# APPENDIX D

# DESIGN LOADS

R·H·H

**R · H · HORWITZ ASSOCIATES**
Civil & Structural Engineering Consultants

Sheet No. 10/01
Job No. 6869
Engineer DC
Date DEC 13

6A NORTH END

These sheets are loadings for the structural calculations

ROOF :- (PITCHED - EXISTING)

Dead loads :-

| | | |
|---|---|---|
| Tiles / Felt / Battens | - | 0.8 kn/m² |
| Rafters / Trusses | - | 0.2 kn/m² |
| ceiling & Services | - | 0.3 kn/m² |
| | | 1.3 kn/m² |

Live loads :- Maintenance Access only 0.6 kn/m²

Wind = 1.9 kn/m² Wind = 2.8 kn/m²

UPPER FLOORS :-

Dead loads :-

| | | |
|---|---|---|
| Boards | - | 0.3 kn/m² |
| Joists | - | 0.2 kn/m² |
| Ceiling & Ser | - | 0.3 kn/m² |
| | | 0.8 kn/m² |

Live loads :-

| | | |
|---|---|---|
| Residential | | 1.5 kn/m² |
| Partitions | - | 0.5 kn/m² |
| | | 2.0 kn/m² |

GROUND FLOOR (Ex. conc)

Dead loads :-

| | |
|---|---|
| Screed | 1.8 kn/m² |
| 150mm slab | - 3.6 kn/m² |
| Support | - 1.0 kn/m² |
| ceiling & Serv | - 0.3 kn/m² |
| | 6.7 kn/m² |

Live loads - Residential - 1.5 kn/m²

Wind = 8.2 kn/m² Wind = 11.5 kn/m²

R·H·H
R · H · HORWITZ ASSOCIATES
Civil & Structural Engineering Consultants

Sheet No. 10/02
Job No. 6869
Engineer DC
Date DEC 13.

GROUND FLOOR :- (EXTERNAL)

Dead loads :-

| | | |
|---|---|---|
| Finishes | - | 1.2kN/m² |
| Soil | - | 18kN/m³ |
| 200mm slab | - | 4.8kN/m² |
| Ceiling & Ser | - | 0.3kN/m² |
| | | 24.3kN/m² |

Live loads :- 3.0kN/m² say

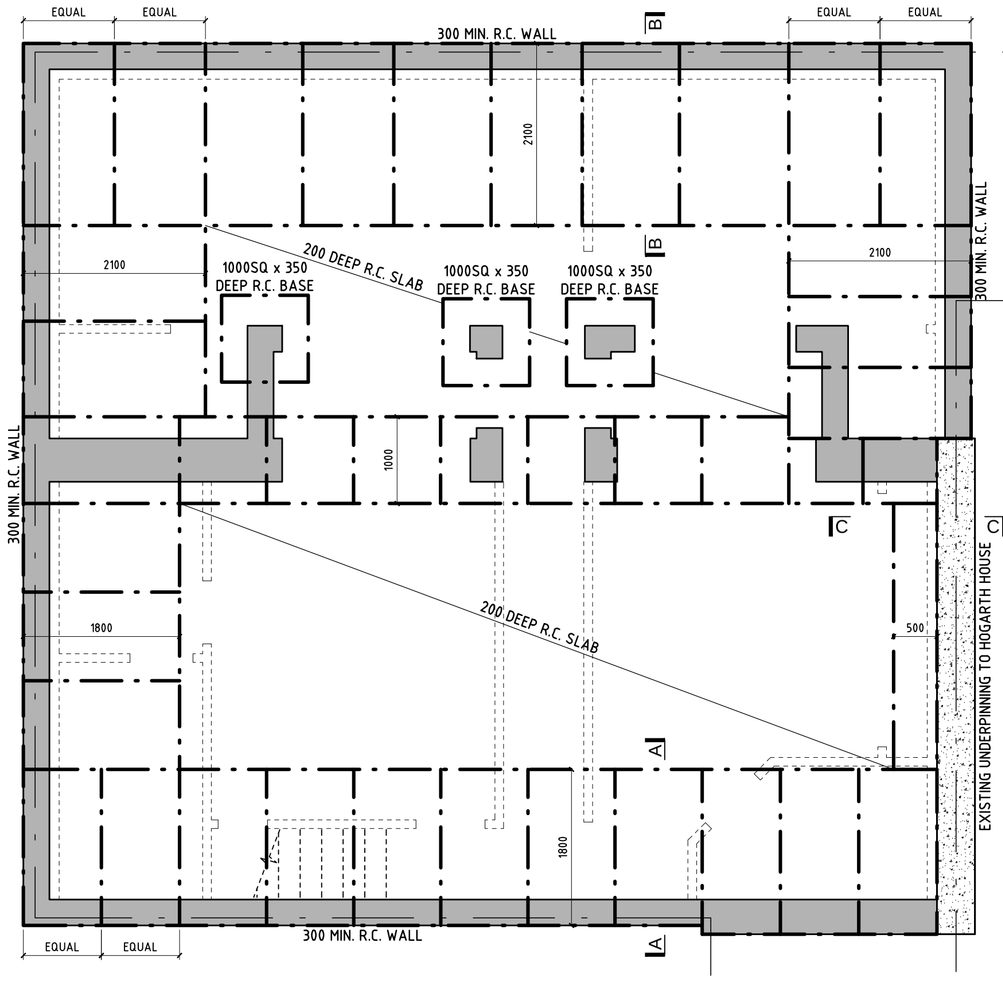
Wss = 27.3kN/m² Wus = 38.8kN/m²

WALL LOADS :-

| | | | | | |
|---|---|---|---|---|---|
| 100mm | Block | - 0.1 x 18 x 2.8 x 1.4 | = | 7.0kN/m | (5.0kN/m) |
| 215mm | Masonry | - 0.215 x 22 x 2.8 x 1.4 | = | 18.5kN/m | (13.2kN/m) |
| 330mm | Masonry | - 0.33 x 22 x 2.8 x 1.4 | = | 28.5kN/m. | (20.3kN/m) |
| 440mm | Masonry | - 0.44 x 22 x 2.8 x 1.4 | = | 37.9kN/m. | (27.1kN/m) |

# APPENDIX E

# DESIGN PRINCIPLE DRAWINGS




NOTE:
DRAINAGE GULLY TO BE PROVIDED IN LIGHT WELL & ALSO WITHIN THE DWELLING CONNECTED TO A PUMP FOR DISCHARGE TO GROUND LEVEL IN ACCORDANCE WITH ARCHITECTS & SPECIALISTS DETAILS

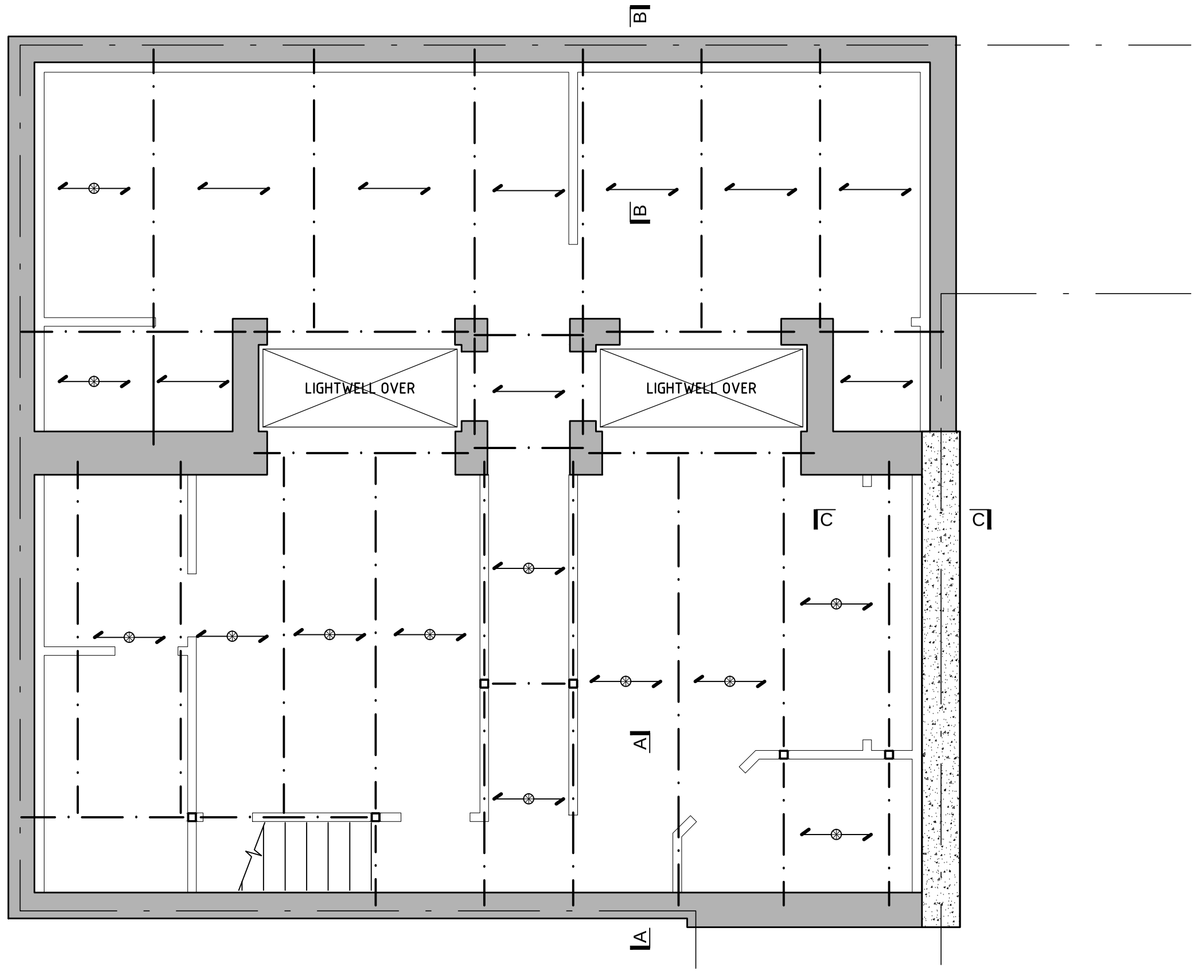
THE CONTRACTOR IS TO DESIGN & PROVIDE ALL NECESSARY TEMPORARY WORKS, PROPPINGAND SHORING THIS IS TO INCLUDE ALL NEEDLING AND PROPPING TO SUPPORT THE EXISTING WALLS AND FOUNDATIONS (WHICH MAY BE FRAGILE AND LOOSE) AND LATERAL SUPPORT TO ALL WALL AND UNDERPINNING SECTIONS UNTIL THE ENTIRE WORKS HAVE BEEN COMPLETE

SEQUENCE OF UNDERPINNING IS TO BE AGREED IN WRITING BETWEEN ENGINEER AND CONTRACTOR

ALL WATERPROOFING AND DAMP PROOFING IS TO BE BY OTHERS ANY DETAILS SHOWN ON THIS DRAWING ARE PURELY INDICATIVE

ALL DETAILS PRELIMINARY
DESIGN ASSUMES ALLOWABLE SAFEGROUND BEARING PRESSURE OF 175 kN/M SQ

## BASEMENT FLOOR PLAN
SHOWING UNDERPINNING & FOUNDATIONS
[Scale 1:50]




DENOTES SPAN 200 RC SLAB ON HOLORIB PERMANENT FORMWORK OR SIMILAR APPROVED

DENOTES SPAN LINTEL SUPPORTS TO ASSUMED EXISTING LOWER GROUND FLOOR CONCRETE SLAB.

