting upwards on the basement slab will be approximately:

Slab Pressure = 30.5+25-(25+0.3*5.5)=28.9kN/m2

The retaining wall design will need to give consideration to both lateral and vertical forces. The lateral forces arise from surcharge loads, soil and hydrostatic pressure; the vertical loads arise from the shear forces transferred by the ground floor slab and the vertical forces coming down the perimeter main house walls.

For the calculation of the soil pressure acting on the earth face, active pressure coefficients are appropriate for use.

With regards to the surcharge loadings, it is likely that a value of 2.5kPa - 5kPa will be used for retaining wall verification; considering the distance to the nearest structures and highway. Active pressure coefficients will be used to derive the lateral pressure acting on the wall from the vertical stresses acting at ground level.

Whilst a large proportion of the basement slab will contribute to the load transfer into the ground, it is anticipated that the RC underpin stem base will distribute most of the loads transferred from above. The ground bearing stresses will be limited to 100kPa, as advised by the geotechnical assessment report.

5.0 Water-Resisting Protection

The proposed basement will offer habitable space for the building occupants and is thus is considered to be grade 3 in accordance with BS 8102: Code of Practice for Protection of Structures Against Water from the Ground.

It is assumed that a dry environment with no leakage permitted (Tightness Class 3 in accordance with BS EN 1992-3) will be required for the project; and suitable waterproofing measures will need to be employed to achieve high levels of protection.

Three methods of protection against water ingress are typically considered for basement design (see Table 1 below and Figs. 1 to 3):

Table 1: Basement Waterproofing – Methods of Protection as per BS 8102

Type	Method of Protection	Operation
A	Barrier	A membrane is used to keep water physically outside the usable space
B	Structurally Integral	The basement walls and slabs are designed to specific crack width and/or special additives are used to obtain waterproof concrete
C	Drained Cavity	An inner cavity membrane lines the basement wall and slab; any water penetrating the wall and slab is directed behind the cavity membrane into a drainage channel and a sump chamber where water is removed by a pump.

