DIG FOR VICTORY

Flat 3, 269 Goldhurst Terrace, London, NW6 3EP

Method Statement – New Basement Construction

Date Issued: 07 March 2014

Version: Provisional subject to issuing of Temporary Works Design

Issued By: AE

Checked By: RS

Introduction

- This method statement should be read in conjunction with the architectural drawings
- This method statement should be read in conjunction with the structural engineering drawings by AND Designs with reference 15-139, as well as calculations reference 01-38.
- 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 (*yet to to be issued temporary works design by MMP to follow)*

- 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 a number of projects of a similar size on Goldhurst Terrace and we will be employing the same methodology, project team and resources here. 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 200mm of turf over 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

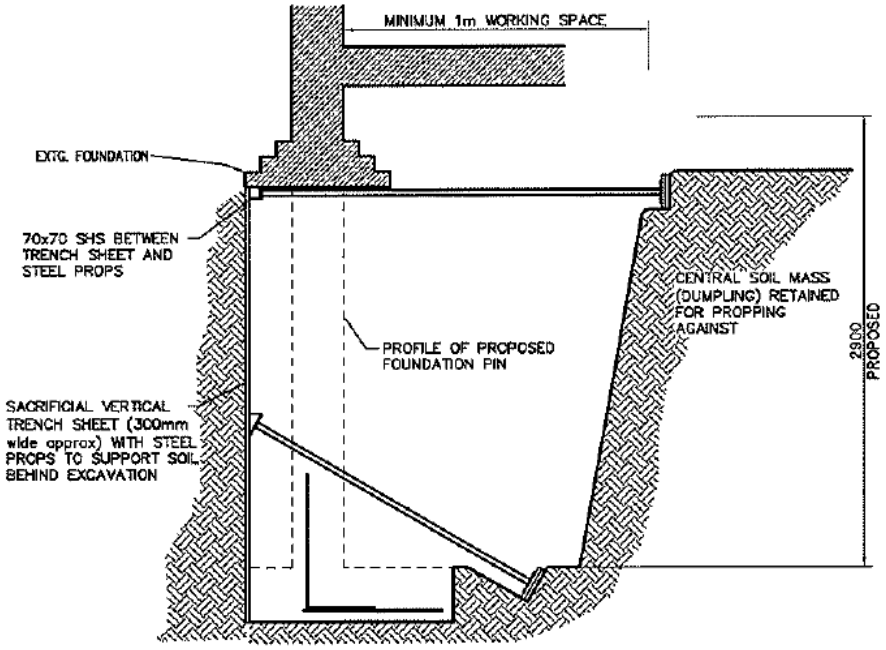
- Once the underpinning is complete to all walls, the bulk excavation can be completed.
- Depending on the structural design it may be a requirement to implement propping to resist sliding forces (As per structural engineering requirements) at the base of the underpins, prior to construction of the new 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

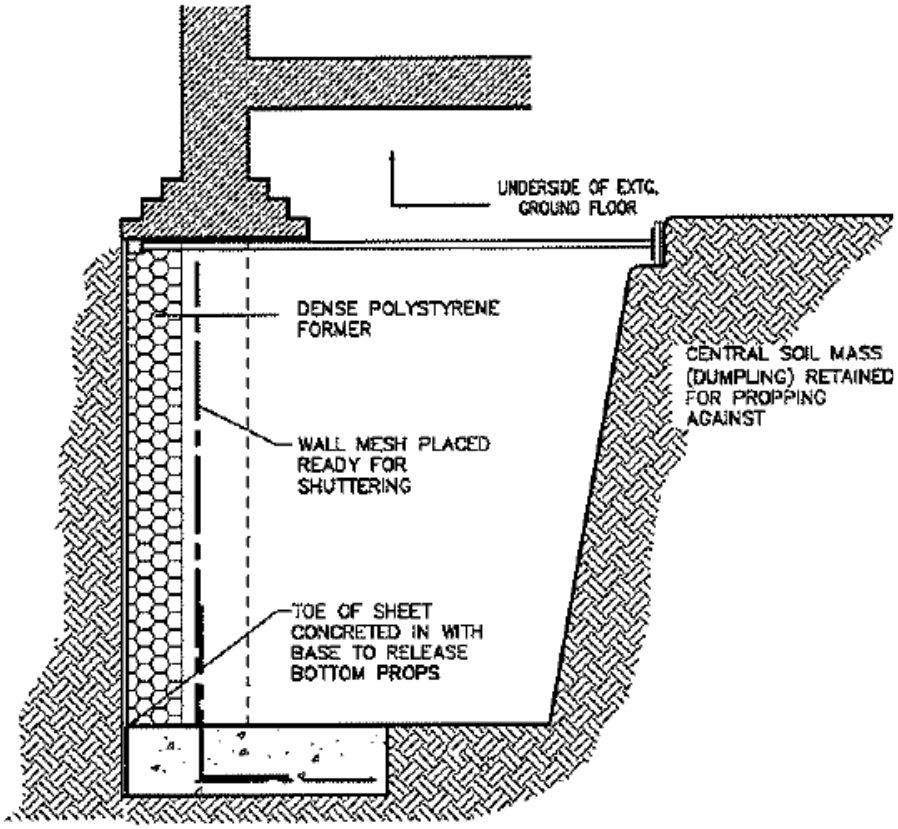
- Generally the waterproofing membrane will be in accordance with the attached sketch.
- Once the basement slab is complete, the DELTA internal waterproofing cavity membrane will be installed as per the architectural layouts and manufacturers technical specification.
- The floor finishes which may include 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