## BASEMENT FLOOR PLAN
SHOWING LOWER GROUND FLOOR / ROOF OVER
[Scale 1:50]

### UNDERPINNING NOTES:-

A. ALL REINFORCED CONCRETE CAST ON THE GROUND TO BE PLACED ON 50mm C20 CONCRETE BLINDING

B. FOUNDATIONS HAVE BEEN DESIGNED ASSUMING A SAFE GROUND BEARING PRESSURE OF 125kN/m2. THE BEARING STRATA TO BE APPROVED BY THE LOCAL AUTHORITY BUILDING INSPECTOR BEFORE LAYING ANY BLINDING OR CASTING OF FOUNDATIONS. ANY ADDITIONAL EXCAVATION DUE TO SOFT SPOTS ETC TO BE DUG OUT AND BACKFILLED USING C20 CONCRETE MIX. IN THE EVENT OF ANY EXTENSIVE ADDITIONAL EXCAVATION BEING REQUIRED THE ENGINEER MUST BE INFORMED FRESH INSTRUCTIONS OBTAINED IF REQUIRED.

C. CONCRETE:
UNDERPINNING (BASES & WALLS) TO BE GRADE C35 IN ACCORDANCE WITH BS 8110. AN APPROVED RAPID HARDENING AGENT TO BE ADDED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND SPECIFICATIONS. SLAB TO BE GRADE C35 IN ACCORDANCE WITH BS8110.

D. ALL CONCRETE AGAINST BLINDED OR EARTH SURFACES IS TO BE CLASS DS-2 ACEC AC-2 IN ACCORDANCE WITH SPECIAL DIGEST 1 OF BRE GUIDANCE ( CONCRETE IN AGGRESSIVE GROUND Part 1 - Assessing the aggressive chemical environment, Special Digest 1, 2001.

E. UNDERPINNING TO BE CARRIED OUT IN 1200mm MAXIMUM LENGTHS

F. ANY BACKFILLING BEHIND RETAINING WALLS TO BE CARRIED OUT USING C20 CONCRETE MIX.

G. CONCRETE COVER UNLESS NOTED 35mm. BLINDED SURFACES TO BE 40mm. EARTH FACES 75mm.

H. THE UNDERSIDE OF THE EXISTING WALL OR FOUNDATION SHALL BE TRIMMED AND CLEANED OF ALL MUD & DEBRIS BEFORE DRY PACKING. THE DRY PACK SHALL BE A 1:3 MIX AND WELL RAMMED IN HORIZONTAL LAYERS NOT EXCEEDING 75mm THICKNESS. DRY PACKING SHALL BE LEFT 24 HOURS BEFORE EXCAVATIONS ARE COMMENCED ON ADJACENT UNDERPINS.

I. AFTER EXCAVATING ADJACENT PREVIOUSLY CAST BASES, CLEAN AND SCABBLE EXISTING SURFACE OF CONCRETE.

J. ALLOW 48 HOURS MINIMUM BEFORE DRY-PACKING OVER WALLS.

K. SEQUENCE OF UNDERPINNING WORKS TO BE AGREED ON SITE WITH ENGINEER PRIOR TO COMMENCEMENT OF WORKS.

L. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY DE-WATERING OF EXCAVATIONS DURING THE EXECUTION OF THE WORKS.

### SUPERSTRUCTURE NOTES:-

1. STEELWORK TO BE MILD STEEL GRADE 43 IN ACCORDANCE WITH BS 4360 FOR QUALITY AND BS 5950 FOR DESIGN, DETAIL AND WORKMANSHIP.
2. ALL STEELWORK IS TO BE CLEANED TO SWEDISH 2½ SA AND PRIMED WITH MINIMUM 75 MICRON DFT. WORKS APPLIED APPROVED PRIMER.
3. ALL BEAM TO BEAM CONNECTIONS SHALL BE 12mm WELDED END PLATES (6mm FPFW) 4 No. M20 (8.8) BOLTS. OR SIMILAR APPROVED.
4. FIRE PROTECTION TO ALL STEELWORK TO BE IN ACCORDANCE WITH ARCHITECTS DETAILS
5. PADSTONES TO BE C50 GRADE CONCRETE WITH A MAX. 10mm AGGREGATE SIZE OR SOLID CLASS 'A' ENGINEERING BRICKWORK IF SPECIFIED.
6. ALL NEW STRUCTURAL TIMBER TO BE GRADE C24 TO BS 5268 AND ALL ENDS TREATED ETC TREATED WITH AN APPROVED TIMBER PRESERVATIVE
7. 30x5 GMS STRAPS TO BE PROVIDED AT 1.25m CENTRES TO ALL FLOORS TO COMPLY WITH PART A3 DISPROPORTIONATE COLLAPSE SECTION 5c. FOR CLASS 2A BUILDINGS.
8. BRICKWORK TO BE CONSTRUCTED IN CLASS 'A' SOLID ENGINEERING BRICKWORK WITH A MINIMUM CRUSHING STRENGTH OF 35 N/mm2. BLOCKWORK TO HAVE A MINIMUM CRUSHING STRENGTH OF 3.5 N/mm2.
9. ALL UNLESS NOTED OTHERWISE
10. ALL MASONRY SHALL BE LAID IN CLASS (iii) MORTAR EXCEPT BELOW DPC CLASS (i).
11. ANY CUTTING AWAY OF EXISTING BRICKWORK TO BE CARRIED OUT CAREFULLY TO REDUCE DAMAGE TO SURROUNDING AREAS TO A MINIMUM.
12. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE EXISTING STRUCTURE AND ADJOINING PROPERTIES DURING EXECUTION OF THE WORKS AND MUST TAKE ALL NECESSARY PRECAUTIONS TO SAFEGUARD THIS STABILITY.

### GENERAL NOTES:-

1. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND SPECIALIST DRAWINGS WHICH MUST BE REFERRED TO FOR VERIFICATION OF LEVELS AND SETTING OUT.
2. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE
3. DO NOT SCALE THIS DRAWING
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE GROUND INVESTIGATION REPORTS.
5. THE MAIN CONTRACTOR SHALL BE RESPONSIBLE FOR EXECUTING ALL NECESSARY TEMPORARY WORKS INCLUDING DESIGN WHICH SHALL BE CARRIED OUT BY A SUITABLY QUALIFIED ENGINEER WITH ADEQUATE INSURANCES FOR UNDERTAKING SUCH WORKS. THE MAIN CONTRACTOR SHALL PROVIDE ALL NECESSARY INSURANCE COVER FOR HIS WORKS AND IS TO PROVIDE TO NECESSARY PARTIES FULL METHOD STATEMENTS FOR EXECUTION OF ALL WORKS.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE EXISTING BUILDING AND ADJOINING PROPERTY TOGETHER WITH EXCAVATIONS AND EARTHWORKS AND MUST TAKE ALL NECESSARY PRECAUTIONS TO SAFEGUARD THIS THROUGHOUT EXECUTION OF THE WORKS.
7. ADEQUATE SHORING SHALL BE INSTALLED DURING THE WORKS TO ENSURE THE STABILITY OF THE STRUCTURES. SUCH SHORING SHALL BE ADEQUATELY FOUNDED
8. ANY DEVIATION FROM THE DETAILS SHOWN MUST BE NOTIFIED TO THE ENGINEER BY THE CONTRACTOR IN WRITING BEFORE BEING CARRIED OUT.
9. THE LOCAL AUTHORITY's BUILDING INSPECTOR AND THE ENGINEER ARE TO BE INFORMED BY THE CONTRACTOR IN WRITING AT LEAST 48 HOURS PRIOR TO THE WORKS STARTING ON SITE. THEIR AGREEMENT MUST BE OBTAINED BEFORE WORK CAN COMMENCE.
10. THE CONTRACTOR MUST MAINTAIN ANY EXISTING SERVICES REQUIRED TO THE ADJOINING PROPERTY AS NECESSARY.
11. THE CAVITY DRAIN TO WALLS AND SLAB TO BE IN ACCORDANCE WITH ARCHITECTS AND SPECIALISTS DETAILS INCLUDING DRAINAGE AND PUMPS. ALL TO SPECIALISTS DESIGN AND DETAILS.
12. A FULL CONDITIONAL AND PHOTOGRAPHIC SURVEY IS TO BE UNDERTAKEN TO THE PROPERTY AND ADJACENT PROPERTIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.
13. THE CONTRACTOR IS TO DESIGN,SPECIFY AND PROVIDE ALL NECESSARY TEMPORARY WORKS INCLUDING THE PROPPING AND NEEDLING OF ALL EXISTING WALLS AND FOUNDATIONS ( (CONTRACTOR TO NOTE THAT THE EXISTING FOUNDATIONS MAY BE FRAGILE, LOOSE AND BECOME HAZARDOUS - SUITABLE MEASURES AND SAFE WORKING PRACTICES ARE TO BE EMPLOYED) THE CONTRACTOR IS TO PROVIDE ALL LATERAL PROPPING OF THE UNDERPIN SECTIONS TO SUPPORT THE RETAINED SOIL BEHIND,STRUCTURES ABOVE AND ADJACENT AND THE PUBLIC FOOTPATH AND HIGHWAY.
14. ALL UNDERPINNING WALL STEMS AND BASE SECTIONS ARE TO BE DOWELLED TOGETHER WITH H12 BARS AT 150 CENTRES (LENGTH OF BARS 600MM)
15. TRIAL PITS ARE TO BE DUG PRIOR TO THE COMMENCEMENT OF THE MAIN WORKS TO EXPOSE THE EXISTING FOUNDATIONS AND ANY POSSIBLE HISTORIC UNDERPINNING WHICH MAY EXIST - THE DESIGN AND DETAILS OF THE PROPOSED UNDERPINNING MAY NEED TO BE REVISED TO SUIT AND SHOULD BE REPORTED IN WRITING TO THE ENGINEER PRIOR TO ANY MODIFICATION BEING AGREED.
16. REFER TO ARCHITECTS SPECIFICATION FOR ALL DAMP PROOFING DETAILS INCLUDING DPC, DPM'S & BASEMENT WATER PROOFING.
17. ALL WORKMANSHIP & MATERIALS USED IN RESPECT OF THE WORKS SHALL BE IN ACCORDANCE WITH THE CURRENT BRITISH STANDARDS AND CODES OF PRACTICE WHERE RELEVANT TO THIS PROJECT.