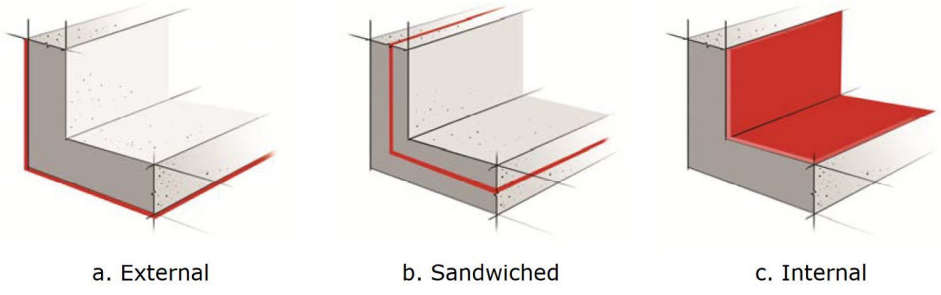


Fig. 1 – Barrier Protection Waterproofing Options

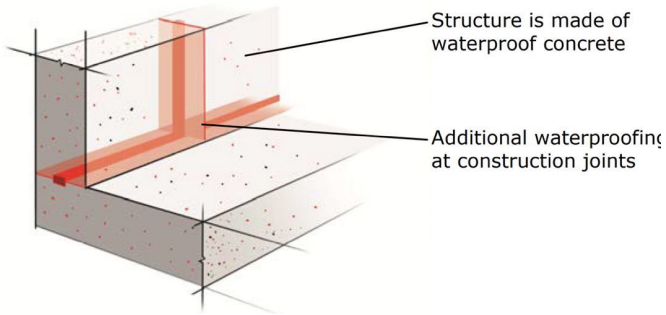


Fig. 2 – Structurally Integral Waterproofing

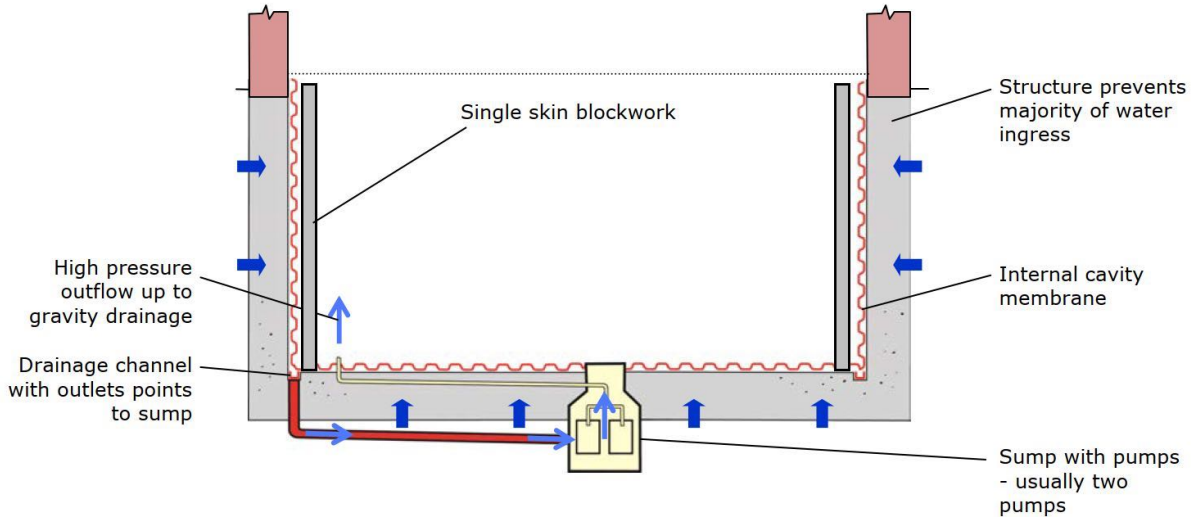


Fig. 3 – Drained Cavity

Types A and B measures are often combined to achieve high levels of waterproofing resistance; Type C is also common with habitable basements.

The final waterproofing strategy will be decided collectively by the design team, client and a specialist waterproofing contractor. At this stage, it is assumed that a combination of structurally integral protection (RC wall/slab designed to 0.2-0.3mm crack width and/or adoption of water resistant concrete) and a drained cavity system will be implemented for this basement.

6.0 Movement Monitoring and Control

A competent contractor experienced with this type of works will be appointed to undertake the works. Early input from the contractor will be required in order to establish the optimal sequence of construction and co-ordination of temporary works.

Two levels of stiff temporary propping will be employed during the construction of the basement. The propping system is anticipated to comprise a waling beam (steel UB or UC sections) running horizontally along the basement walls. Props, consisting of proprietary sections or UC/UB steel elements, are to be installed such that these run the full width of the basement; and act in compression to resist the horizontal actions on the wall.

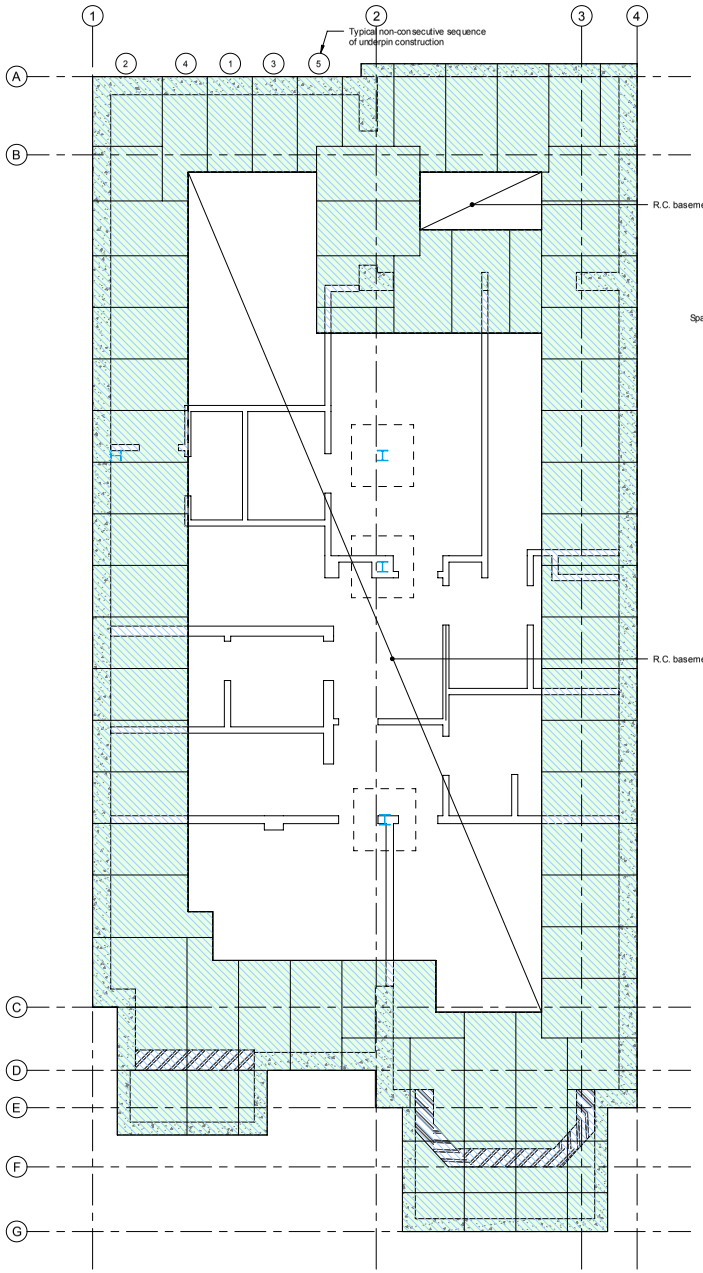
A movement monitoring regime with a traffic light system (“green” – no action; “amber” – increase frequency of readings and notify relevant parties; and “red” – implement agreed measures and/or stop work) will be employed during construction. The aim of the monitoring will be to establish the amount of vertical and horizontal structural movement such that any structural damage recorded can be no worse than Category 1.

