

## Chelmer Site Investigations

Unit 15, East Hanningfield Industrial Estate  
Old Church Road, East Hanningfield, Essex CM3 8AB

**Telephone:** 01245 400 930 **Fax:** 01245 400 933

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## Factual Report

**Client:**

Dig for Victory Ltd

**Site:**

63 Goldhurst Terrace  
London NW 6

**CSI Ref:**

FACT/5126B

**Dated:**

12<sup>th</sup> August 2014

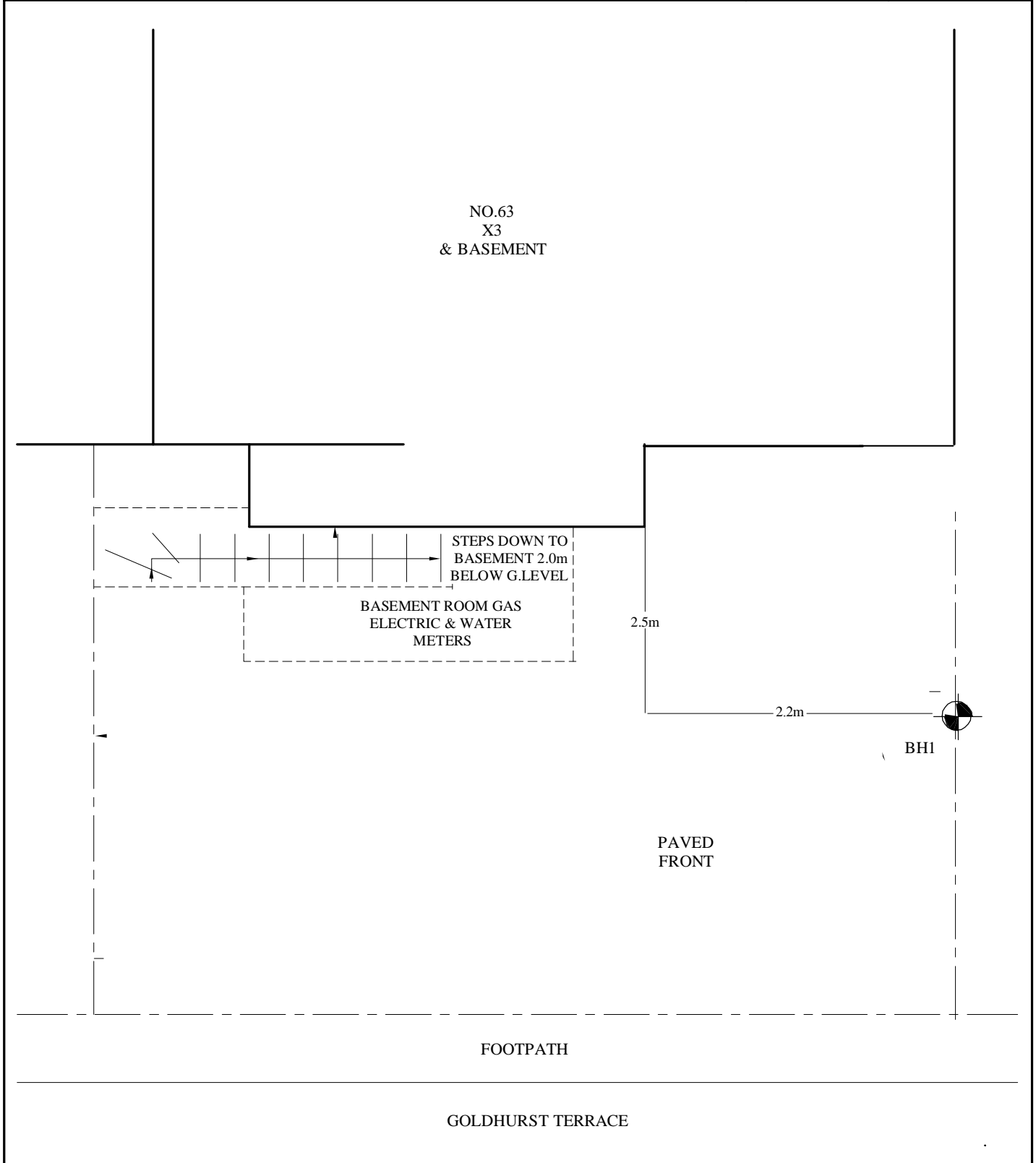
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<b>Client:</b> Dig for Victory Ltd	<b>Scale:</b> N.T.S.	<b>Sheet:</b> 1 of 1	<b>Date:</b> 12.8.14	
<b>Location:</b> 63 Goldhurst Terrace, London NW6	<b>Job No:</b> 5126B	<b>Weather:</b> Overcast	<b>Drawn by:</b> JG	<b>Checked by:</b> ME



**Notes:**

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

**Key:**

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

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Client:		Dig for Victory Ltd		Scale:		N.T.S.		Sheet No:		1 of 1		Weather:		Overcast		Date:		12.8.14			
Site:		63 Goldhurst Terrace, London NW6		Job No:		5126B		Borehole No:		1		Boring method:		Hand auger							
Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Result	Root Information	Depth to Water	Depth Mtrs												
G.L.	BRICK PAVING	0.15																			
0.15	MADE GROUND: medium compact, dark brown, very silty clay, with gravel and brick fragments.	0.75		D			Hair and fibrous roots to 0.9m. ↓		0.5												
0.9																					
2.3	Firm, orange-brown, grey veined, silty CLAY, with partings of orange and brown, silt and fine sand, claystone nodules and selenite crystals. .....becoming stiff from 1.4m.	1.4		D	V	62 66	No roots observed below 0.9m.		1.0												
				D	V	78 82				1.5											
				D	V	94 100					2.0										
				D	V	140+ 140+						2.5									
2.7	Very stiff, orange-brown, grey veined, silty CLAY, with partings of orange and brown, silt and fine sand, frequent claystone nodules and selenite crystals.	2.7		D	V	140+ 140+			3.0												
				D	V	140+ 140+				3.5											
				D	V	140+ 140+					4.0										
				D	V	140+ 140+						4.5									
5.0	Borehole ends at 5.0m			D	V	140+ 140+			5.0												

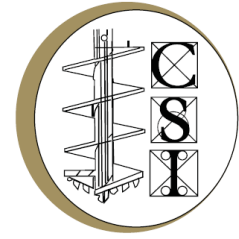
Drawn by: JG	Approved by: ME	Key: T.D.T.D. Too Dense to Drive D Small Disturbed Sample J Jar Sample B Bulk Disturbed Sample V Pilcon Vane (kPa) U Undisturbed Sample (U100) M Mackintosh Probe W Water Sample N Standard Penetration Test Blow Count
Remarks: Borehole dry and open on completion.		

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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 ( $\text{Kn/m}^2$ ) 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.