| Rev. | Description. | Date. |
|---|---|---|

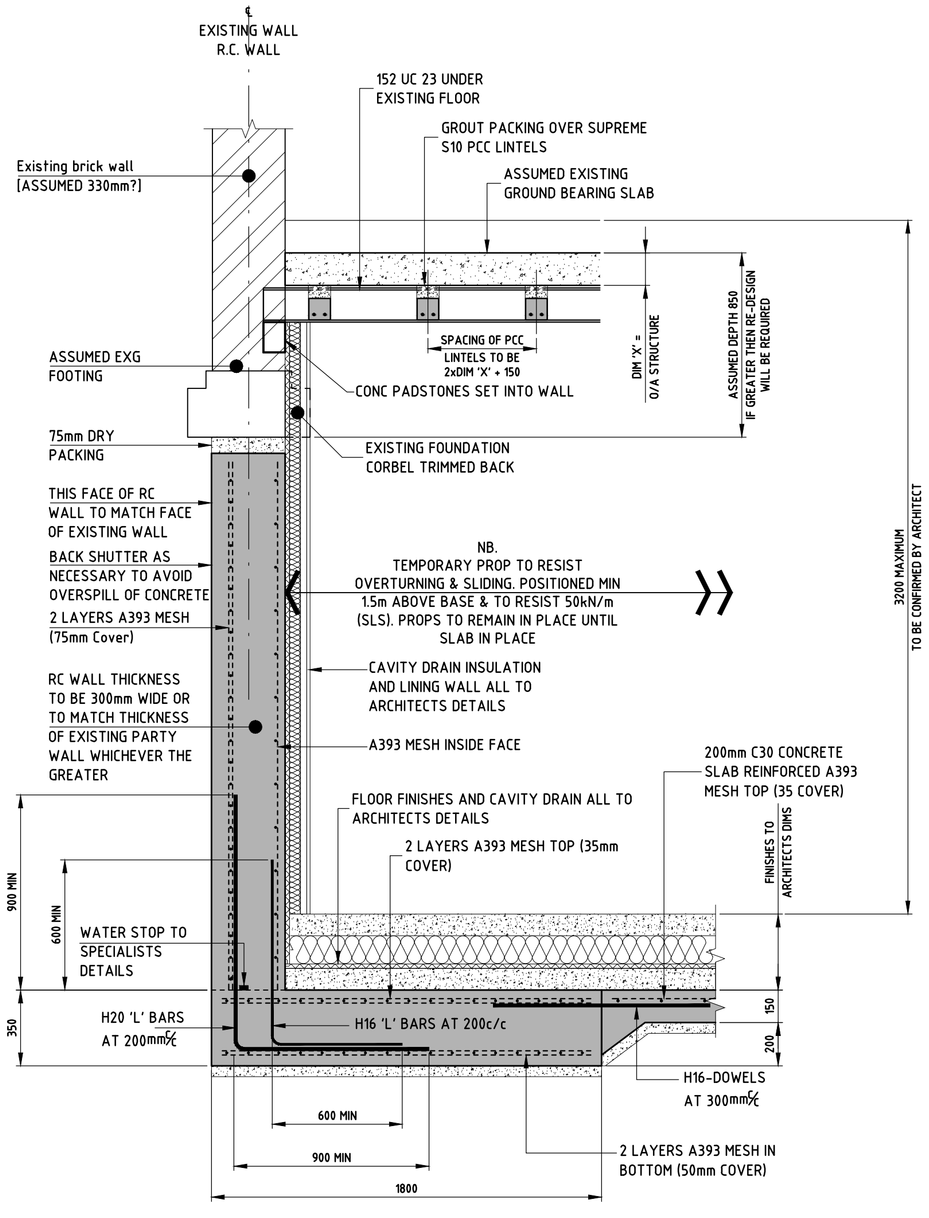
Cranbrook Basements

R-H-HORWITZ ASSOCIATES
Civil & Structural Engineering Consultants
Tel: 01245 809010
Email: RHH@Horwitz.co.uk

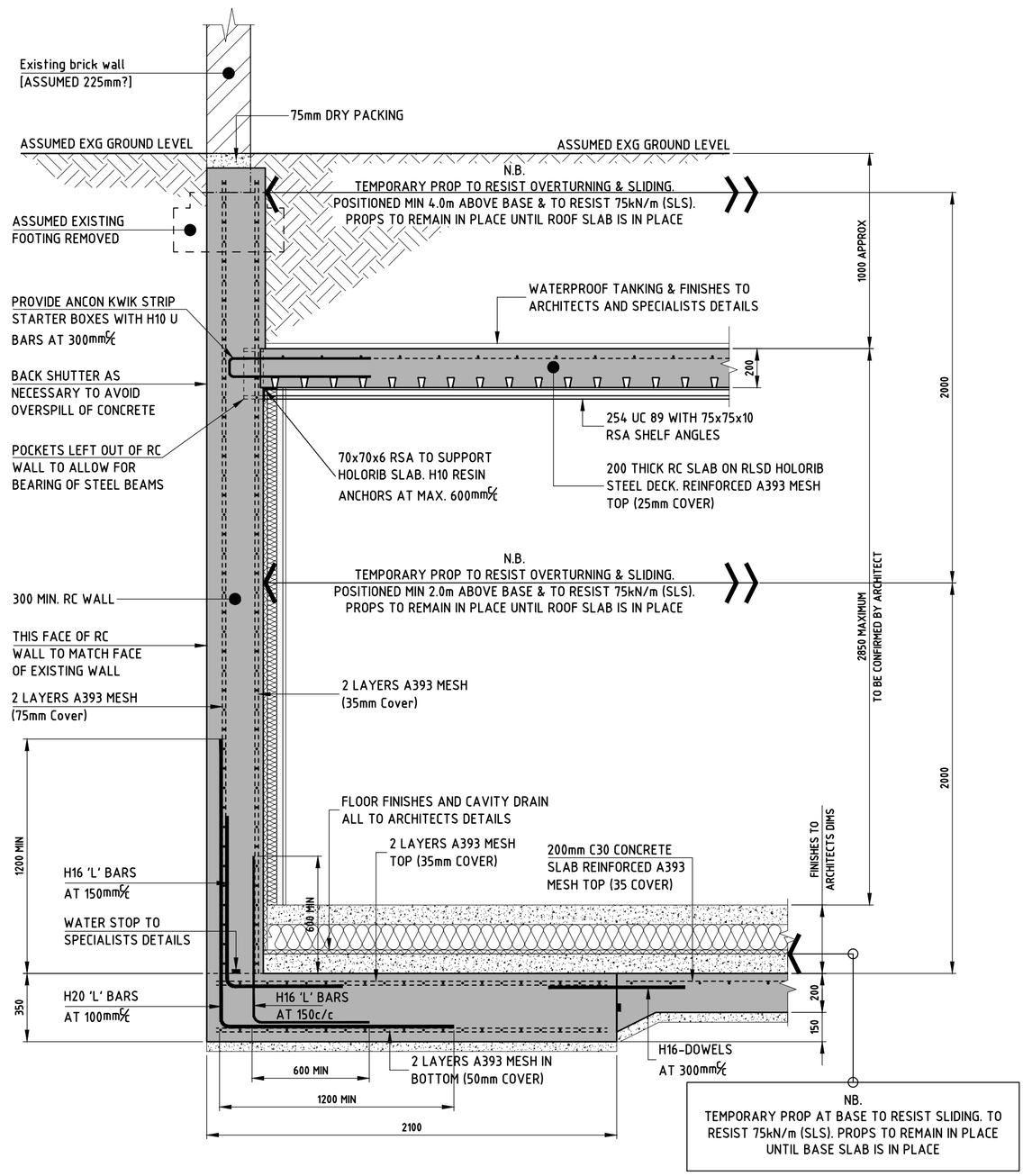
**PROPOSED BASEMENT AT No. 6A NORTH END, LONDON, NW3 7HL**

**PROPOSESD UNDERPINNING : BASEMENT STRUCTURAL DETAILS**

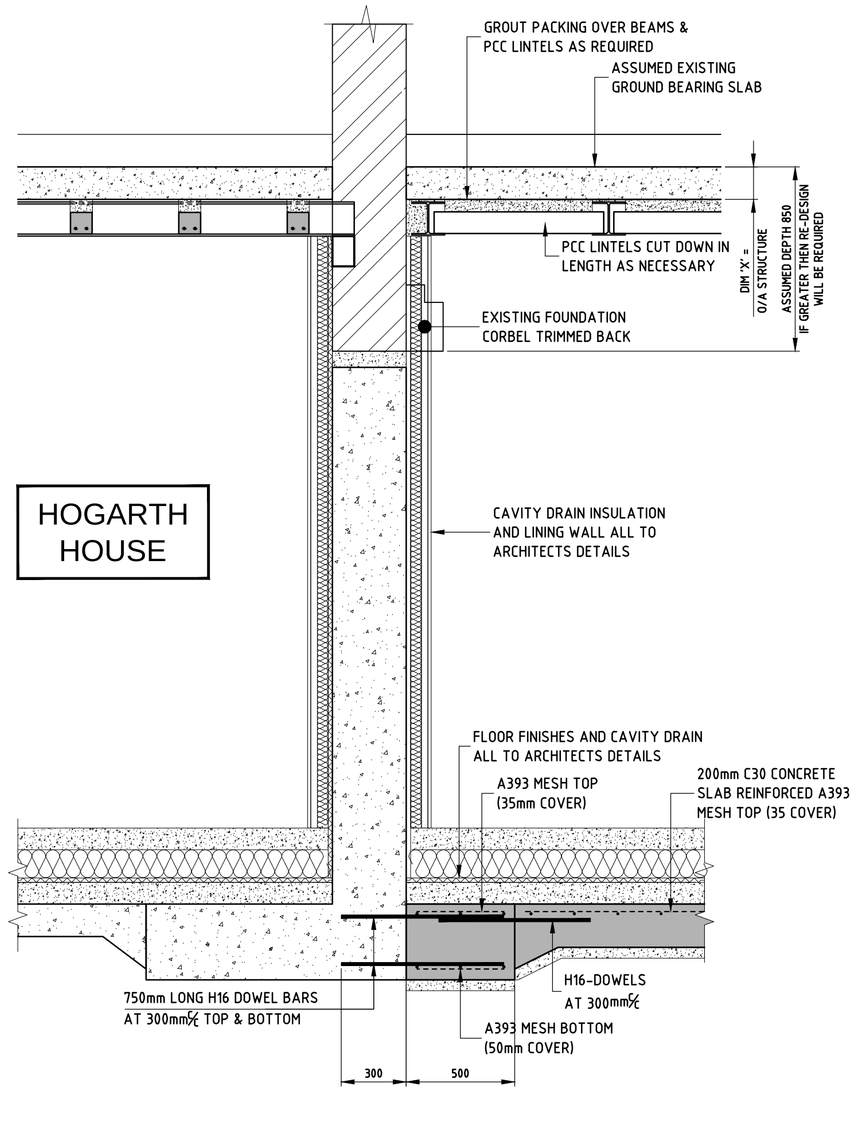
| | | | |
|---|---|---|---|
| Scale AS SHOWN AT A1 | | Date DECEMBER 2013 | |
| Engineer D.C. | | Drawn A.E. | Checked |
| Client CRANBROOK BASEMENTS | | DRG No. 6869-PS-01 | REV. - |




SECTION A - A (Party Wall)
[Scale 1:20]




SECTION B - B (Boundary Wall)
[Scale 1:20]




SECTION C - C (Party Wall)
[Scale 1:20]

FOR UNDERPINNING & GENERAL NOTES, SEE DRAWING 6869-PS-01.

| Rev. | Description. | Date. |
|---|---|---|

Cranbrook Basements

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PROPOSED BASEMENT AT
No. 6A NORTH END, LONDON, NW3 7HL

PROPOSESD UNDERPINNING : BASEMENT SECTIONS

| | | |
|---|---|---|
| Scale AS SHOWN AT A1 | Date DECEMBER 2013 | |
| Engineer D.C. | Drawn A.E. | Checked |
| Client CRANBROOK BASEMENTS | DRG No. 6869-PS-02 | REV. - |

# APPENDIX F

# SPECIFICATION

**6A NORTH END, LONDON, NW3 7HL**

**SPECIFICATION**

**FOR WORKS**

---

## 1.0 DEMOLITION

### 1.1 Scope

The areas to be demolished are shown on the drawings. The Contractor shall make good, at his own expense, any areas demolished beyond the limits shown on the drawings.

### 1.2 Demolition

All demolition work shall be carried out strictly in accordance with BS 6187 2011. Before commencement of work the demolition Contractor shall submit details of his insurance cover. In particular, cover shall be obtained for claims arising out of any act, neglect or omission by the building owner, as well as providing for all contractual liability.

If it is necessary to erect temporary hoardings, etc., the Contractor shall obtain all necessary licences, give all notices and pay all dues in connection therewith.