Movement trigger levels are to be agreed with the Party Wall Surveyors and implemented accordingly.

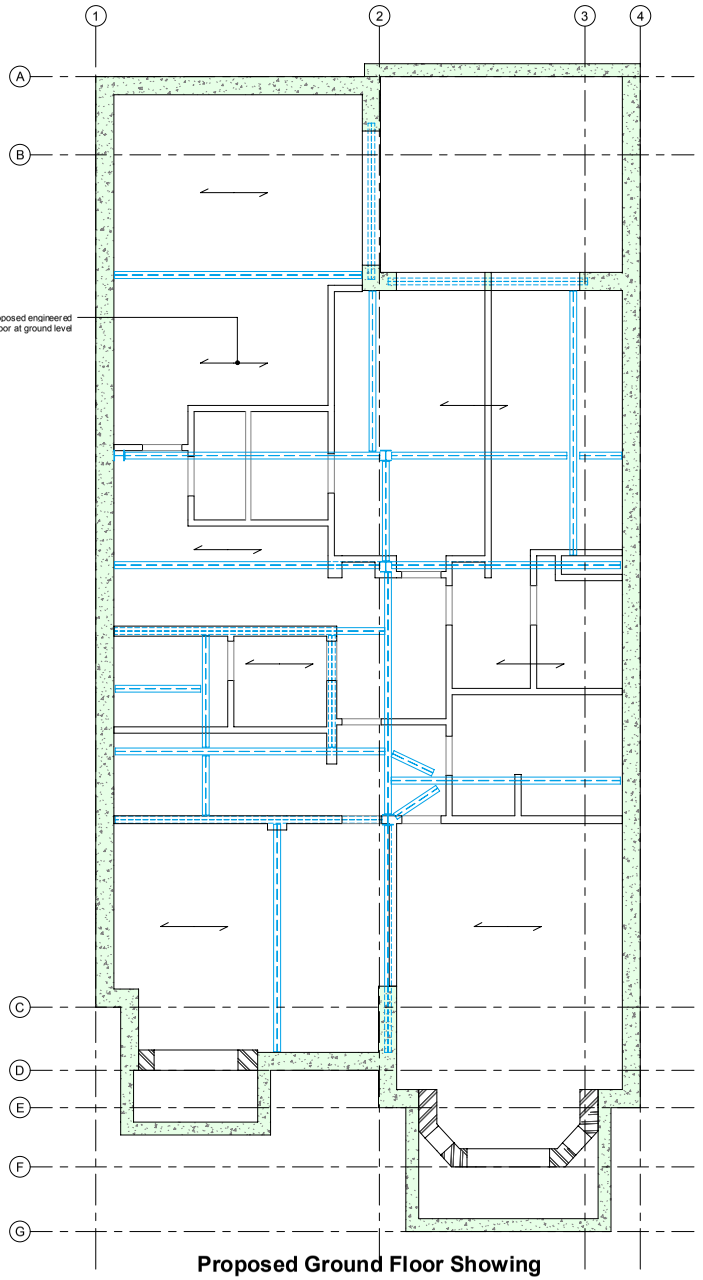
Assuming high standards of workmanship, close co-ordination between the temporary and permanent works engineer and the correct implementation of movement monitoring, minimal ground and structural movement is anticipated during construction

7.0 Appendix 1

Diagram of a typical RC Underpin Construction; Indicative Temporary Works



Proposed Basement Plan
1 : 50



Proposed Ground Floor Showing Basement Under
1 : 50

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6. REFER TO GENERAL NOTES DRAWINGS FOR MATERIAL SPECIFICATIONS AND NOTES

Construction (Design & Management) Regulations 2015

Residual Hazards:

We have assumed that competent contractors will be entrusted with the structural works, and that these contractors will be aware of all common construction hazards and how to deal with such hazards safely. Our residual hazard list(s) below contain only those hazards which are not likely to be obvious to a competent contractor or follow-on designer

(Residual Risks to be added)

Key	
	Existing Structure
	Structure to be demolished
	Steelwork
	Reinforced Concrete
	Denotes R.C. underpin forming the basement wall

Note:
This drawing has been prepared for planning purposes only

Rev	Date	Description	Issuer
P1	15.07.22	Preliminary	V.P.