## 63 Goldhurst Terrace, London, NW6 3HB

### Method Statement – New Basement Construction

Date Issued: 07 September 2014

Version: -

Issued By: AE

Checked By: RS

#### **Introduction**

- This method statement should be read in conjunction with the architectural drawings by Dig For Victory DFVI407-P01.
- This method statement should be read in conjunction with the structural engineering drawings.
- Please also refer to the attached DFV Typical underpinning sequence for clay soils with sacrificial sheeting. This sketch details the construction method we are likely to adopt, based on the assumed ground conditions at the property consisting of London clay (Refer to section B below).
- Please also refer to the attached hoarding and conveyor layout, which details a typical compound layout over the footpath and the highway.
- Please also refer to the document '61GT Typical Temporary Works Arrangement', which details the designed temporary works for a similar project undertaken at nr 61 Goldhurst Terrace, which we commenced less than 4 months ago as of the date of this document. Once we establish the existing structural arrangements as stage B below we will then employ our Structural Engineer to design a suitable temporary works regime which, in our view, will not differ greatly from the exemplar shown.
- The key stages are as follows:-
  - A - Establish hoarding and conveyor
  - B - Investigatory works
  - C – Underpinning and retaining walls
  - D - Steel frame installation at basement and basement ceiling level
  - E - Excavation, drainage and basement slab construction
  - F - Internal waterproofing membrane and screed

Note : Temporary Support to Excavated Faces

- Ground conditions will be continuously assessed by a competent person to determine the means and method of supporting any face of any excavation. All necessary shoring equipment will be available for use on site. The most likely method to be adopted will be the introduction of trench sheets supported by Acrow props in accordance with the temporary works design prepared by the Engineer. Please refer to the attached diagrams which indicate the temporary works we will adopt during the underpinning works.
- We would like to note that we completed an almost identical project at nr 66 Goldhurst Terrace at the end of 2013 and we will be employing the same methodology, project team and resources at nr 63. Our highly trained, experienced and competent Foreman (holding the 5 Day Site Managers Safety Training Scheme accreditation) shall ensure that every part of every excavation is inspected at the start of each shift (and at intervals as specified by law and good practice) and will record the findings of any such inspection in a register held on site.

**A. Establish access, hoarding and conveyor**

- The hoarding and conveyor will be positioned at the front of the property, which will be subject to any restrictions imposed by the local governing authority. The layout will be similar to the attached hoarding and conveyor layout sketch, which details a typical conveyor set-up over the highway and footpath.
- Carefully protect and/or remove any internal or external fixtures and fittings affected by the works.
- Erect plywood hoarding with vertical standards, anchored to the ground. The hoarding will be fully secure with a lockable door for access.
- Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local governing authority, construct a plywood bulkhead onto the pavement. Hoarding to have a plywood roof covering, night-lights and safety notices.
- Install conveyor at basement level. Ensure that the conveyor is adequately supported and secured to the hoarding using a temporary scaffold structure.
- Install temporary electrical and water supplies from Clients permanent connections.

## **B. Investigatory works**

- We have a soil investigation report which shows a soil profile of made ground to 1.3m deep and stiff London clay below that to our formation level.
- On commencement of construction DFV will determine the foundation type, width and depth. Any discrepancies from the design allowances will be reported to the structural engineer in order that the detailed design can be modified.
- Prior to installation of new structural beams in the superstructure, DFV may undertake the local exploration of specific areas in the superstructure. This will confirm the exact form and location of the temporary works that are required. A fully designed temporary works package will be prepared once the existing structural composition is determined, and only once the structural engineer has been made aware thereof and issues either an instruction to continue as planned or revised design information. Only then can the permanent structural work can then be undertaken while ensuring that the full integrity of the structure above is maintained.

## **C. Reinforced concrete underpinning and retaining walls**

- Sacrificial trench sheets are installed at the back of the excavation as said excavation progresses. The method adopted to prevent localised collapse of the soil is to install these progressively one at a time. The trench sheets are held in place with acrows until such time as the full underpinning excavation is sheeted.
- Once the toe section is cast, the lower level propping to the trench sheets can be removed, prior to casting the stem section. This method ensures that at all times the excavation is controlled, and indeed the integrity of the surrounding soil and structure above is maintained, to enable permanent works construction.
- The access trench is first excavated, directly underneath the wall to be underpinned. The width of any base is individually assessed on site with due regard to the type and condition of the foundation, and structural geometry above. The maximum width of any underpinning base will be 1,200mm.
- Break off projecting brick or concrete footing back to internal face of brick wall. Excavate using hand and compressed air tools removing spoil until the design depth is reached, and removed to muck away conveyor.
- Soils, where unstable in the temporary condition, will be shored. Shoring system design will be undertaken by DFV if required.
- Once the excavation is completed to the design depth and length. The stratum at the proposed founding depth is confirmed as being appropriate by our engineers or the building control inspector.
- The design steel reinforcement will be fixed in the toe section of the underpinning base. This will be checked by the building control inspector prior to concreting.
- Following construction of the toe, the design steel reinforcement will then be fixed in the stem (Or wall) section. This will be checked by the building control inspector prior to concreting.
- A single sided shutter is then erected, and concrete poured to form the underpinning base up to a maximum of 100mm below the underside of the existing foundation.

- After 24 hours the temporary wall shutters are removed. The void between the top of the underpin base and underside of the existing foundation will then be drypacked with a mixture of sharp sand and cement (Ratio 3:1 sharp sand:cement).
- A further 24 hours is allowed before adjacent sections can be excavated.
- Construction joints, if required, are formed using a suitable shear key or joggle joint. In exceptional circumstances, dowel bars are incorporated. Typically these are post drilled and resin fixed with specification as per structural design.
- A record will be kept of the sequence of construction, which will be in strict accordance with recognised industry procedures. The as-built records will be updated as necessary and issued to involved parties during the works.

#### **D. Steel framework installation**

- The new steel framework is to be installed to provide the new openings as per the architectural layouts. The framework will consist of a system of steel beams and columns that will bear at the new basement level.
- The new frame will be installed in a sequence to be determined by the DFV, in conjunction with the district surveyor.
- Once full internal investigation of the property has been concluded, DFV will carry out a temporary works design for the steel beam installation.
- Temporary works will be undertaken as per the MMP Design Temporary Works drawings.

#### Supporting existing walls above basement excavation:

- Where steel beams need to be installed directly under load bearing walls, temporary works will be required to enable this work. Support consists the installation of steel needle beams at high level, supported on vertical props, to enable safe removal of brickwork below, and installation of the new beams and columns.
- Once the props are fully tightened, the brickwork will be broken out carefully by hand. All necessary platforms and crash decks will be provided during this operation.
- Decking and support platforms to enable handling of steel beams and columns will be provided as required.
- Once full structural bearing is provided via beams and columns down to the new basement floor level, the temporary works will be redundant and can be safely removed.
- Any voids between the top of the permanent steel beams and the underside of the existing walls will be packed out as necessary. Voids will be drypacked with a 1:3 (cement: sharp sand) drypack layer, between the top of the steel and underside of brickwork above.
- Any voids in the brickwork left after removal of needle beams can at this point be repaired by bricking up and/or drypacking, to ensure continuity of the structural fabric.