### 1.3 Temporary Works

The Contractor shall be responsible for the stability of the existing building on the site and any adjoining sites and he shall take all necessary precautions to safeguard this stability. Any temporary shoring, propping or strutting inserted to ensure this stability shall comply with the relevant British Standards.

Any scaffolding erected shall comply with BS EN 12811 and BS 5975 2008.

Any metal props and struts required shall comply with BS 4074 2000.

Any temporary shoring, propping or strutting shall be provided with an adequate foundation.

## 2.0 EXCAVATIONS

### 2.1 General

Excavation for the various parts of the works shall be carried out to the widths, lengths and depths indicated on the drawings or as directed by the Engineer on site.

Materials arising from the excavations shall be removed from the site.

Any excavations taken out below the depth required for construction of the works shall be replaced at the Contractor's own expense with approved and properly compacted materials as directed by the Engineer on site.

### 2.2 Planking and Strutting

Where excavations are taken out with vertical sides the Contractor shall, if necessary, provide all shoring, planking and strutting for supporting the sides of excavations at his own expense. The Contractor shall be responsible for the stability of earth works and shall take all necessary precautions to safeguard this stability.

### 2.3 Temporary Drainage

All excavations shall, as far as is reasonably possible, be kept free of water during the progress of the works and the Contractor shall provide, at his own expense, all temporary drains, sumps and pumping machinery that may be needed for this purpose.

### 2.4 Formation of Works

No concrete shall be poured until the ground formation for it has been inspected by the Building Control Officer.

The Contractor shall notify the Local Authority when approvals are required.

The formation of all excavations shall be trimmed and levelled 75mm above the formation level shown on the drawings prior to approval of the Engineer. In the case of mass concrete footings a further 75mm shall be taken out and the whole base poured immediately. In the case of reinforced concrete bases a further 125mm shall be taken out and the formation sealed with a 50mm layer of blinding concrete 1:8 laid as dry as is practicable.

**2.4 Formation of Works (cont'd)**

If the exposed formation is not satisfactory for the loading required, the Contractor shall execute such extra works as may be necessary to achieve a firm foundation as directed by the Engineer on site.

Should the material forming the bottom of any excavation, whilst sound at the time of excavation, become soft or deteriorated due to percolation of water or unsatisfactory protection during the progress of the works, the Contractor shall, at his own expense, remove such softened or loose material and replace it with approved material as directed by the Engineer on site.

The top surface of all blinding concrete under reinforced concrete work shall be such that the tolerance from the true level is +0, -20mm.

All existing construction and obstructions in the way of the proposed new foundations shall be reported to the Engineer. They shall then be removed or otherwise as directed by the Engineer.

**3.0 UNDERPINNING**

WORKMANSHIP: The work shall be carried out in accordance with the Engineer's drawings and instructions and to the approval of the Architect and the Building Control Officer.

Any other sequence of operations or method of working proposed by the Contractor is to be submitted to the Architect and copied to the Engineer and agreed in writing a minimum of 14 days before work is to be commenced on site.

CONTRACTORS RESPONSIBILITIES: The Contractor shall be responsible for the safety of the underpinned structure and provide all necessary shoring, strutting and bracing to ensure its safety and stability at all times.

SERVICES: The Contractor is also to carry out a survey of the property and adjacent area to establish to location of obstructions such as service runs or drains. Any obstruction found is to be brought to the attention of the Architect/Engineer. The Contractor is to allow for any temporary support to the services or obstructions during the underpinning.

CONSTRUCTION SEQUENCE: The underpinning is to be undertaken in short sections not exceeding 1.2 metres in length. The underpinning is to be undertaken on a 'hit and miss' sequence as shown on the drawings or otherwise agreed in writing by the Engineer.

No adjacent pin is to be excavated until a minimum 48 hours after the adjacent pin has been cast and dry pack has been installed.

The Contractor is to provide drawings marked up to show the proposed sequence of underpinning a minimum of 14 days before work is commenced.

EXCAVATIONS: Excavation shall be to the depth and width shown on the drawings. However, where tree roots are encountered new underpins are to extend 600mm below the last trace of any root activity. The sides of the excavation shall be adequately shored and propped to prevent subsidence or slip of the soil. Soil faces behind the pin and at the formation level shall be undisturbed.

Any soil faces behind the underpinning that require to be retained shall be by precast concrete poling boarding. The boards are to have holes to enable the void behind the boards to be grouted up. The poling boards are to be measured as left in.

INSPECTIONS: All excavations are to be inspected by the Engineer and/or the Building Control Officer. Minimum notice of 24 hours is to be given when excavations are ready for inspection.

PREPARATION: The sides of the completed pin are to be thoroughly cleaned and scabbled to the satisfaction of the Engineer.

The soffit of the existing footings is to be levelled off and cleaned of all loose or detrimental material.

No projecting partitions of the existing footings are to be trimmed except as shown on the drawings or directed by the Engineer.

The Contractor must provide shear keys.

Allow for 150 deep x 100 wide shear keys across width of scabbled interfaces at 1m maximum vertical centres. Minimum 2 per face. Form in timber or polystyrene.

ANTI-HEAVE PRECAUTIONS: Before carrying out concreting introduce anti-heave precautions in the form of Claymaster as directed by the Engineer to the faces of the excavation.

PLACING CONCRETE: The concrete for the underpinning is to be mass concrete and poured continuously to 75mm below the soffit of the existing footing. The concrete is to be fully compacted using a mechanical vibrator.

The top 75mm of the pin is to be filled to the full depth and width of the void with a well rammed C35 concrete using 5mm-10mm coarse aggregate and Conbex 100' expanding admixture by Messrs Fosroc UK Ltd in accordance with their instructions. The filling of this void is to be undertaken 24 hours after the mass concrete has been poured.

CONCRETE GRADE: On works where a full specification has not been provided, a FND2 mix should be used. This has characteristic 28 day strength of 35N/mm2 and is suitable for Class 2 sulphate soils.

OVER-EXCAVATION: Except where noted otherwise on the drawings, areas of over-excavation are to be backfilled with a granular material and compacted in 225mm layers to provide a stable sub-base compatible wish the final finishes.

SPOIL: The Contractor will include in his prices for the removal of all spoil arising from the works which is not suitable for backfilling purposes.

RECORDS: A full record of each section underpinned is to be kept on site and readily available for inspection by the Engineer or Building Control Officer.

GUARANTEE: The Contractor is to provide a 10 year insurance backed guarantee for the underpinning works.

## 4.0 PLAIN & REINFORCED CONCRETE WORK

### 4.1 Scope

This specification applies to the materials and workmanship in plain and reinforced concrete work to beams, columns, foundations, slab, staircases, walls and similar work, the extent of which is shown on the drawings.

### 4.2 Materials

Aggregates - fine and course aggregate shall be obtained from natural sources and shall comply with BS EN 12620 2012.

Cement shall be Ordinary Portland Cement complying with BS EN 197-1 2011.

Water used for any purpose shall be from an approved public supply.

Reinforcement - mild steel bars shall be plain round, hot rolled bars complying with BS 4449. High tensile bars shall be rolled steel bars of square or rolled ribbed indented section, which have been twisted cold, complying with BS 4461. Hot rolled bars shall have a yield stress of 420 N/mm² complying with BS 4449. Welded fabrics, twisted square bar fabric or expanded metal shall comply with BS 4483.

### 4.3 Concrete Mixes

Concrete mixes to be used are noted on the drawings. The proportions of aggregate and cement shall be measured by weigh batching.

Ready-mix concrete may be used in accordance with BS EN 206 with the Engineer's prior approval.

The mix proportions and minimum strength requirements shall comply with BS 8110 and BS 8500 as stated on drawings.

All reinforced concrete work, unless otherwise specified, shall be compacted by means of poker vibrators.

## 4.4 Workmanship

Workmanship shall be in accordance with BS 8110 as stated on the drawings.

All concrete shall be properly cured for a minimum of seven days. The method of curing shall be agreed with the Engineer prior to the commencement of the work.

The interval between adding water to the dry mix and final placing shall not exceed thirty minutes and thereafter the concrete shall not be disturbed.

The method of working in cold weather shall be as set out in BS 8500 and Concrete Society Publication CS164-Good Concrete Guide 8 and is to be agreed with the Engineer prior to the commencement of the work.

The Contractor shall be responsible for the strength and stability of all temporary formwork and its supports. All formwork shall be constructed to prevent any losses of grout or mortar from the concrete. Adequate openings and removable panels shall be provided in shuttering for inspection and cleaning, etc. Connections shall be so constructed to permit easy removal of the shuttering.

All faces of shuttering and moulds in contact with wet concrete shall be treated with mould oil or other coating to the Engineer's approval.

The timing of the removal of formwork shall be entirely the Contractor's responsibility and forms shall not be struck until the concrete reaches a strength of at least twice the stress to which the concrete may be subjected at the time of striking. All formwork shall be removed without shock or vibration that would damage the concrete construction.

The surface finish to the concrete shall be as specified by the Inspecting Officer.

Concrete test cubes shall be made as directed by the Engineer and shall conform to BS 1881. The location of the concrete under test shall be clearly stated on the Test Certificate.

Reinforcement shall be free from pitting, loose rust, mill scale, paint, oil, grease, adhering earth, ice or any harmful matter that may impair the bond between the concrete and the reinforcement.

All reinforcement shall be bent in accordance with BS 4466.
All reinforcement shall be placed and maintained in the position shown on the drawings with plastic chairs or similar.

## 4.5 Concrete in Cold Weather

No concrete shall be mixed or placed whilst the temperature is below $2^0$C on a rising thermometer or below $4^0$C on a falling thermometer, or freezing temperatures are forecast in the next 24 hours, but in any event, the following should be noted:-

1. No part of fresh concrete, at the time of placing, should have a temperature of less than $5^0$C.
2. All surfaces with which the fresh concrete will come into contact, including those of formwork, reinforcement and hardened concrete, should be free of snow, ice and frost.
3. Regardless of the air temperature at the time of placing, the temperature of the concrete should at no point fall below $5^0$C, nor should the water curing be applied until the concrete in the structural element reaches a strength of 5N/m².
4. Any concrete damaged by frost shall immediately be removed and the member re-constructed at the Contractor's own cost.
5. The Contractor shall provide an accurate maximum and minimum thermometer and hang in an approved position in the works and keep accurate daily record of these maximum and minimum temperatures for inspection by the Engineer.
6. Concrete may be preheated in the mixer by heating the mixing water to not more than $40^0$C.
7. The use of calcium chloride or any other chemicals to accelerate hardening will not be allowed.

## 5.0 STRUCTURAL STEEL WORK

### 5.1 Scope

This specification applies to the supply of materials and workmanship in connection with the fabrication, delivery to site and erection of structural steelwork consisting of beams, stanchions, connections, including all necessary fittings, bolts and welding, the extent of which is shown on the drawings.

The Contractor shall visit the site and carry out a survey to check the spans, section sizes and setting out of the existing steelwork and structural arrangement.

### 5.2 Materials

Mild steel shall comply with BS EN 10025 2004 Grade 5275 for quality and BS 4-1 with regard to form.

High tensile steel shall comply with BS 1775 for quality and BS 4 Part 2 with regard to form.

Steel tubes shall comply with BS 1775 for quality and BS 4 Part 2 with regard to form.

Cold formed steel sections formed from plate, sheet or strip steel 6mm thick and under shall comply with P.D. 4064 Addendum No 1 to BS 449.

Black bolts and nuts shall comply with BS 916 and BS 1769.

High strength friction grip bolts shall comply with BS 4395 and BS 4604.

The term 'weld', 'welds' and 'welding' shall refer to work done by electric metal arc welding and shall comply with BS EN 1011-2 2001. The Contractor shall provide certified evidence that every welding operative has passed tests as required by BS 5950 and specified in BS 2645.