not for construction

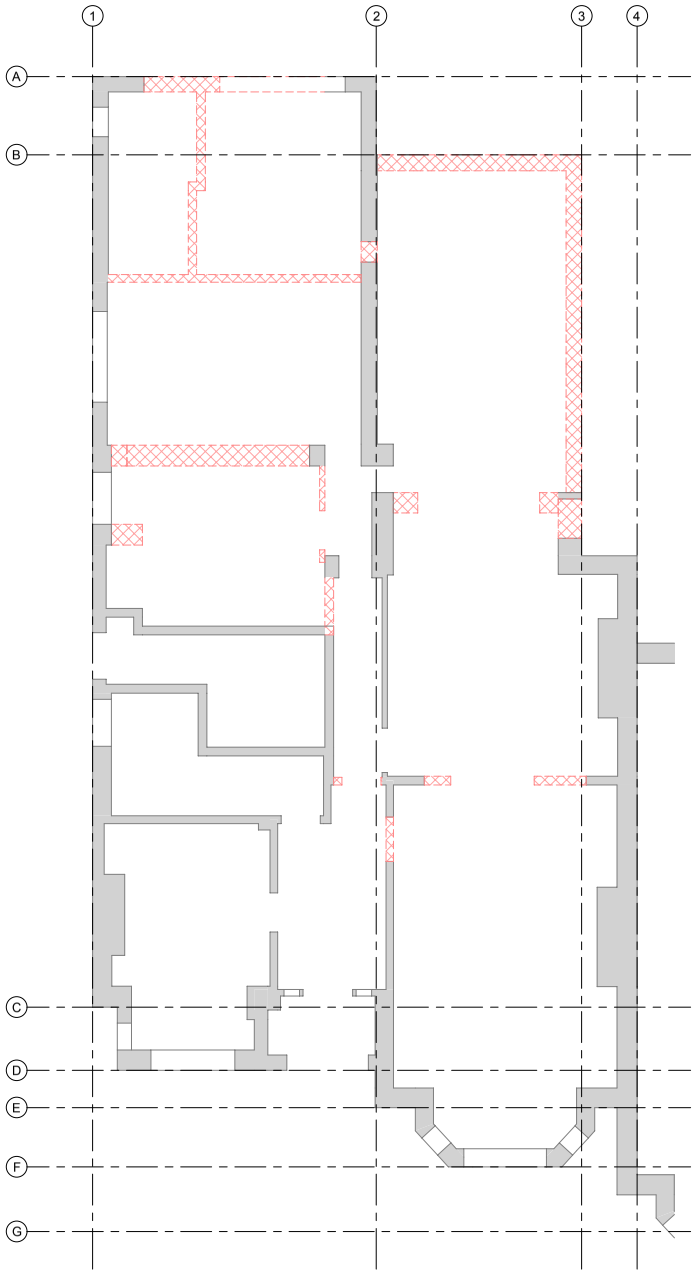
PILEDESIGNS GEOTECHNICAL EXPERTISE

dvp structures

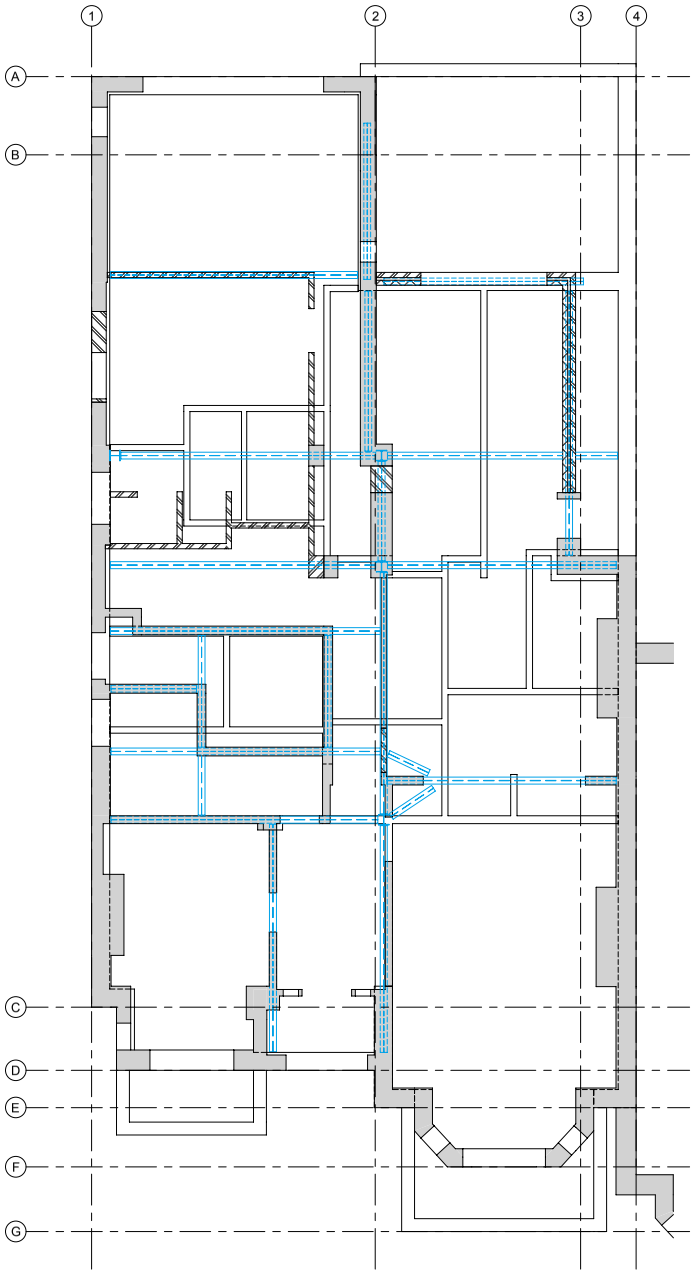
Client	Owner
Project	FLat 1, 192 Goldhurst Terrace, London NW6 3HN
Title	Proposed Basement Plan

Drawn by	Checked by	Scale	Sheet Size
M.A.	V.P.	As indicated	A1
Proj. No.	**Doc. Type**	**Drg. No.**	**Rev**
22107	D	001	P1

 Check all dimensions and verify on site. Report any discrepancies or omissions



Existing Ground Floor Plan
1 : 50



Proposed Ground Floor Plan
1 : 50

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P : PRELIMINARY - EVOLVING DRAWINGS FOR APPROVALS , TENDERS, BILLINGS, ETC.