## **E. Excavation, drainage and basement slab construction**

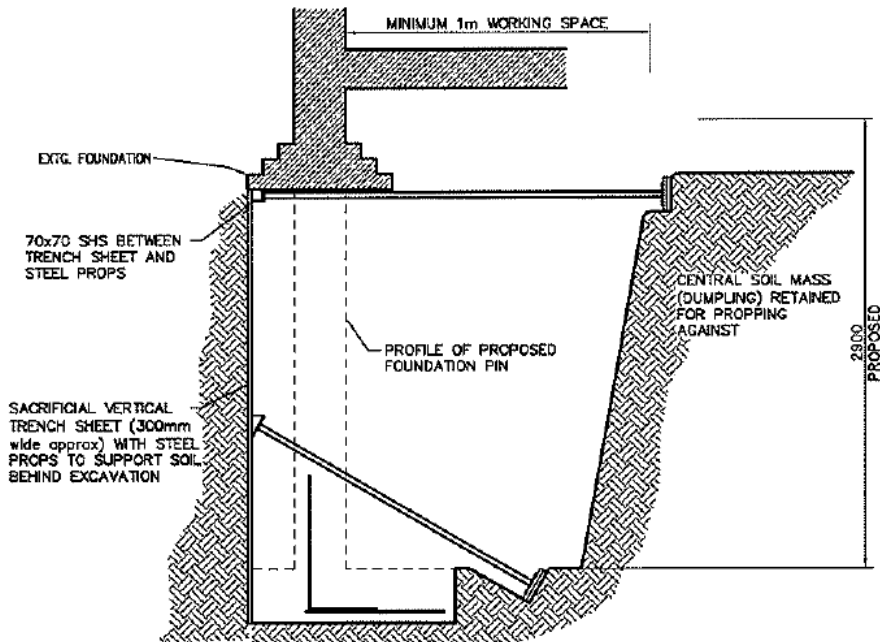
- Once the underpinning is complete to all walls, the bulk excavation can be completed.
- Depending on the structural design it may be a requirement to implement propping to resist sliding forces (As per structural engineering requirements) at the base of the underpins, prior to construction of the new basement slab, and to allow for excavation to formation level. Generally, the underpinning works are completed around the perimeter walls, with the central soil mass (Dumpling) left intact as detailed on the attached sheets. This enables the earth mass to act as a firm support for the underpinning stem single sided shutters, and also to provide a prop force at the base of the pins.
- The pump sump units and associated underground drainage will then be installed in conjunction with the mechanical and electrical details and architectural layouts.
- Once excavation to formation level has been completed, and the slab cast, any temporary shoring can be safely removed.
- The design steel reinforcement will then be fixed in the slab. This will be checked by the engineer and building control inspector prior to concreting.

## **F. Internal waterproofing membrane and screed**

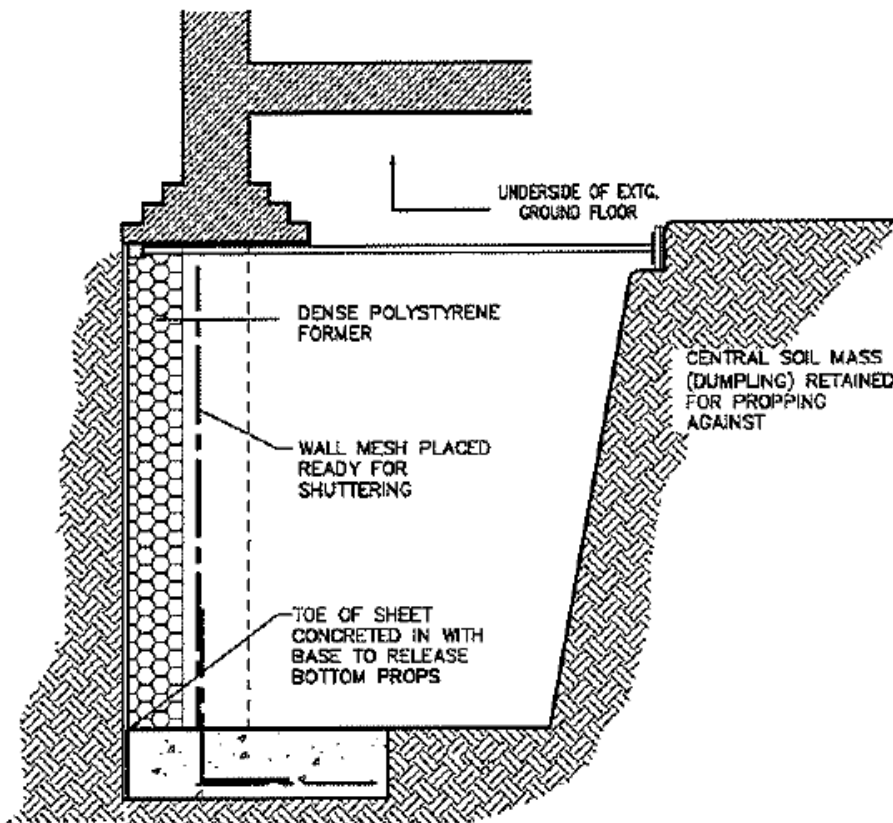
- Generally the waterproofing membrane will be in accordance with the attached sketch.
- Once the basement slab is complete, the DELTA internal waterproofing cavity membrane will be installed as per the architectural layouts and manufacturers technical specification.
- The floor finishes which may include insulation and under floor heating, can be laid as per the final architectural details.
- A cement and sand screed will be applied on the slab surface.
- This completes the structural work by DFV, in preparation for the fit out works.