## 5.3 Workmanship

Workmanship shall be of a first class standard and the design, fabrication and form of details shall be in accordance with BS 5950 and to the approval of the Engineer.

Cleaning of all surfaces to be painted shall be carried out in accordance with the requirements of BS ISO 27831.

All steelwork, unless otherwise agreed, shall be painted with one coat of zinc phosphate to 75 micron DFT.

The size of the steel members are shown on the Engineer's drawings and must not be varied without his approval.

## 5.4 Connections

The connections are to be of bolted or welded construction and of adequate strength to sustain the various loads indicated on the drawings and all details shall be sent to the Engineer for his examination before any work is put in hand.

## 6.0 SHORING TO FORM OPENINGS

### 6.1 Scope

The scope of the work comprises the erection of internal shoring to support the structure whilst new openings are formed or existing openings are extended, the extent of which is indicated on the drawings.

Details of the existing work have been assumed. These are to be checked on site by the Main Contractor and any discrepancies reported to the Engineer so that adjustments may be made to the structural scheme if necessary.

### 6.2 Materials

All structural timber used to form the temporary shoring shall comply in all respects with BS 5268 and BS 4978, the grade of timber to be used shall be as specified on the drawings.

Any metal props and struts required shall comply with BS 4074. The type of prop shall be as specified on the drawings.

Any scaffolding erected shall comply with BS EN 12811 and BS 5975 2008.

Any shoring, propping or strutting shall be provided with an adequate foundation to the approval of the Engineer.

### 7.3 Sequence of Operation

Before any openings are formed by removal of brickwork, the internal shoring, as shown on the drawings, shall be in position and shall be to the satisfaction of the Engineer.

The Contractor shall, at all times, allow access to the Engineer to inspect the works.

Notwithstanding the work specified to be carried out, the Contractor shall carry out the work in such a manner as to safeguard the structure from further structural damage.

The Contractor shall regularly inspect all shoring to ensure that it is maintained in a rigid condition and also regularly inspect the structure for any movement whatsoever. Should any movement be noted before, during or after the execution of the works described in this specification, he shall notify the Engineer immediately and shall also place in position any props, needles and shores he may consider necessary.

**6.3 Sequence of Operation cont'd**

The Contractor shall provide all necessary scaffolds, screens, platforms, etc., to protect the adjoining properties and public from damage or falling objects during the execution of the works.

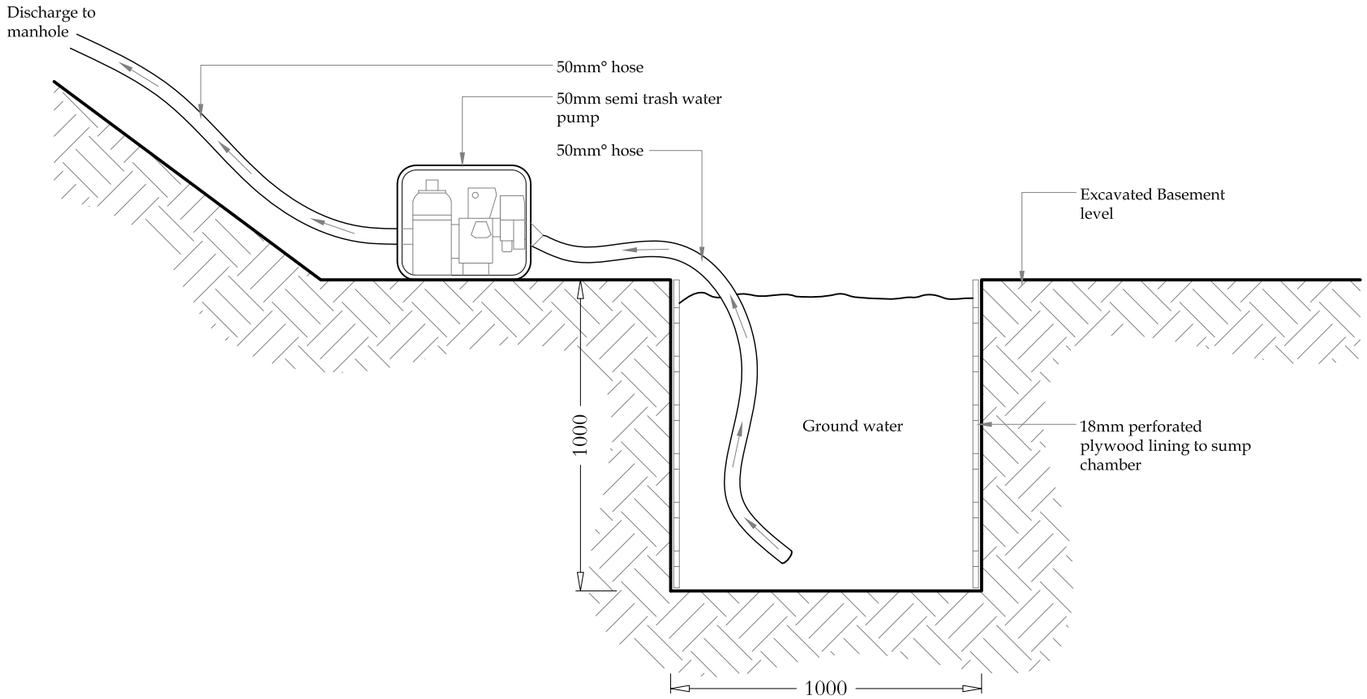
The shoring shall be constructed with props, needles, braces, wedges, etc., as shown on the drawings or in accordance with any written instructions which may be issued by the Engineer.

The whole shall be placed in position with the minimum of shock to the existing structure and shall, in every way, be to the satisfaction of the Engineer. The location of the seating for members shall be inspected by the Contractor to ensure that the existing brickwork is sound. In no case shall a shoring member be placed against lathe and plaster work. In such locations the lathe and plaster shall be cut away to expose the brickwork or main structural frame. The Contractor shall provide all necessary timber packs, folding wedges, etc., as may be instructed by the Engineer. All braces shall be properly mitred, bolted or spiked as instructed by the Engineer and the whole of the shoring maintained in a rigid condition.

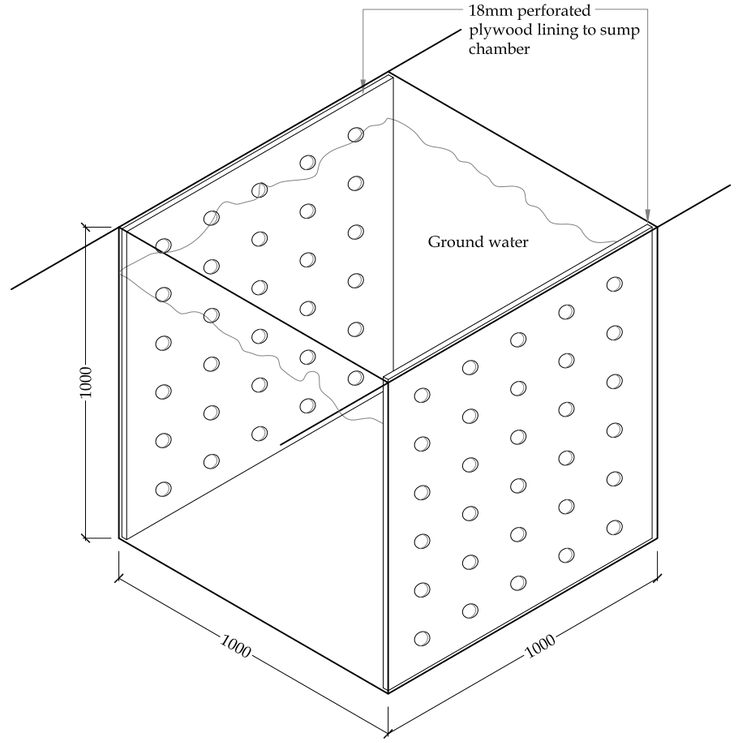
On completion of the shoring the openings of the required size shall be formed. All brickwork shall be removed by hand, brick by brick, with the minimum of shock on the existing structures. Under no circumstances shall mechanical appliances be used for this work without prior approval of the Engineer in writing.

The brickwork reveals shall be reinstated in accordance with the drawings. The padstones shall be positioned to the levels shown on the drawing. The new steel supports shall be erected and shall be pinned up solid using semi-dry 1:1.1/2:3 mix having a minimum cube crushing strength of 25:5 N/mm² at 28 days using a maximum aggregate size of 10mm well rammed into position using a club hammer and caulking tool. None of the shoring shown on the drawing shall be removed until the dry packing has achieved its full strength.

During the removal of the shoring, the Contractor shall ensure that it is taken down with the minimum of shock and that all props are released slowly to ensure that all displaced members are securely bedded down to their new seating.




Typical Sump Chamber Section




Typical Sump Chamber Isometric

| No. | Date | Amendment | Initials |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Client : | Mrs P Lent | | |
| Project : | Hogarth House<br>North End<br>London<br>NW3 7HL | | |
| Drawing : | Water Pumping Detail | | |
| Scale : | 1:20 @ A3 | Status : PRELIMINARY | Rev : - |
| Date : | 14 Jun 12 | Dwg No : 2102-TD 20 | |

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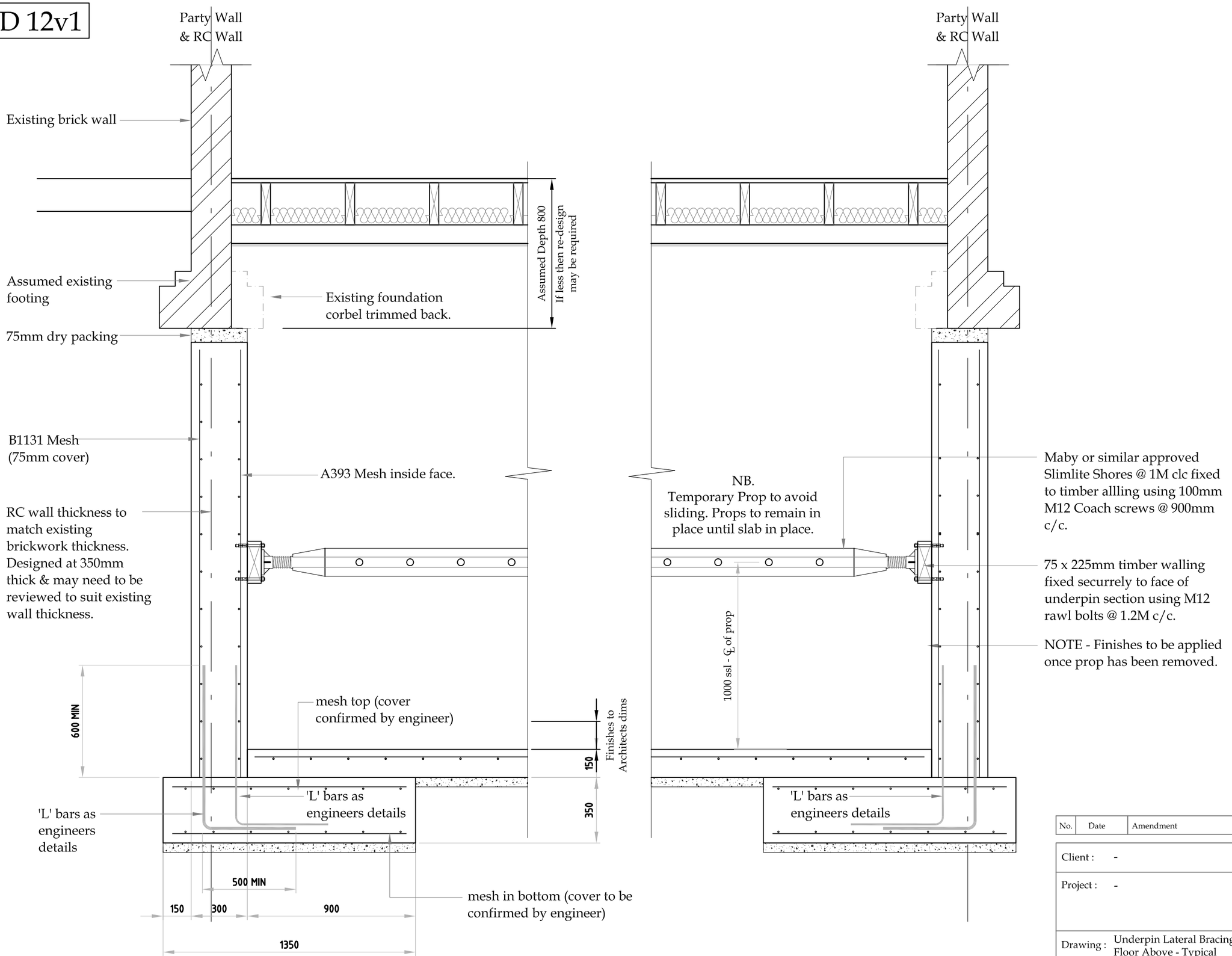
www.cranbrook.co.uk