C : CONSTRUCTION - FULLY DEVELOPED DRAWINGS ISSUED UNDER INSTRUCTION FOR CONSTRUCTION

6. REFER TO GENERAL NOTES DRAWINGS FOR MATERIAL SPECIFICATIONS AND NOTES

Construction (Design & Management) Regulations 2015

Residual Hazards:

We have assumed that competent contractors will be entrusted with the structural works, and that these contractors will be aware of all common construction hazards and how to deal with such hazards safely. Our residual hazard list(s) below contain only those hazards which are not likely to be obvious to a competent contractor or follow-on designer

(Residual Risks to be added)

Key	
	Existing Structure
	Structure to be demolished
	Steelwork
	Reinforced Concrete
	Denotes R.C. underpin forming the basement wall

Note:
This drawing has been prepared for planning purposes only

Rev	Date	Description	Issuer
P1	15.07.22	Preliminary	V.P.

not for construction

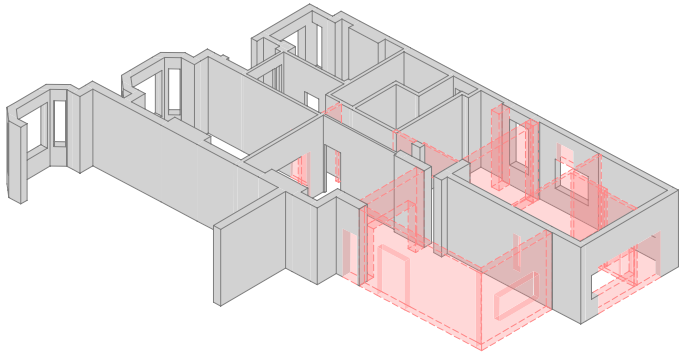
PILEDESIGNS
GEOTECHNICAL EXPERTISE

dvp structures

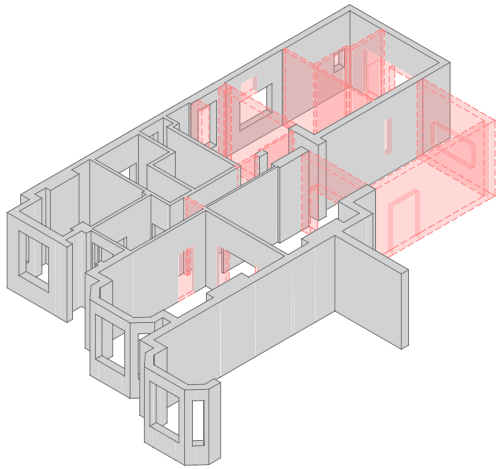
Client	Owner
Project	FLat 1, 192 Goldhurst Terrace, London NW6 3HN
Title	Existing/Proposed Ground Floor Plan

Drawn by	Checked by	Scale	Sheet Size
M.A.	V.P.	As indicated	A1
Proj. No.	**Doc. Type**	**Drg. No.**	**Rev**
22107	D	002	P1

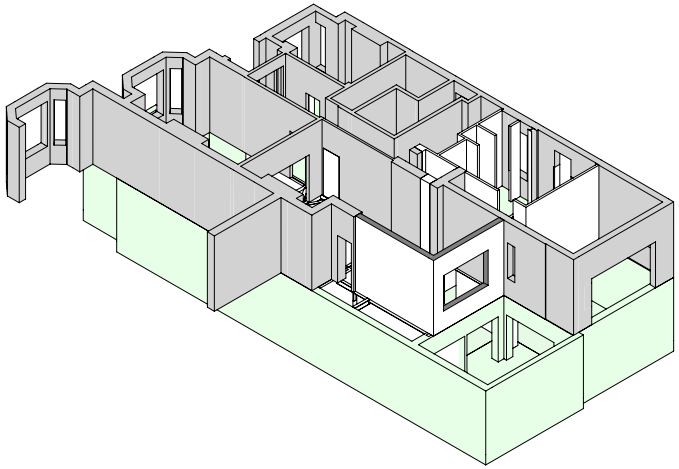
Check all dimensions and verify on site. Report any discrepancies or omissions



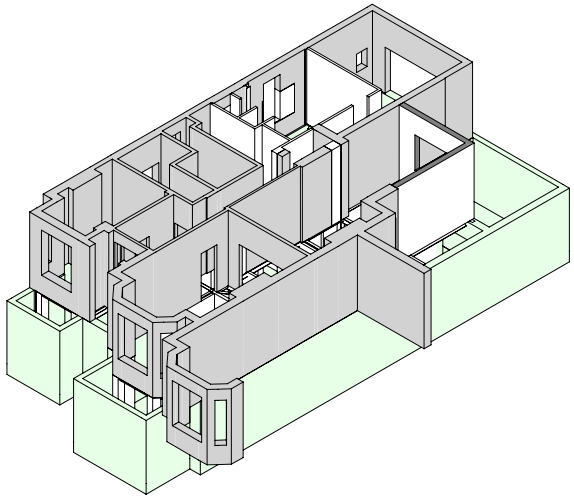
3D View 1



3D View 2



3D View 3



3D View 4

NOTES

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Rev	Date	Description	Issuer
P1	15.07.22	Preliminary	V.P.