## Typical underpinning sequence – Clay soils with sacrificial sheeting

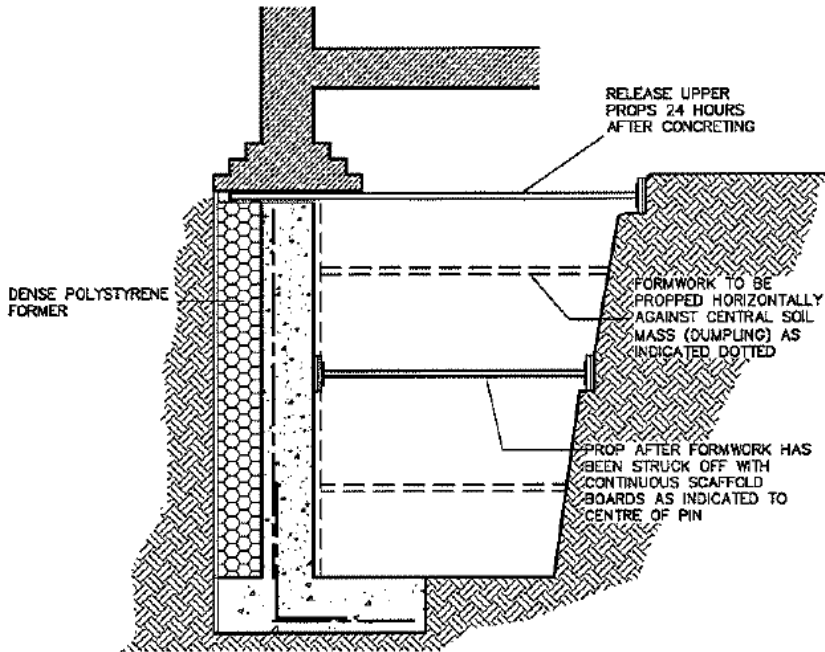
### Stage 1



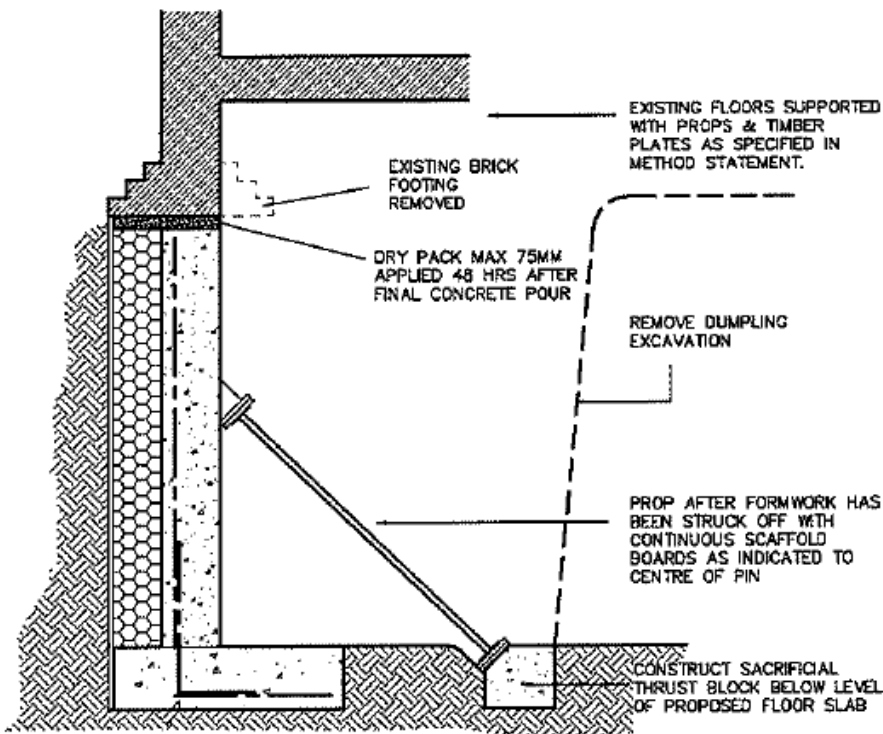
### Stage 2

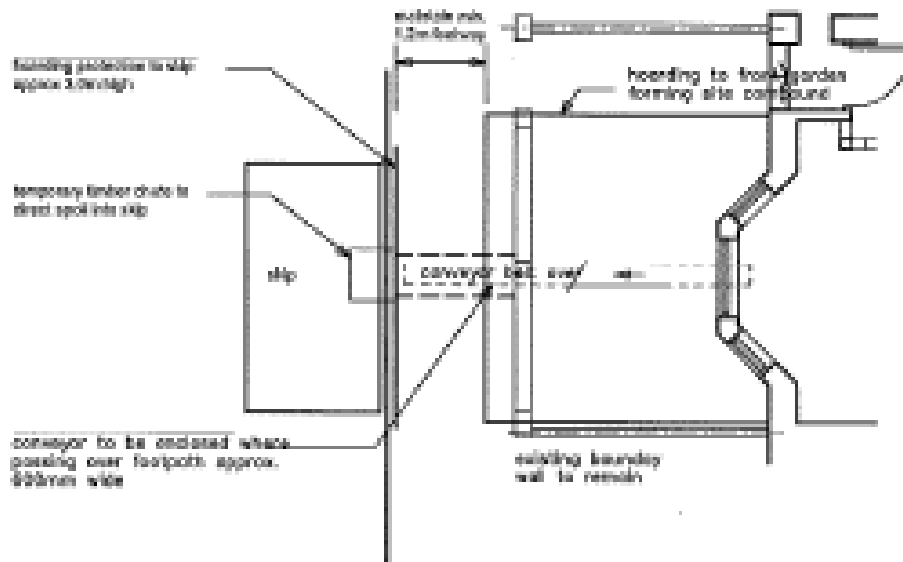


### Stage 3

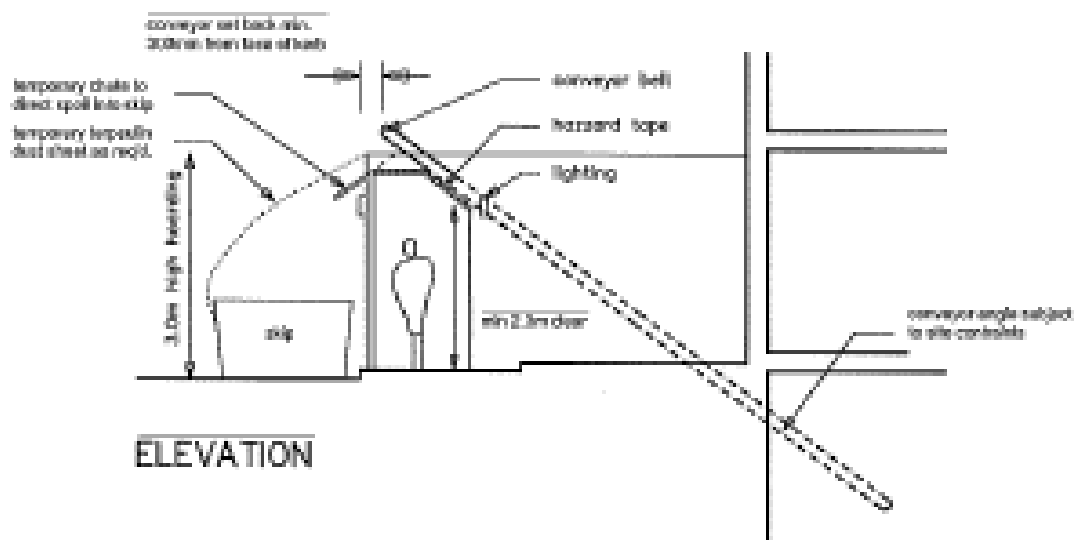


### Stage 4





PLAN AT PAVEMENT LEVEL



ELEVATION

## TYPICAL HOARDING & OVERHEAD CONVEYOR INSTALLATION

## delta dual V3 sump installation instructions and technical details

### application

The Delta Dual V3 Sump is designed to evacuate water collected from the Delta cavity membrane system installed in basement applications.

The Dual V3 Sump can also be used for collecting wastewater from small light wells, baths, showers, wash hand basins, sinks, dishwashers and washing machines. It is not possible to collect wastewater from a W.C.

Ground water in basement applications is collected via the cavity membrane system through the clear opening at the top of the chamber or can enter the chamber through one of the three 110mm inlets on the side of the chamber. It is important to note that ground water is collected at slab level to prevent dewatering below this level.

### method of operation

The Delta Dual V3 sump chamber is manufactured from high-density polyethylene and is designed to resist ground water pressure.

Two powerful Delta V3 pumps are fitted, one to operate as the main duty pump the other to act as a back up. During regular maintenance the operation of the two pumps are reversed.

The sump chamber is fitted with two brass nonreturn valves to prevent water travelling back into the chamber once the pumps have stopped and a gate valve for isolation or maintenance purposes.

### maintenance

The Delta Dual V3 sump chamber is manufactured using high quality components designed to give a long a trouble free life. With any piece of mechanical equipment regular preventative maintenance is important to keep this product working efficiently on a day-to-day basis. We recommend the sump is serviced twice a year by specialist pump engineers.