TD 12v1




# TYPICAL SECTION INDICATING UNDERPIN SUPPORT PROPS

| No. | Date | Amendment | Initials |
|---|---|---|---|

Client : -

Project : -

Drawing : Underpin Lateral Bracing - Timber Floor Above - Typical

Scale : N.T.S @ A3

Status : PRELIMINARY

Rev : V1

Date : -

Dwg No : TD 12

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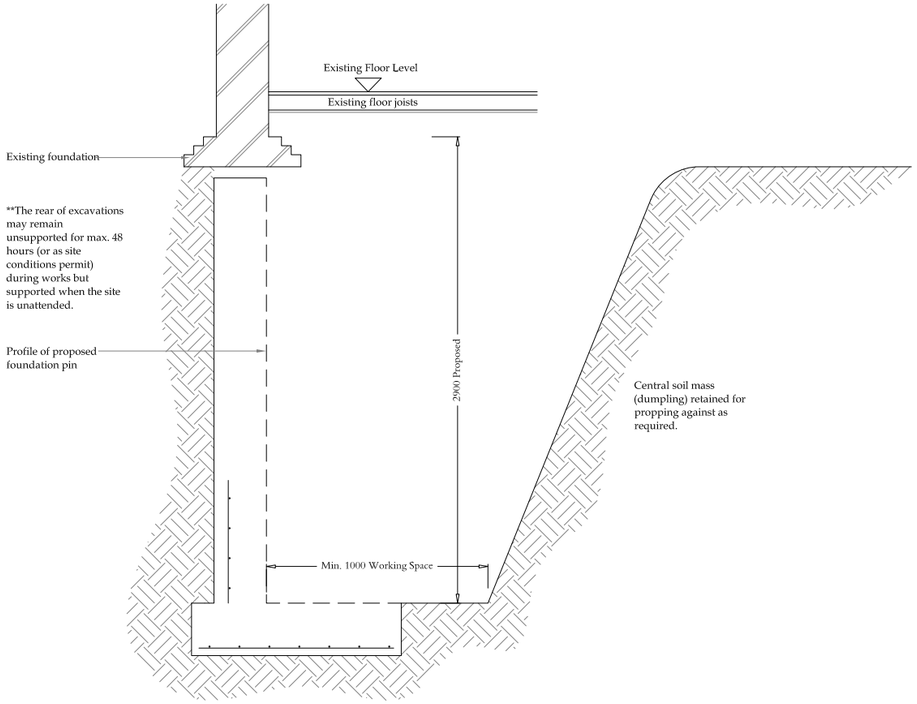
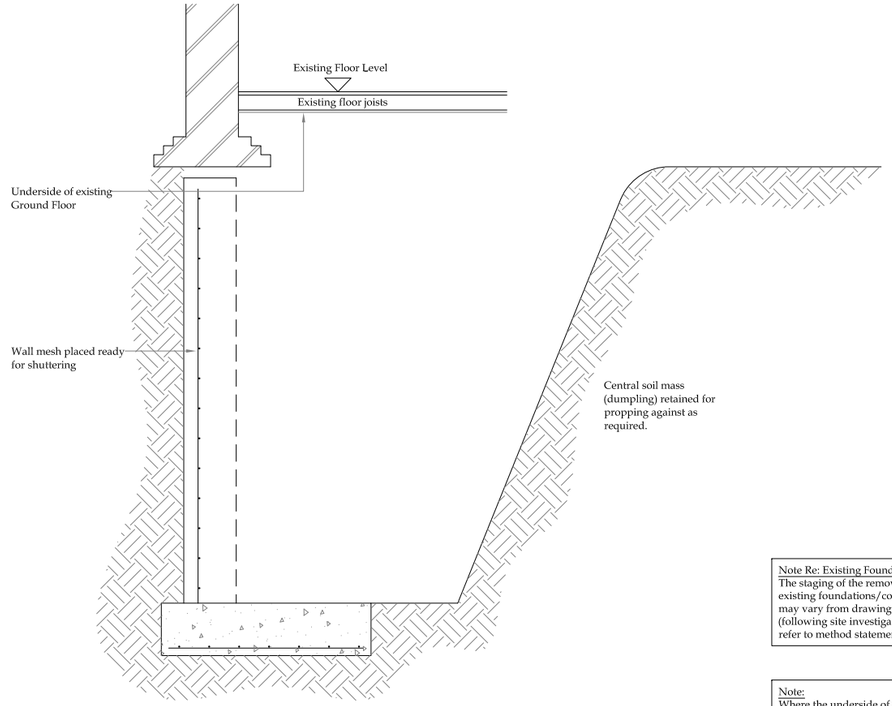
TD 09



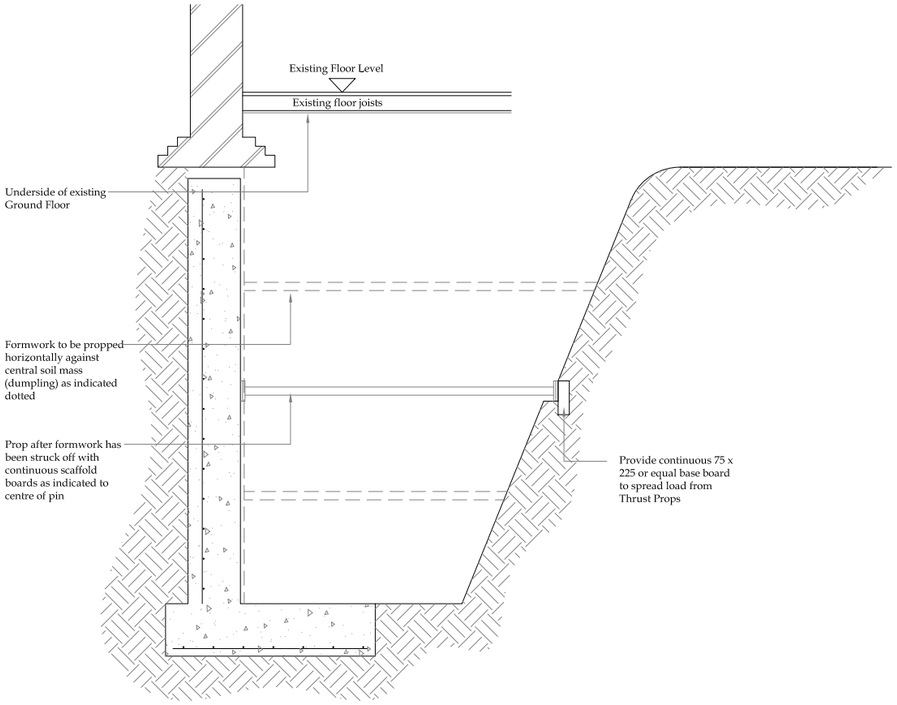

Stage 1 - Clay Soils



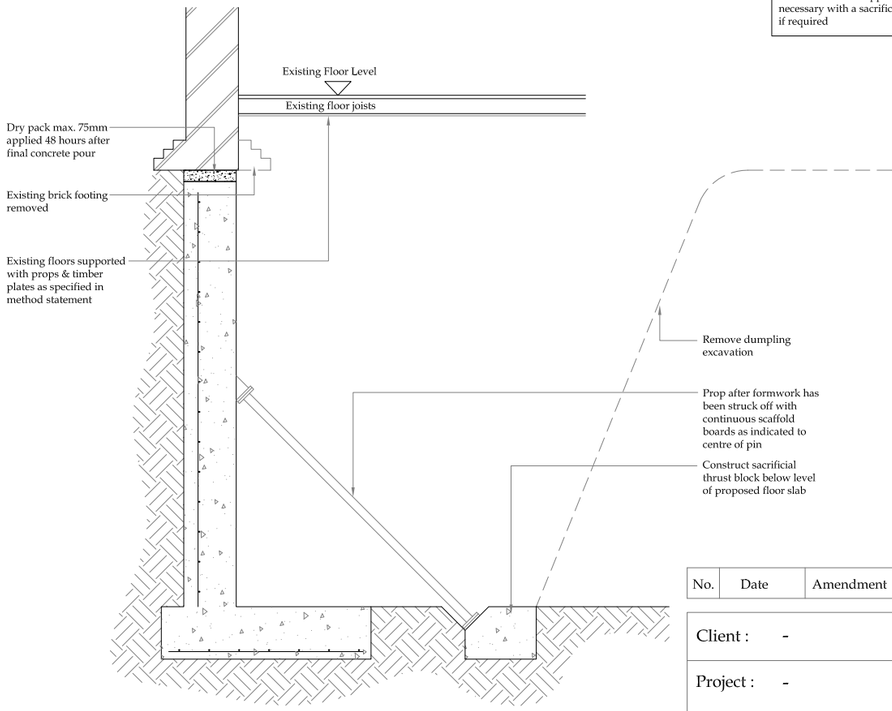

Stage 2 - Clay Soils

Note Re: Existing Foundations
The staging of the removal of existing foundations/corbels may vary from drawing (following site investigation) refer to method statement

Note:
Where the underside of the existing footings is found to be unstable IE. in the case of loose brickwork as opposed to concrete foundations, then the undersides to be supported as necessary with a sacrificial prop if required




Stage 3 - Clay Soils




Stage 4 - Clay Soils

| No. | Date | Amendment | Initials |
|---|---|---|---|

Client : -

Project : -

Drawing : Underpin Excavation Propping - To Central Mound - 4 Stage - Timber Floor

Scale : N.T.S @ A3

Status : PRELIMINARY

Rev : -

Date : -

Dwg No : TD 09

S:\Server1\BUP\Logos\2012 Cranbrook logos\cB Logo.jpg

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# A Factual Report on the

# Site Investigation undertaken for

# Cranbrook Basments

# at

# 6a North End Road
# Camden
# London NW3

# CSI Ref: 2997

## Dated: 26th November 2013

Chelmer Site Investigation Laboratories Ltd. Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Telephone: 01245 400930 Fax: 01245 400933 Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk

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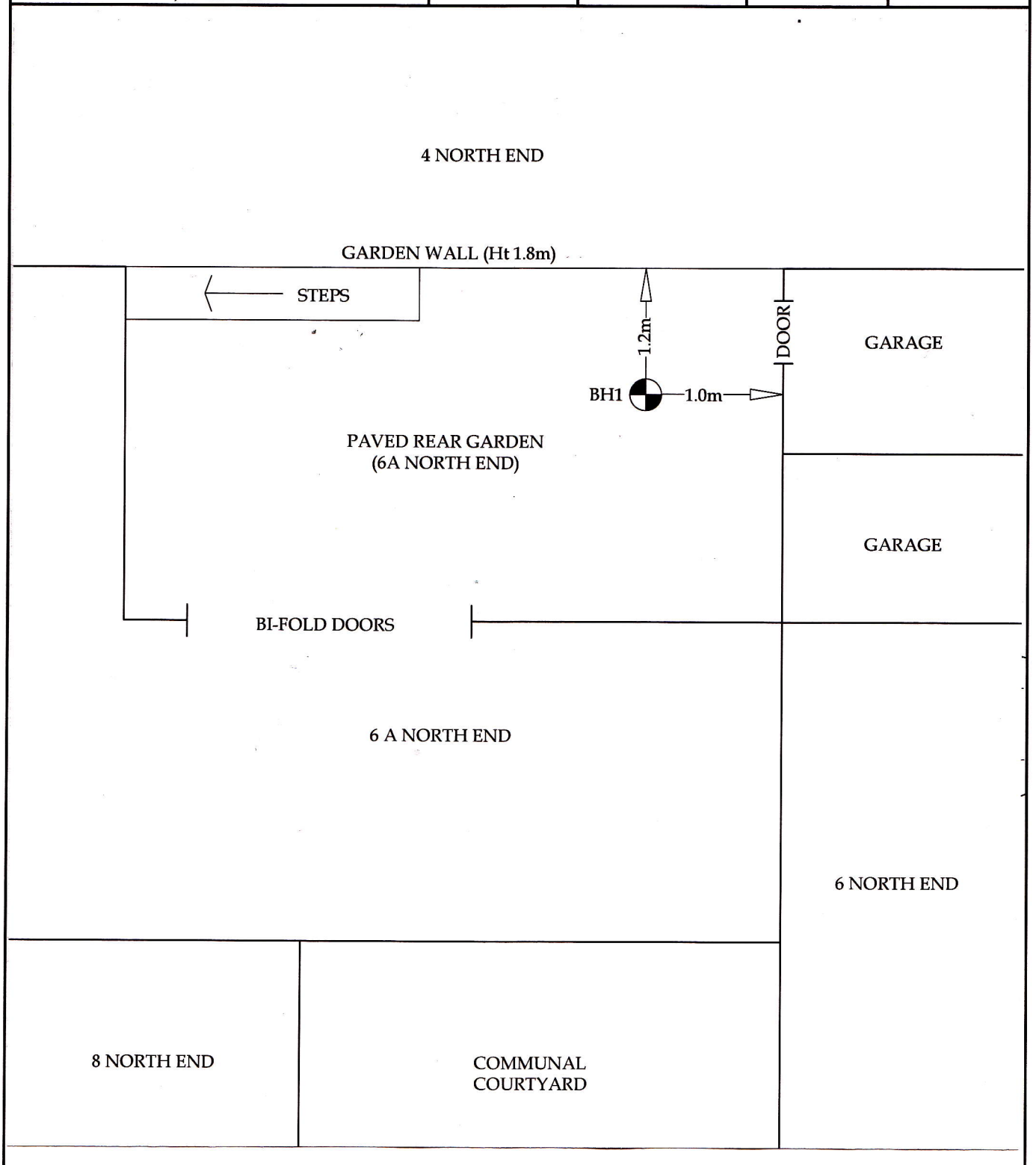
| | | | | | |
|---|---|---|---|---|---|
| **Client:** | Cranbrook Basements | **Scale:** N.T.S. | **Sheet:** 1 of 1 | **Date:** 26.11.13 | |
| **Location:** | 6a North End Road<br>Camden, London NW3 | **Job No:** 2997 | **Weather:** Overcast | **Drawn by: JC** | **Checked by: ME** |




**Notes:** RAISED FRONT GARDEN IS APPROX. 1.5m HIGHER THAN FOOTPATH LEVEL.

*On site tree identification for guidance only. Not authenticated.*

**Key:**

Tree/Shrub | Borehole | Trial Pit | G Gully | Tree Stump | Rain Water/ Soil Pipe | MH Manhole

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**Email: info@siteinvestigations.co.uk Website: www.siteinvestigations.co.uk**

| | | | | | |
|---|---|---|---|---|---|
| **Client:** Cranbrook Basements | **Scale:** N.T.S. | **Sheet No:** 1 of 1 | **Weather:** Hand auger | **Date:** 26.11.13 | |
| **Site:** 6a North End Road, London NW3 | **Job No:** 2997 | **Borehole No:** 1 | **Boring method:** Hand auger | | |

| Depth Mtrs. | Description of Strata | Thick-ness | Legend | Sample | Test Type | Test Result | Root Information | Depth to Water | Depth Mtrs |
|---|---|---|---|---|---|---|---|---|---|
| G.L. | TOPSOIL | 0.3 | | | | | | | |
| 0.3 | MADE GROUND: medium compact mid brown silty gravelly very sandy clay with numerous brick and concrete fragments. | 0.6 | | D | | | Roots of live appearance to 5mmØ to 2.2m. | | 0.5 |
| 0.9 | Stiff mid brown/orange silty very sandy CLAY. | 2.3 | | D | V | 78<br>82 | | | 1.0 |
| | | | | D | | | | | 1.5 |
| | | | | D | V | 88<br>92 | | | 2.0 |
| | | | | | | | Roots of live appearance to 1mmØ to 3.8m. | | |
| | | | | D | | | | | 2.5 |
| | | | | D | V | 110<br>108 | | | 3.0 |
| 3.2 | Stiff mid brown grey veined silty CLAY with partings of orange and brown silt and fine sand and crystals. | 0.6 | | D | | | | | 3.5 |
| 3.8 | Stiff dense mid brown/orange silty fine SAND. | 0.9 | | D | M | 27<br>29<br>31<br>35 | No roots observed below 3.8m. | | 4.0 |
| | | | | D | | | | | 4.5 |
| 4.7 | Stiff/medium dense to dense mid brown/ orange laminated CLAY SILT and fine SAND. | 0.6 | | D | M | 32<br>34<br>37<br>39 | | | 5.0 |
| 5.3 | Medium dense mid brown slightly clayey very silty fine SAND. | 0.4 | | D | | | | *5.4* | 5.5 |
| 5.7 | Borehole ends at 5.7m<br>Unable to extract samples below 5.5m. | | | | | | | | |

**Drawn by:** JC **Approved by:** ME

**Remarks:** *Water seepage at 5.4m.*
Borehole moist and collapsing on completion.

Key: T.D.T.D. Too Dense to Drive
D Small Disturbed Sample J Jar Sample
B Bulk Disturbed Sample V Pilcon Vane (kPa)
U Undisturbed Sample (U100) M Mackintosh Probe
W Water Sample N Standard Penetration Test Blow Count

Chelmer Site Investigations,
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# REPORT NOTES

## Equipment Used

Hand tools, Mechanical Concrete Breaker and Spade, Hand Augers, 100mm/150mm diameter Mechanical Flight Auger Rig, GEO205 Flight Auger Rig, Window Sampling Rig, and Large or Limited Access Shell & Auger Rig upon request and/or access permitting.

## On Site Tests

By Pilcon Shear-Vane Tester ($Kn/m^2$) in clay soils, and/or Mackintosh Probe in granular soils or made ground and/or upon request Continuous Dynamic Probe Testing and Standard Penetration Testing.

Note:

Details reported in trial-pits and boreholes relate to positions investigated only as instructed by the client or engineer on the date shown.

We are therefore unable to accept any responsibility for changes in soil conditions not investigated i.e. variations due to climate, season, vegetation and varying ground water levels.

Full terms and conditions are available upon request.

# DELTA MEMBRANE SYSTEMS LTD.

## DELTA SYSTEM 500

## *'Providing Waterproofing Solutions'*

| | |
|---|---|
| Uniclass<br>L6814 | EPIC<br>F831 |
| CI/SfB<br>(13.9) Ln6 (L34) | |

February 2006

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 00/3742
DELTA MEMBRANE SYSTEMS

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DELTA DÖRKEN

## The Sealed System

In soil retaining situations such as basements and vaults etc. the **DELTA** sealed system is recommended. The membrane selection depends on the required finish and flow rate if applicable. All membrane junctions, fixing points, service entries and other protrusions are sealed with the **DELTA** range of sealing products. Where active ground water is evident or expected drainage of one form or another should be incorporated into the specification. Our technical staff are available to give advice in this respect.

## The Ventilated System

In above ground situations or in areas where no free running water is expected, for example where external pavements have been built up, the ventilated system can be used. The ventilated system with air gap at top and bottom does not require sealed joints or fixings, a 200mm overlap is sufficient in this situation. This method is seen as a sympathetic solution in Heritage type properties as a general damp proofing system. The fabric of the building remains unchanged but the new internal surfaces are 'dry' and are salt and contamination free. Both dry lining or plaster direct finishes are available on the ventilated system.

## Floors

As well as being a complete waterproofing and damp proofing system, the **DELTA** system is also used to upgrade damp and defective floors. With excellent crush resistance the system lends itself to a variety of different finishes which include conventional screeds, thin layer fast drying screeds and wood based floating floors. Insulation can also be used in conjunction with the system where required. The system can be linked to the D.P.C. constructed within a new wall or to an existing D.P.C.

## Preparation

As the membrane systems are mechanically fixed there is no reliance on the ability of the product to bond to the substrate. The **DELTA** system can be applied

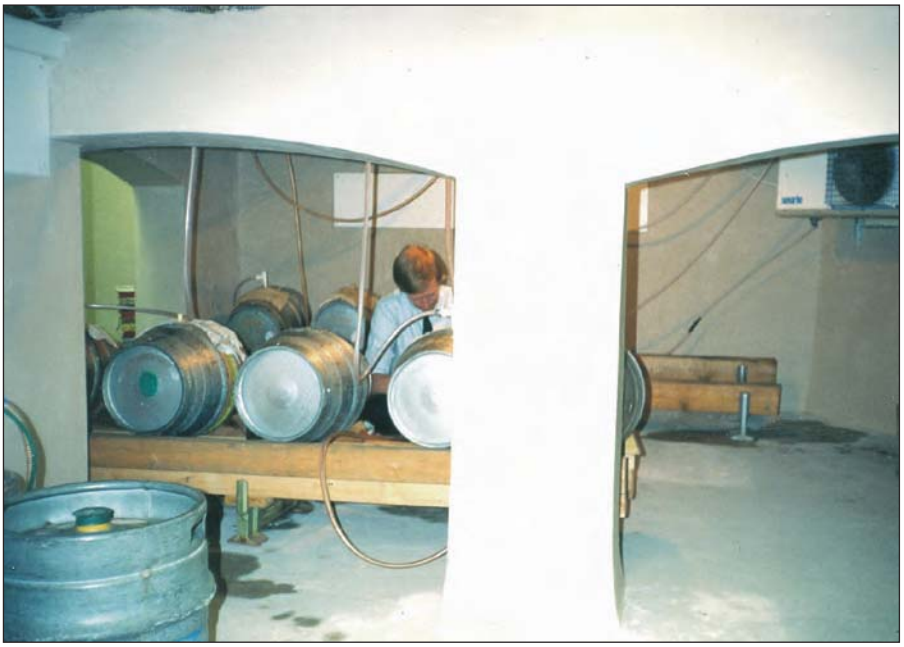
to a variety of different substrates for example over existing renders or broken down bitumen coatings, etc. This can be easily achieved without detriment to the integrity of the system.