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GEOTECHNICAL EXPERTISE

dvp structures

Client: Owner			
Project: FLat 1, 192 Goldhurst Terrace, London NW6 3HN			
Title: 3D Views Sheet 1			
Drawn by: M.A.	Checked by: V.P.	Scale: 1 : 1	Sheet Size: A1
Proj. No.: 22107	Doc. Type: D	Drg. No.: 020	Rev: P1

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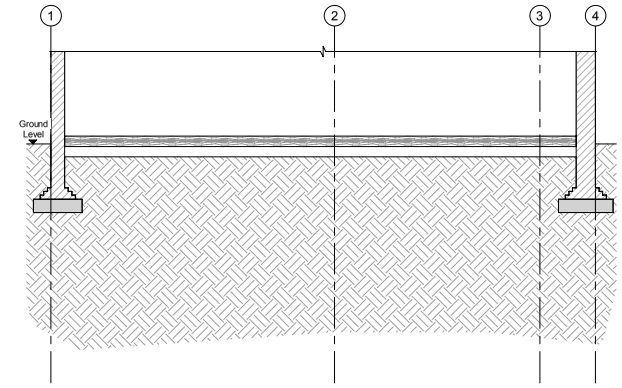
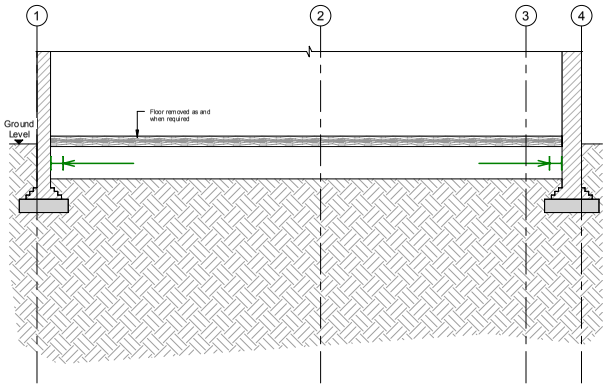


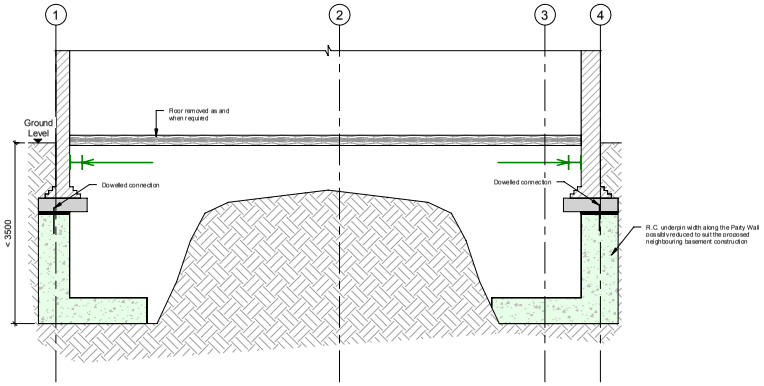
STAGE 0

- Existing construction



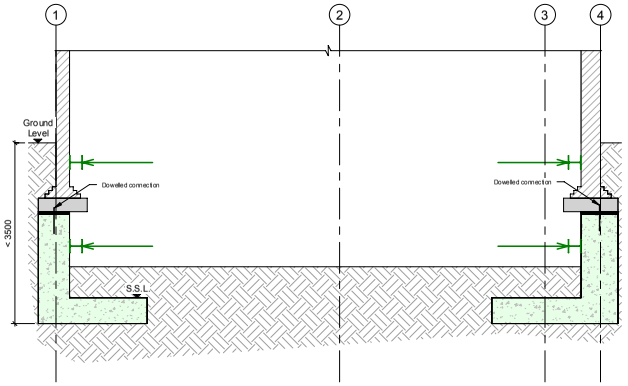
STAGE 1

- Install upper level of temporary propping (waling beam and props); Excavate slightly to enable access, if required
- Once the upper level temporary propping is installed, the ground floor structure can be removed as required to suit the basement related construction works