### electrical connections

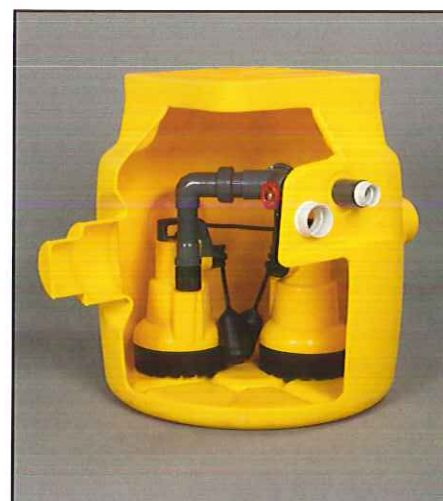
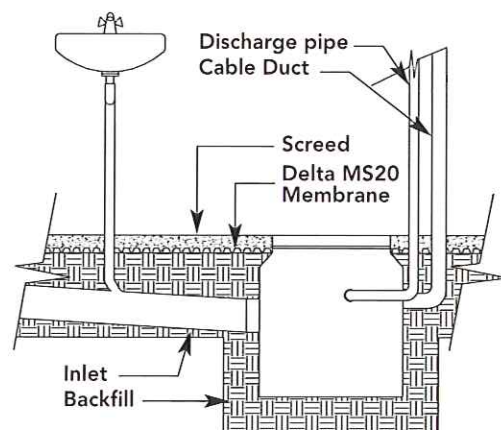
Each pump and high level alarm are to be electrically connected to a non switched fused spur (total of three). This spur should have it's own dedicated supply from the main fuse board.

It is advisable to leave 500mm of the pump electrical cable in the sump to allow for servicing of the pump(s) outside the sump.

Pumps must not be wired to a 'RCD' or similar protective device.

### float(s)

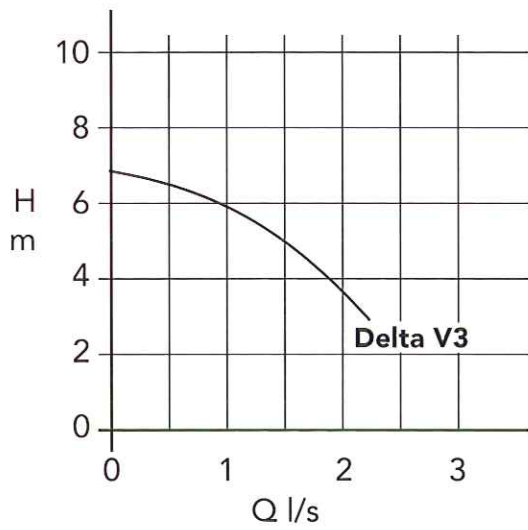
Ensure float(s) does not foul chamber sides. It may be necessary to rotate pipe work on pump to achieve this as there may have been some movement during transit.



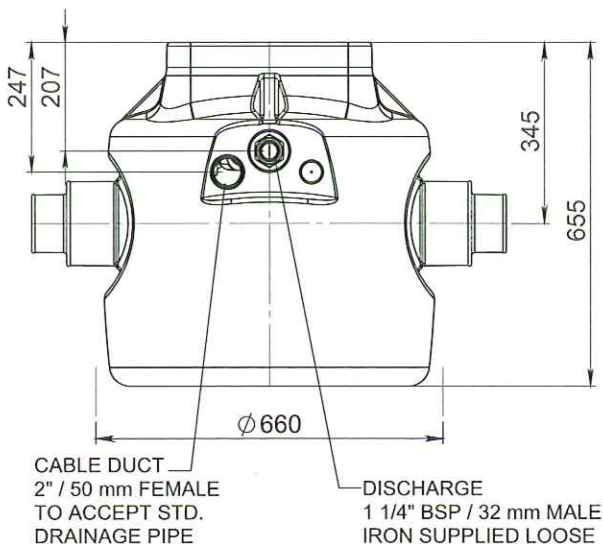
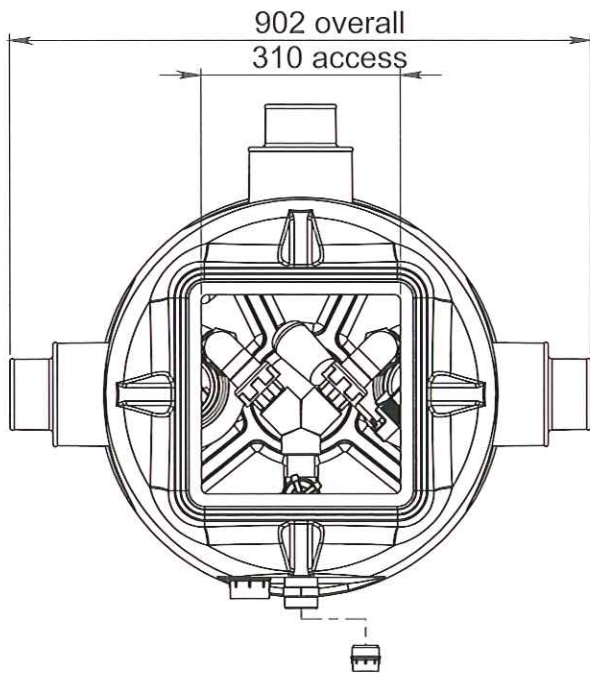
Cutaway of Delta Dual V3 Sump



**delta dual V3 sump - Delta V3 technical details**



Performance tolerance to ISO 2548, Class C (water under normal conditions)



**high level alarm**

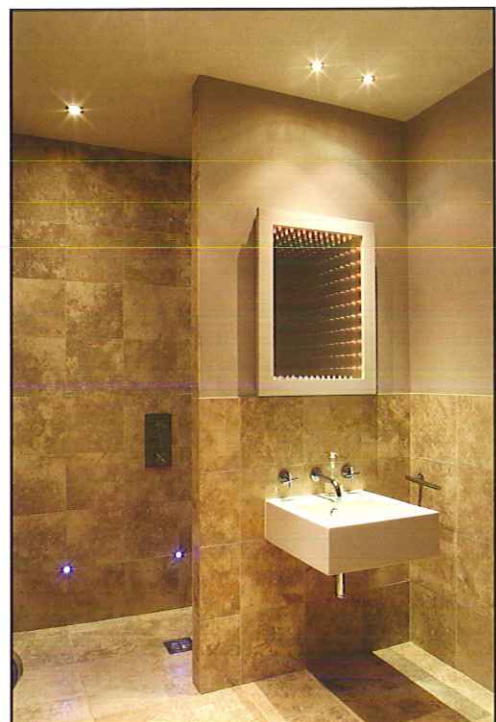
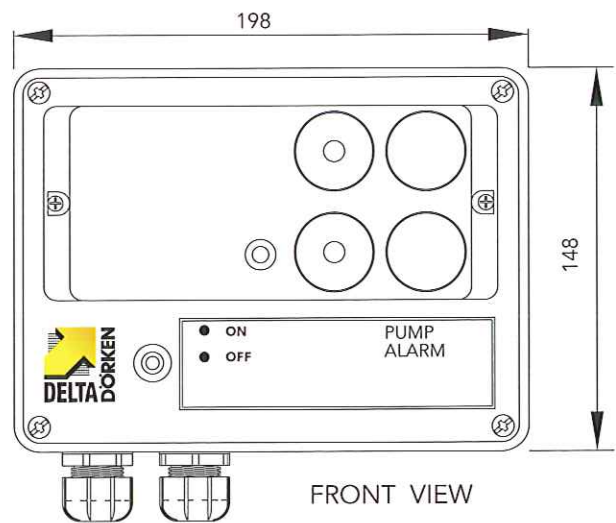
The Delta Dual V3 sump chamber can be fitted with a mains dependent / mains independent high-level alarm. An audible signal will be heard in case of pump failure. This alarm is normally operational from the mains power supply (240/1/50) however in case of a power cut the alarm is power by a built in back up battery.