## Damp Pressure Equalisation

The studded structure of the membrane allows the dampness behind the membrane to move in all directions unhindered, therefore the whole of the wall or floor surface takes the damp loading. Break downs created by weak points are eliminated. The product does not divert the problem to other areas.

## Flexibility

In structures where movement or vibration can be a problem, examples being under street vaults, railway arches, and buildings constructed with movement joints,



the **DELTA** system can cope. The **DELTA** membrane has an elongation break of greater than 50%.

## Speed

As there is little or no preparation required the system is by comparison quick to install. When dry finishes are used the system is a 'fast track' solution. Decoration does not need to be delayed as there is no drying process.
**DELTA** Membrane Systems is the U.K. arm of the world's largest producer of cavity drain systems. The market leading **DELTA** brand has a track record approaching three decades. The **DELTA** systems have been used successfully in many situations in the U.K, from small domestic basements up to major waterproofing projects such

as London Underground stations. There is rarely a dampness or water ingress problem that falls outside the scope of the capabilities of the **DELTA** system.

## What are DELTA Systems

With the introduction of British Standard BS.8102:2009 'Protection of below ground structures against water from the ground', the use of

cavity membranes has been generally accepted in the U.K. **DELTA** Systems are a complete range of products which are used together to solve many of today's problems in both new and old construction. **DELTA** Systems can easily deal with aggressive ground water conditions, where basements are liable to flooding, or indeed where simple dampness, contamination or salting problems are prevalent. Other more diverse applications include turf covered roofs, barn conversions, tunnel linings or even as a barrier against radon gas.

The main components of the system are the membranes themselves. These are manufactured from virgin high density polyethylene which is thermally and alkaline stabilised. The stud heights vary from 3mm for **DELTA-FM**, 8mm for **DELTA MS 500 & DELTA PT** to 20mm for **DELTA MS 20**. The cavity created by the membrane contains between 2.1 and 10 litres of space respectively. This is known as either the 'Air Gap' or the 'Drained Cavity', in wet situations.

## The Membranes

**DELTA-MS 500** This is used for walls and floors, and is supplied in 2.4, & 2m x 20m rolls. This membrane can be used for light water ingress situations, and is available yellow (**DELTA-FM**), and **clear**. The MS 500 **clear** aids the selection of good fixing points in more difficult application i.e. random stone and friable brickwork. The sealed **DELTA-Plug** or **Qwik Seal Plug** is used to secure System 500, the centre shank of this fixing is also used for subsequent dry lining applications.

**DELTA PT LATH** This membrane has a mesh incorporated on the internal face which is attached by a thermic welding process at the time of manufacture. The sealed PT fixing plug is used to secure the

membrane at 250mm horizontal and vertical centres. The welded mesh and fixing plugs allow for direct render 1.1.6. (cement/lime/sand), or plasters: Tarmac Whitewall, Carlite Bonding, or dab fixed plasterboard for internal applications. When this grade is used for external above ground protection polymer renders can be used as a finish. These renders are polymer modified and can also have reinforcing fibres incorporated for added strength and durability. This grade is available in clear 2.0m x 20m (40m$^2$),1.5m x 10m (15m$^2$) or 1.0m x 15m (15m$^2$).

**DELTA MS 20** This is a heavy gauge version of System 500 with deep 20mm studs. This is used where extra drainage capacity is required, for example on deeper structures, or where a larger flow rate is required. MS 20 can also be used as a 'cavity former' for many types of new construction. The rolls are a full 2 metre width by 20 metres in length (40m$^2$).

## Product Guarantee

**DELTA** membrane systems can come with a thirty year product guarantee when installed by registered installers. The guarantee covers the membrane and ancillary components. Based on experience, accelerated ageing tests and a quality manufacturing system to ISO 9001, the **DELTA** range can also be guaranteed with confidence.

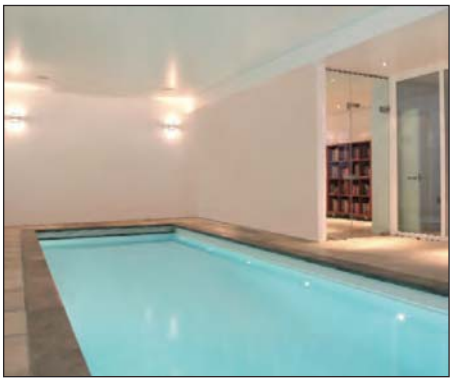
## Technical site and/or office visits

Staff are available to visit site to give advice on particularly difficult or unusual situations, where appropriate specifications are prepared to assist in the correct use of the system.

## Who Installs DELTA Systems

Although **DELTA** systems are by comparison, easy to install, it must be recognised that correct diagnosis of the problem is essential so that **DELTA** systems can be designed and tailored to the needs of the building, to give the best possible performance. It is therefore recommended that only competent specialist contractors, who understand dampness, and the associated problems, be employed to survey the site, install the system and thereby ensure the best possible performance of the system. **DELTA** systems are installed by a nationwide network of specialist contractors who are holders of 'Registered Installers' Certificates. These contractors also offer guarantees for their workmanship, giving peace of mind to the client.

# COMPLETED BASEMENT PROJECTS



**Leisure**

**Study**

**Photography Studio**

**Playroom**

**Home Cinema**

**Music Room**

# DRAINAGE OPTIONS

## DELTA® SUMPS & PUMPS

When specifying a sealed cavity membrane system, full consideration must be given to drainage, when installed below ground.

The concept of the drained cavity system is to collect and manage any moisture which breaches the integrity of the structure by channelling, collecting, and discharging such free water via a suitable evacuation point.

Channels, laid to falls, can discharge passively into a sump or be connected to a drainage system but access for maintenance should be provided.

Access ports allow inspection and water jetting of channels, while sumps have a sealed access cover which allows for annual maintenance checks to be carried out, which are recommended.

If drainage has been installed, it should be flood tested before covering it up to make sure the system works.

Delta offer a choice of sump+pump stations to fit the purpose, and free advice is available from their technical staff.
Service agreements can be arranged through Delta and are maintained by PPS Ltd.

**Delta Retrofit Sumps** are fitted with a dual pump system and have three 110mm/160mm side inlets to take ground water, and grey water from shower, laundry and sink waste.

# DELTA® CHANNEL

## DELTA® AQUADUCT

**Delta Channel** is a water collection conduit which is bedded into a preformed channel at the floor/wall angle. Holes in the channel wall allows water to ingress at this point to drain away to a sump or soak away. Access ports are available to allow maintenance and inspection. The system is joined with a range of connectors.

**Delta Aquaduct** is a drainage channel which acts as a perimeter conduit bedded in at the floor/wall angle. Where appropriate, it can be laid under the slab to take off ground water to a sump or soak away, and reduce flotation pressures from bearing on the slab.

**Delta Aquaduct** is fully perforated for maximum performance, and incorporates an outer geotextile filter to prevent particles from entering the channel.

The product comes on a roll 150m x 60mm diameter. It is also available in 100m x 100mm dia rolls.

### 'FREE LIME' RISK

When new concrete forms the structure, to walls or particularly floors, there is a risk of excess free lime leaching out during the curing process.When a cavity drainage system is used in this type of application, a silicification pre-treatment of the concrete should be used to prevent the risk of free lime build up, and blockage of the drainage cavity. Delta Polysil-TG 500 is applied by spray for this purpose, and is available in 10kg drums.


# POWER FAILURE?

## HELP IS AT HAND


Delta Power Pack Pumps 8,100 Ltr in back up mode.

If you've installed a cavity drained system internally, one of the main design considerations is how are you going to manage the water collection and discharge. This can be done passively into existing drainage points, if available and appropriate.

However, the majority of projects require a collection sump + pump, to automatically manage the evacuation of any water ingress. This type of unit requires mains power to operate, so what can be done if the power fails, and is coincident with high water ingress? Here are two options from Delta.

**High Water Level Alarm** - This system gives an audible warning if a high level situation occurs. It is fitted with it's own rechargeable battery, which is trickle charged , and will still operate in the event of mains power failure.

**Delta Power-Pack** -This unit is designed to run the secondary pump if a power failure occurs. The unit is trickle charged under normal conditions, and will auto switch to battery power if mains power fails. The unit will pump approx. 8,100 litres in back up mode.

## DELTA®-MS 500:

Cavity drainage membrane for use on walls and floors, as a waterproof system. A choice of finishes are available. Can also be used externally for waterproof protection of sub-ground structures.

| | |
|---|---|
| Material: | high density polyethylene |
| Thickness: | approx. 0.6 mm |
| Stud height: | approx. 8 mm |
| Roll size: | available in clear |
| (With flat edge of 7 cm | 2.4 x 20 m |
| on one side) | 2.0 x 20 m |
| Compressive strength: | > 250 kN/m² |
| Drainage capacity: | approx. 2.25 l/s · m |
| | approx. 135 l/min · m |
| | approx. 8 100 l/h · m |
| Air volume between studs: | approx. 5.3 l/m² |
| Temperature resistance: | – 30°C to + 80°C |
| Chemical properties: | resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water |
| Behaviour in fire: | Class E |

## DELTA®-MS 20:

Dimpled sheeting with particularly high drainage capacity and compressive strength, suitable for high performance seepage layers in building and civil engineering construction.

| | |
|---|---|
| Material: | high density polyethylene |
| Thickness: | approx. 1 mm |
| Stud height: | approx. 20 mm |
| Roll size: | 2.0 x 20 m |
| | In the case of special requirements, also available in board format |
| Compressive strength: | approx. 150 kN/m² |
| Drainage capacity: | approx. 10 l/s · m |
| | approx. 600 l/min · m |
| | approx. 36 100 l/h · m |
| Air volume between studs: | approx. 14 l/m² |
| Temperature resistance: | – 30°C to + 80°C |
| Chemical properties: | resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water |
| Behaviour in fire: | Class E |

## DELTA®-PT:

Dimpled sheeting with plastic mesh welded on, suitable as a damp-proof base for plaster or shotcrete, e.g., as a seepage layer in tunnel construction, or for repairing basements internally.

| | |
|---|---|
| Material: | high density polyethylene |
| Thickness: | approx. 0.5 mm |
| Stud height: | approx. 8 mm / 8mm / 4mm |
| Roll size: | 2.0 x 20 m / 1.5 x 10 m / 1.0 x 15m |
| Compressive strength: | approx. 70 kN/m² |
| Drainage capacity: | approx. 5 l/s · m |
| | approx. 300 l/min · m |
| | approx. 18 100 l/h · m |
| Void between studs: | approx. 5.5 l/m² |
| Temperature resistance: | – 30°C to + 80°C |
| Chemical properties: | resistant to chemicals, resistant to root penetration, rotproof, neutral towards drinking water |
| Behaviour in fire: | Class E |

## DELTA®-FM:

DELTA®-FM is specifically designed for floor applications, to combat dampness, and contamination. The special low stud profile (3mm) minimises changes in floor levels but still provides an air gap to achieve damp pressure equalisation.

The membrane is a fast-track application that allows various floor finishes to be achieved with zero 'down time'. The R.H. levels are isolated in the air gap, and controlled. Delta-FM can be used in new build, remedial or refurbishment projects for floors, and walls.

| | |
|---|---|
| Material: | Virgin high-performance PE-VHD |
| Application: | Special low stud profile for floor. Can be used on walls |
| Sheet thickness: | approx. 0.6 mm |
| Dimple height: | approx. 3 mm |
| Compressive strength: | approx 140 kN/m² |
| Roll dimensions: | 20m x 2m (40m²) |
| Volume between dimples: | approx 2.1 1/m² |
| Service temperature range: | -30degC / +80degC |
| Behaviour in fire: | Class E |

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DELTA MEMBRANE SYSTEMS

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DELTA DÖRKEN



08/11