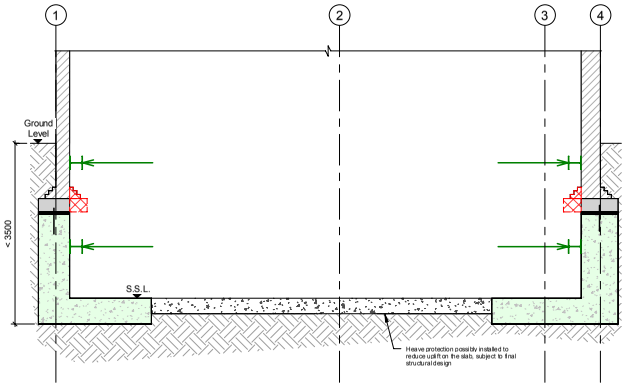
STAGE 2

- Excavate and construct R.C. underpins
- Construct the R.C. toe, followed by the kicker and stem
- 75mm dry pack to be installed between the u/s of foundation and stem



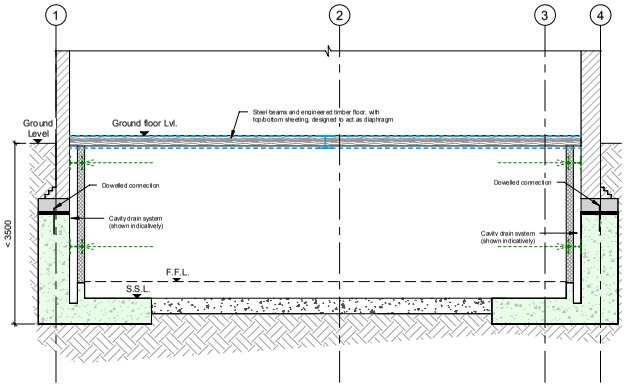
STAGE 3

- Backfill base of underpins and compact
- Install low level temporary propping



STAGE 4

- Mass excavate the basement following the installation of the low level propping
- Construct the R.C. basement slab whilst maintaining all the propping in place



STAGE 5

- Install the steelwork and timber floor at ground level
- Remove the low level props
- Remove the upper level propping post ground floor construction

NOTES

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6. REFER TO GENERAL NOTES DRAWINGS FOR MATERIAL SPECIFICATIONS AND NOTES

Note:
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Note:
Lightwell construction sequence not included. However, these are to be constructed using the methodology employed for the main basement.

The wall is to be constructed using R.C. pins cast in a non-consecutive sequence. High stiffness propping to be employed during construction. In the permanent condition, the lightwell R.C. walls will span horizontally between the returns, which act as stiff supports; as well as cantilever off the toe.

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PILEDESIGNS GEOTECHNICAL EXPERTISE

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Client	Owner
Project	FLat 1, 192 Goldhurst Terrace, London NW6 3HN
Title	Indicative Basement Construction Sequence

Drawn by	Checked by	Scale	Sheet Size
M.A.	V.P.	As indicated	A1

Proj. No.	Doc. Type	Drg. No.	Rev
22107	D	050	P1

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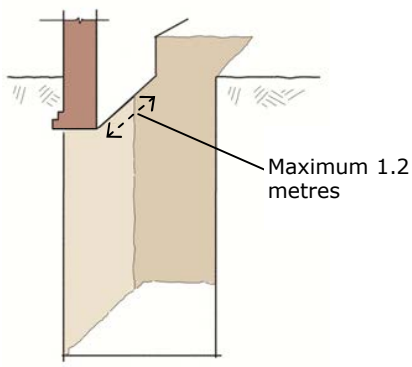
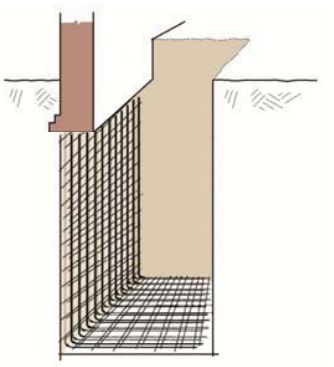
8.0 Appendix 2

Preliminary Structural Drawings



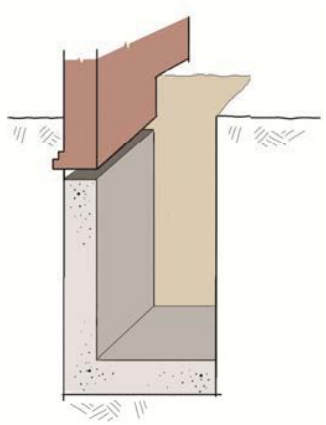
1. Excavation must be fully supported by props and shoring.
2. Edge protection to prevent falls into the excavation must be installed.
3. A temporary vertical prop or support may be placed under the wall to keep any loose bricks or masonry in place.
4. The main load from the existing wall will span onto the wall and foundations on either side of the excavation.

Stage 1. Excavation



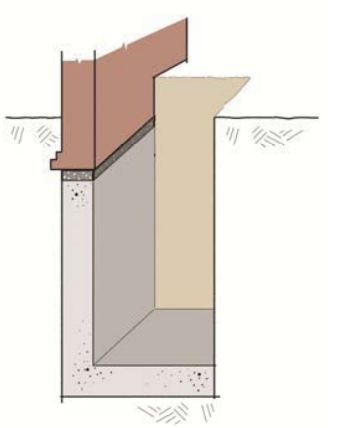
1. Reinforcement is fixed into position.
2. Reinforcement details are given in the engineering design. It is critical that the reinforcement is installed as detailed in the design
3. The design will usually require a shear connection between adjacent underpins. This is generally achieved using dowel bars between adjacent pins or by building sheer keys in the concrete underpin walls.