Overall Size of Alarm Box:

L = 198mm

W = 148mm

D = 106mm



## delta foul V3 sump installation instructions and technical details

### application

The Delta Foul V3 Sump is designed to collect foul water from kitchens, bathrooms and utility rooms installed in basements.

The Foul V3 Sump can be used for collecting waste water from baths, showers, wash hand basins, sinks, dishwashers and washing machines.

It is not possible to collect ground water from the Delta cavity membrane system due to the possibilities of odour problems. It is important that the membrane system is completely sealed from the pump chamber.

Foul water will enter the chamber through one of the three 110mm inlets on the side of the chamber. If only using one inlet the other two can be blocked using the plugs supplied.

### method of operation

The Delta Foul V3 sump chamber is manufactured from high density polyethylene and is designed to resist ground water pressure. A single Delta 612SE pump is fitted in the chamber and designed to handle solid waste.

Due to the tank capacity and non macerating action, the pump will operate infrequently and is very quite in operation.

The sump chamber is fitted with a brass non return valve to prevent waste water travelling back into the chamber once the pump has stopped.

### maintenance

The Delta Foul V3 sump chamber is manufactured using high quality components designed to give a long a trouble free life. With any piece of mechanical equipment regular preventative maintenance is important to keep this product working efficiently on a day to day basis. We recommend the sump is serviced twice a year by specialist pump engineers.

### electrical connections

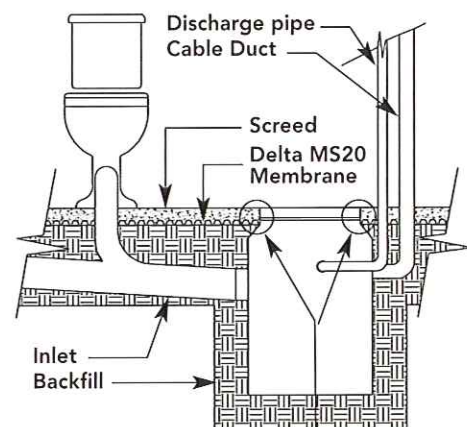
The 612SE pump and high level alarm are to be electrically connected to non switched fused spurs (total of two). These spurs should have their own dedicated supply from the main fuse board.

It is advisable to leave 500mm of the pump electrical cable in the sump to allow for servicing of the pump(s) outside the sump.

The pump must not be wired to a 'RCD' or similar protective device.

### float

Ensure float switch does not foul chamber sides. It may be necessary to rotate pipe work on pump to achieve this as there may have been some movement during transit.



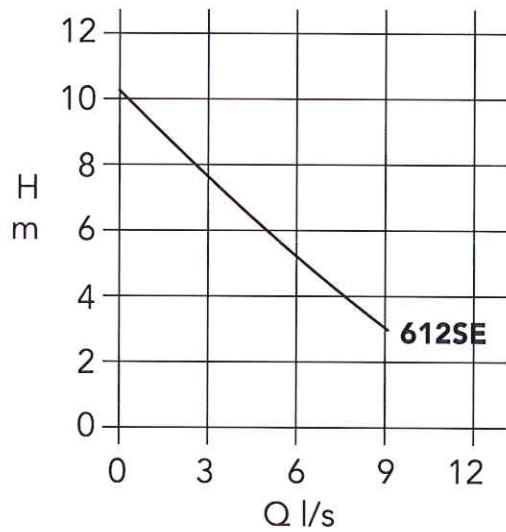
Membrane must be sealed around the perimeter of pump chamber



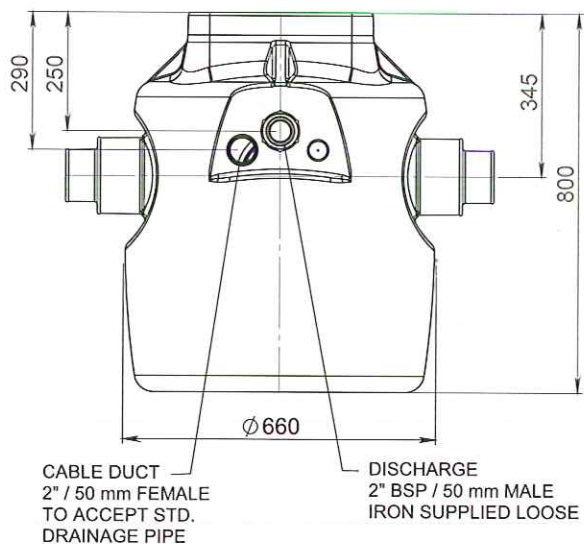
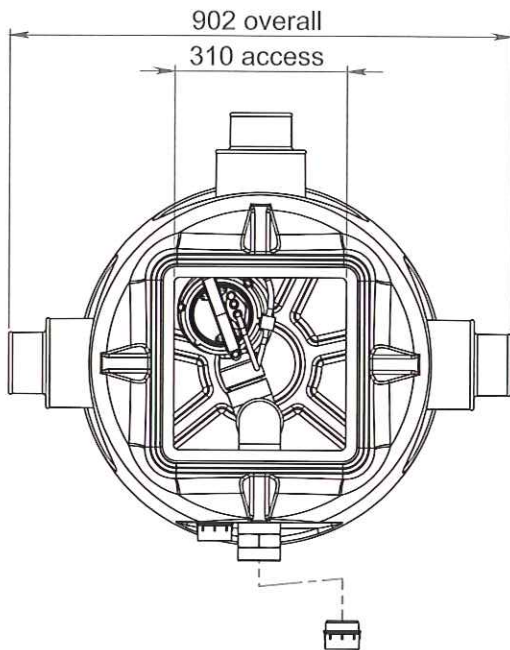
Cutaway of Delta Foul V3 Sump



## delta foul V3 sump - 612SE technical details



Performance tolerance to ISO 2548, Class C (water under normal conditions)



## high level alarm

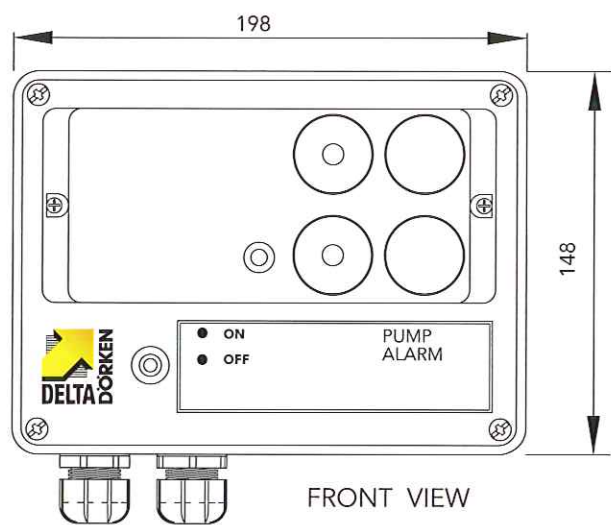
The Delta Foul V3 sump chamber can be fitted with a mains dependent / mains independent high-level alarm. An audible signal will be heard in case of pump failure. This alarm is normally operational from the mains power supply (240/1/50) however in case of a power cut the alarm is power by a built in back up battery.

Overall Size of Alarm Box:

L = 198mm

W = 148mm

D = 106mm





# DELTA®

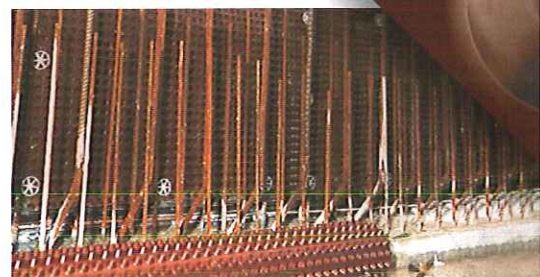
DELTA® protects property. Saves energy. Creates comfort.

**DÖRKEN**

## DELTA®-MS 20

**General-purpose seepage layer for long-term safety.**

Resistant to compression and degradation in soil.



PREMIUM QUALITY

DELTA®-branded quality products  
made by Dörken.

■ Drainage  
system

■ For building  
construction  
and civil  
engineering

■ For vertical  
and horizontal  
application



## Delta Membrane Systems Ltd

Unit 7  
Bassett Business Centre  
Hurricane Way  
North Weald, Epping  
Essex CM16 6AA

Tel: 01992 523811 Fax: 01992 524046  
e-mail: info@deltamembranes.com  
website: www.deltamembranes.com



Agrément Certificate  
**00/3742**  
Product Sheet 2

### DELTA MEMBRANE SYSTEMS

### DELTA-MS20

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Delta-MS20, a moulded HDPE membrane for damp-proofing walls, floors and vaulted ceilings in new construction or existing buildings. It can be used above or below ground, over a contaminated or damp background, to support a dry lining and flooring.

#### AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Resistance to water and water vapour** — the product is water resistant and has a high resistance to water vapour transmission (see section 5).

**Resistance to salt transfer** — the product provides an effective barrier to the transmission of salts or other contaminants from the substrate (see section 7).

**Resistance to puncture, impact and loading** — the membrane has a high resistance to puncture and will not be damaged by normal foot traffic during installation, or while laying concrete or screeding. It can support the long-term loadings likely to be experienced in service without undue deformation (see section 8).

**Durability** — under normal conditions of use the membrane will provide an effective barrier to the transmission of salts, liquid water and water vapour for the life of the structure in which it is incorporated (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. The product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe  
Head of Approvals — Materials

Greg Cooper  
Chief Executive

Date of Third issue: 2 July 2010

Originally certificated on 24 November 2000

*The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)*

*Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

British Board of Agrément  
Bucknalls Lane  
Garston, Watford  
Herts WD25 9BA

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fax: 01923 665301  
e-mail: [mail@bba.star.co.uk](mailto:mail@bba.star.co.uk)  
website: [www.bbacerts.co.uk](http://www.bbacerts.co.uk)



# DELTA®

DELTA® protects property. Saves energy. Creates comfort.

DÖRKEN

## DELTA®-MS

### High compressive strength for extra safety.

Low point loads.

Fast, tailored application straight from the roll  
for waterproofing of basements, foundations,  
and subterranean structures.



PREMIUM QUALITY

■ Protection system

■ For vertical and horizontal application

■ For building, underground, and civil-engineering construction



## Delta Membrane Systems Ltd

Unit 7  
Bassett Business Centre  
Hurricane Way  
North Weald, Epping  
Essex CM16 6AA

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Agrément Certificate  
**00/3742**  
Product Sheet 1

### DELTA MEMBRANE SYSTEMS

### DELTA-MS500

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Delta-MS500, a moulded HDPE membrane for damp-proofing walls, floors and vaulted ceilings in new construction or existing buildings. It can be used above or below ground, over a contaminated or damp background, to support a dry lining and flooring.

#### AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Resistance to water and water vapour** — the membrane is water resistant and has a high resistance to water vapour transmission (see section 5).

**Resistance to salt transfer** — the membrane provides an effective barrier to the transmission of salts or other contaminants from the substrate (see section 7).

**Resistance to puncture, impact and loading** — the membrane has a high resistance to puncture and will not be damaged by normal foot traffic during installation, or while laying concrete, or screeding. It can support the long-term loadings likely to be experienced in service without undue deformation (see section 8).

**Durability** — under normal conditions of use the system will provide an effective barrier to the transmission of salts, liquid water and water vapour for the life of the structure in which it is incorporated (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. The product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe  
Head of Approvals — Materials

Greg Cooper  
Chief Executive

Date of Third issue: 2 July 2010

Originally certificated on 24 November 2000

*The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)*

*Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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# SUSTAINABILITY STATEMENT

## PROPOSED BASEMENT

63 GOLDHURST TERRACE LONDON, NW6 3HB

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## INTRODUCTION

This report sets out the sustainability issues and targets intended for the development at 63 Goldhurst Terrace, NW3 3HB. The development comprises the extension of an existing cellar into a full footprint basement; the new build basement measuring 97m<sup>2</sup>.

There is a requirement to submit a sustainability statement that will demonstrate how the project will aspire to the sustainability requirements of Camden Core Strategy Policy CS13 (Tackling climate change through promoting higher environmental standards) and LDF Policy DP22 (Promoting sustainable design and construction).

Further guidance is taken from Camden Planning Guidance 3 (Sustainability) which would be applicable to the proposed basement extension at 63f Goldhurst Terrace:- “2.4 - All developments are expected to reduce their carbon dioxide emissions by following the steps in the energy hierarchy to reduce energy consumption” as well as seeking to adopt the principles behind the Code for Sustainable Home and/or Eco Homes 2006; where possible and feasible. The Developer of the site acknowledges the current issue with regard to concerns about climate change and the contribution that building stock makes in the form of emissions to the atmosphere, the use of water, waste generation and the use of polluting materials.

## 2.0 SUSTAINABILITY & THE ENERGY HIERARCHY

The London Plan 2011 lays down the methodology for the use of the energy hierarchy in 3 stages

### Stage 1 - Be Lean

Use energy efficiently - reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services

### Stage 2 - Be Clean

Use clean energy - proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)

### Stage 3 - Be Green

Reduce emissions via the use of renewable technologies - proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies

## 2.1 Baseline Energy Model

In order to consider the development against the energy hierarchy, a “baseline” energy model must be established – i.e. the minimum energy efficiency required to meet the Building Regulations Part L, which in the case of the proposed extension, would be Approved Document L1B. AD L1B requires existing thermal elements, if they are to be refurbished, to be refurbished to a minimum U-Value standard, and for new build element to meet a minimum U-Value standard as set out in the table below:

Element	AD L1B U -Value Standard
Retained Walls	0.30
New Walls	0.28
Retained/New Roof - pitched	0.16
Retained/New Roof - flat	0.18
Replacement Windows	1.6
Replacement Doors	1.8
Air permeability	15m <sup>3</sup> /Hr/m <sup>2</sup>
Low Energy Lighting	75%

AD L1B u value standards

While the replacement of controlled services is governed by the Domestic Heating Compliance Guide:

Controlled Service	AD L1B Compliance Requirement
Mains Gas Boiler	86% Efficient
DHW storage	38mm Foam insulation
Controls	Programmer, Stat and TRVs

Therefore, before apply the energy hierarchy to the subject development; it is assumed that the “baseline” efficient development will meet the above minimal standards

## 2.2 Use Energy Efficiency

The scheme will be designed to limit the emissions of carbon dioxide to the atmosphere from the operation of the building services via the use of good building fabric, i.e. be lean – use less energy; step 1 of the energy hierarchy. To achieve this, the development will adopt the principles of “best practice” u-values for the new build extension as noted in CPG 3:-

- New basement and external walls – u value=0.20
- New basement floor – u value=0.20
- New glazing – u=1.5

To further improve fabric efficiency in the ground floor element, the developer will undertake the following retrofitting works as identified in Appendix 1 of CPG 3:-

- Insulate internal walls to meet a minimum u value of 0.30; any further improvement on this would detrimentally affect the net internal space.
- Retrofitting of insulation to intermediate floors and internal walls to (un-heated) common areas.