Stage 2. Reinforcement



1. Concrete is placed in the toe first.
2. Once the toe is sufficiently cured the concrete wall is poured.
3. Shuttering, usually timber, is used to hold the concrete for the wall in place while it is placed.
4. Gap of approximately 75mm left between the top of the concrete and the underside of the existing foundation.

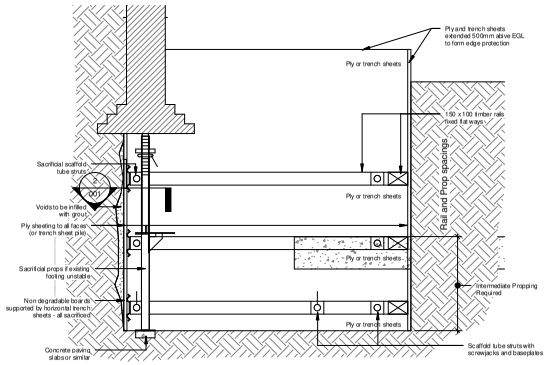
Stage 3. Concrete placement



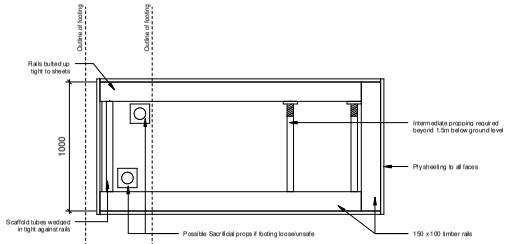
1. After a minimum of 24 hours dry-pack is rammed into the 75mm void that has been left above the new underpin.
2. Dry-pack is a mix of sharp sand and cement. It is easy to handle and has a low shrink volume, minimising settlement of the wall onto the new underpin foundation.
3. The completed underpin must be supported horizontally either by horizontal propping or by backfilling the excavation until the ground slab and possibly other permanent works are constructed.

Stage 4. Dry packing

Typical underpin construction sequence

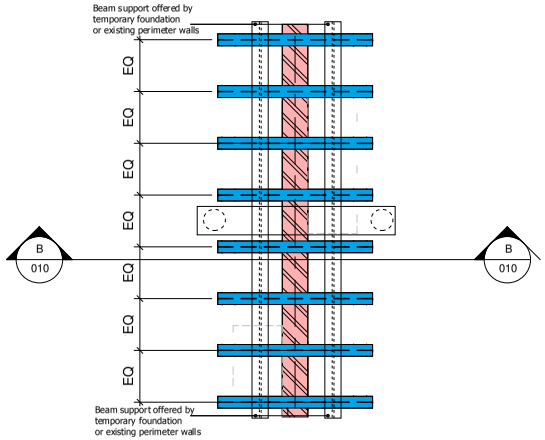


Indicative underpinning temporary works

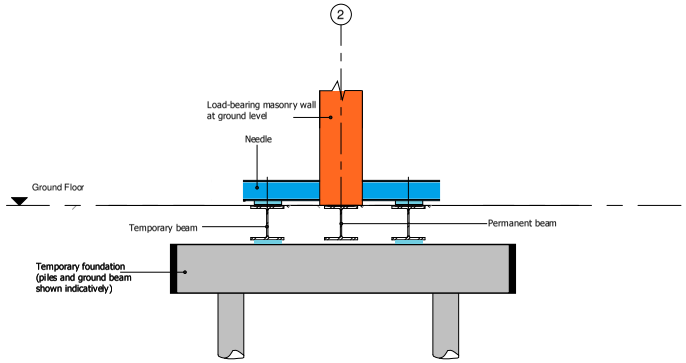


2 / 001 **Section 2**
1 : 20

NOTE:
Detailed design and sequence of temporary works is to be undertaken by the appointed engineer or contractor

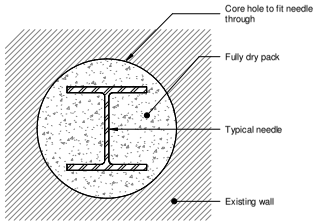


Temporary Works - Plan View



Section B-B

Indicative temporary works that allow the installation of steel beams to the under-side of existing internal loadbearing walls at ground level



Note:
Each needle is to be fully dry packed prior to forming the next needle opening through existing wall

Typical Needle

For General notes refer to Drawing 001

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PILEDESIGNS GEOTECHNICAL EXPERTISE

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Client: Owner			
Project: FLat 1, 192 Goldhurst Terrace, London NW6 3HN			
Title: Indicative Temporary Works Options			
Drawn by: M.A.	Checked by: V.P.	Scale: 1 : 1	Sheet Size: A1
Proj. No.: 22107	Doc. Type: SK	Drg. No.: 01	Rev: P1

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