In terms of the operation of building services, the following strategies will be adopted:-

- New high efficiency gas combination boilers (90% SEDBUK efficiency) will DHW in unvented highly insulated tanks to further enhance efficiency
- Controls will be upgraded via the use of TRVs, wall stats and timers to provide full interlock mechanism to ensure that boilers are only firing when required
- Under floor heating will be installed in the new build element to take advantage of the thermal mass of the building and to enable the heating system to run at lower temperatures and therefore more efficiently.
- Internal service pipework will be insulated to reduce transmissions losses.
- Where possible the use of LED low energy lighting will be adopted, where this is not possible, dedicated compact fluorescent lighting pendants will be installed.

Further energy efficiency measures to assist the reduction of consumption of unregulated energy use is noted under 2.3



## 2.3 Use Clean Energy

The energy hierarchy goes on to consider how energy can be supplied more efficiently via connection to decentralised supplies such as community heating or CHP provisions.

Clearly, for a small refurbishment/extension project of <200sqm, the provision of community heating within the development is not practical and would offer no efficiency savings. However, the use of “traditional” gas boilers, with the flow and return temperatures similar to community schemes, does mean that, as and when such a network was available in the area – the property at 63 Goldhurst Terrace would have the facility to connect to the network.

## 2.4 Use of Renewable Technologies

There is also a requirement to reduce CO<sub>2</sub> emissions from the development using renewable or low carbon energy sources. Therefore this report will briefly considered the feasibility of the following technologies:

- Wind turbines
- Solar hot water
- Photovoltaic systems
- Biomass heating
- CHP (Combined heat and power)
- Ground source heating
- Air source heating

### Wind turbines

Wind turbines produce electricity from wind power – clearly they require an open aspect and thus are clearly more appropriate in rural areas

### Solar hot water

Solar thermal systems harness the sun's energy to heat hot water via roof mounted panels. Without access to individual roof space in a Conservation area, this system cannot be considered for this basement extension project

### Photovoltaic systems

Solar “PV” systems are roof mounted panels with photocells that generate electricity from the Sun's light. Again without access to roof space in a Conservation area, they cannot be considered for this project

### Biomass heating

Biomass heating uses plant matter as a fuel source. It requires a special boiler and storage space for the fuel – usually in a pelleted format. The major drawback for biomass is the much increased level of nitrous oxide emissions – which would be a considerable problem in dense urban and suburban areas such as the London Boroughs. This reason, and the lack of available space, would preclude the consideration of the this system



### **CHP (Combined heat and power)**

Under the renewables section, CHP refers to domestic micro CHP systems. As yet an unproven technology and as such, cannot be recommended.

### **Ground source heating**

Ground source heat pumps extract the heat from the ground (or bodies of water) through collector loops prior to passing through a refrigeration “evaporation/compression heat exchange cycle which passes the heat into central heating systems

Although a highly efficient system, it requires considerable external space for the heat collector loops and as such is not practical for the development under consideration

### **Air source heating**

Delivering heat into the property via the same mechanism as the ground source heat pump, an air source heat pump uses the evaporator unit to extract heat directly from the air. The evaporator unit sits externally and is relatively compact

Given the small external area available – it *may* offer an opportunity to deliver renewable energy to the development at 63 Goldhurst Terrace, but there may well be an issue of noise nuisance which would have to be investigated prior to further consideration.

In addition, air source heat pumps are very marginal when it comes to actually reducing emissions although up to 4 times more efficient than a condensing gas boiler, grid based electricity emits over 2.5 times the carbon emissions per KWh.

Once it is considered that the above noted efficiencies rely on low temperature flow rates (35o–40o) to under floor heating in well insulated properties – the retro fitting of such systems in properties of townscape merit with single glazing etc, are results in the requirements for higher flow temperatures, reduced efficiencies and increased emissions.

With this in mind, it would be difficult to recommend the investment in an air source heat pump for this development.

## **2.5 Eco Homes & Code for Sustainable Homes Principles**

Due to the small scale nature of the development, LDF Policy DP22’s requirement for a formal Eco Homes assessment does not apply. However, the developer is committed to adopting many of the principles of Eco Homes and the Code for Sustainable Homes:-

### **Energy**

Unregulated energy use will be reduced via the provision of clothes drying facility in the rear garden, ensuring that all external lighting is energy efficient, providing a display energy device to enable occupants to monitor, and thereby manage their energy use and to supply information on the EU Energy Rating system to enable informed purchasing of white goods for the home.

## **Water**

All newly installed sanitary ware will be selected to reduce wholesome water use – dual flush toilets, showers, basin and kitchen taps with flow restrictors and selecting baths with limited capacity. In addition, a water butt will be installed to the rear garden to enable the harvesting of rainwater for the upkeep of soft landscaping

## **Materials**

The re-use of much of the building structure is sustainable by definition as much material is retained in situ. In addition, the developer will ensure that the suppliers of building materials, where practical, can demonstrate a policy of responsible sourcing

## **Waste**

The main contractor will be required to put in place a site waste management plan to ensure minimal waste arising from site and to ensure that much of the construction waste is diverted from landfill. In addition, the main contractor will be required to join the Considerate Constructors Scheme and meet the minimum level of “Best Practice”

## **Pollution**

All insulants used within the development will have a rating of zero for ODP and have GWP of less than 5. New high efficiency boilers will be selected that have NO<sub>2</sub> emissions at less than 40mg/Kwh

## **Ecology**

The nature of the development will have limited effect on the ecology of the site, indeed, the Code for Sustainable Homes would rate the effect as “neutral”, however, the developer is committed to a remodelling of the rear gardens with the use of indigenous planting to offer a minor enhancement of site ecology

## **CONCLUSIONS/SUMMARY**

It is the intention of the developer to deliver a sustainable development as defined within the policies of Camden Council; the same policies that have informed this report and the recommendations within. The policies require the developer to commit to the principles of the energy hierarchy and BREEAM sustainable development, and as can be seen above the developer has identified opportunities when they are able to do so, and will deliver these principles as part of the development, thereby meeting the minimum sustainability requirements of Camden Council and advancing the development beyond those requirements.

Prepared by **Dig For Victory Limited** – 20 Mortlake High Street, London, SW14 8JN

Dated **07 September 2014**

For **Mr & Mrs Cryer**