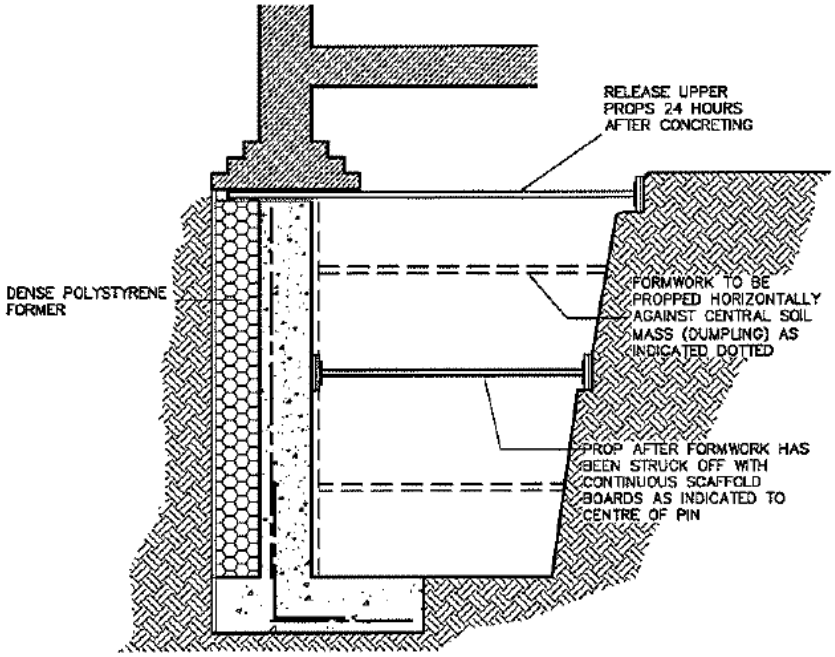
Stage 1



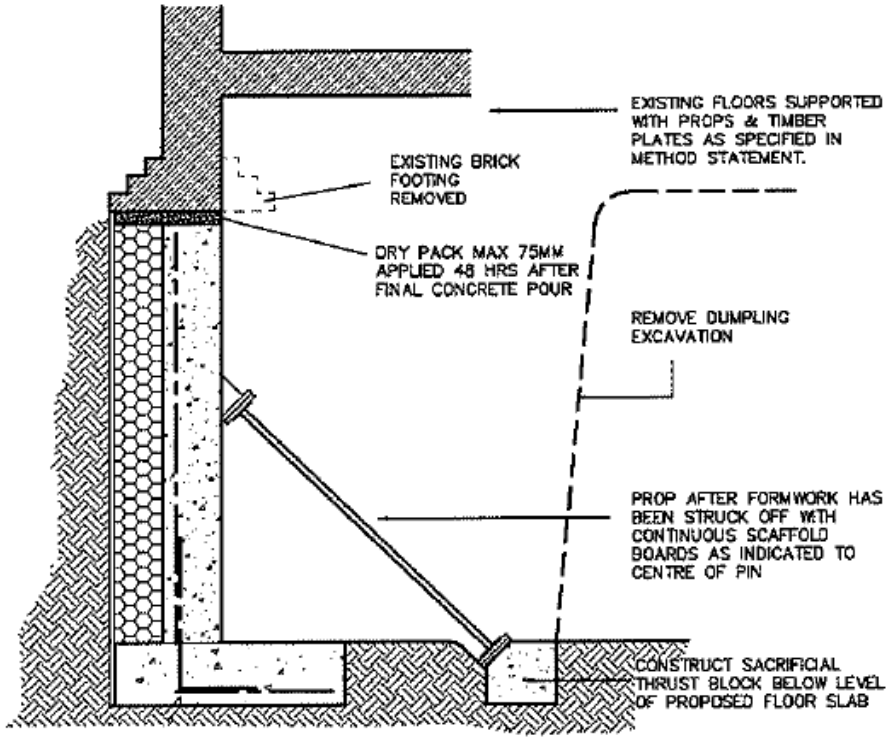
Stage 2

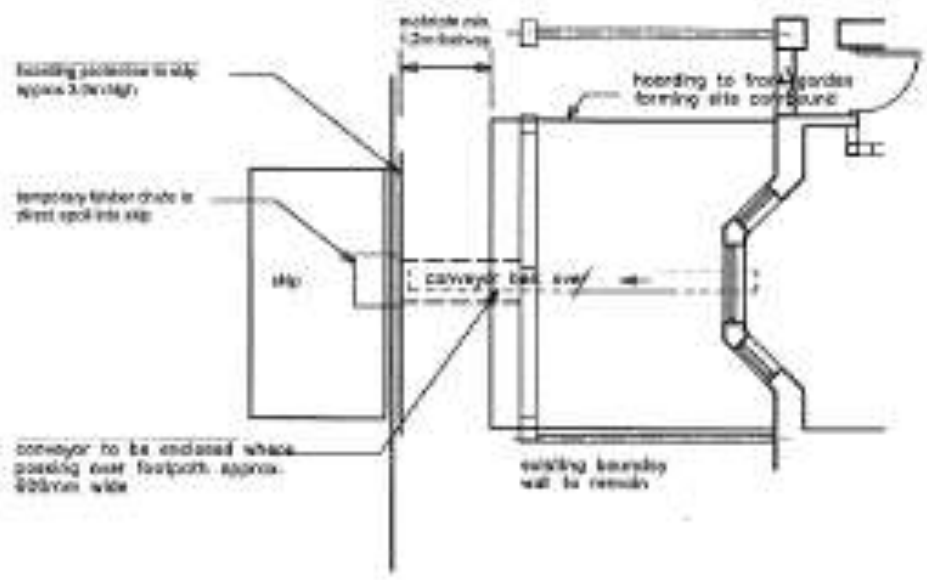


Stage 3

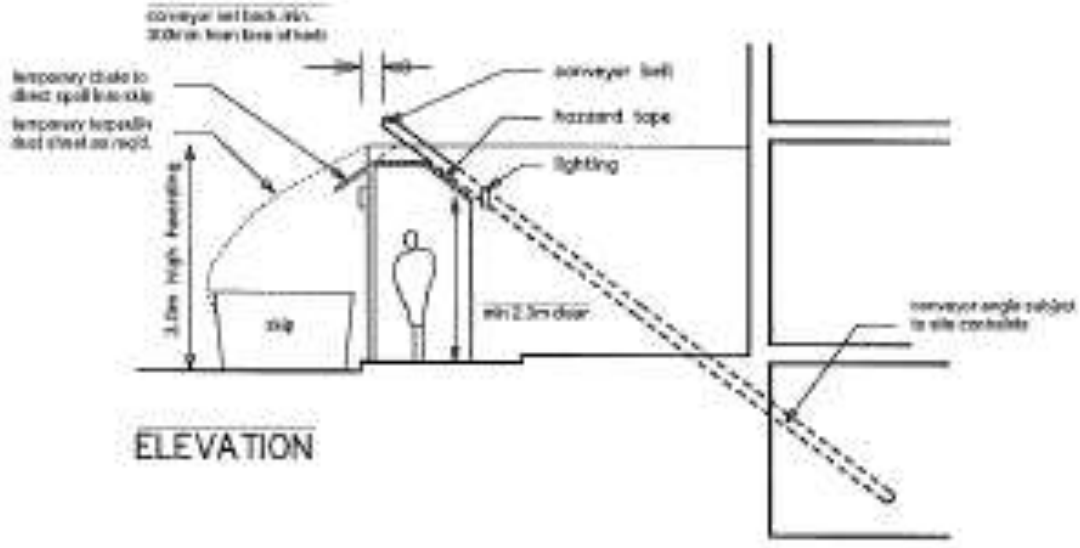


Stage 4





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

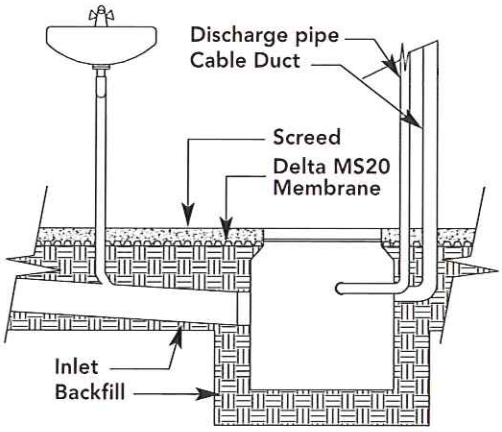
Each pump and high level alarm are to be electrically connected to a non switched fused spur (total of three). This spur should have it's own dedicated supply from the main fuse board.

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.

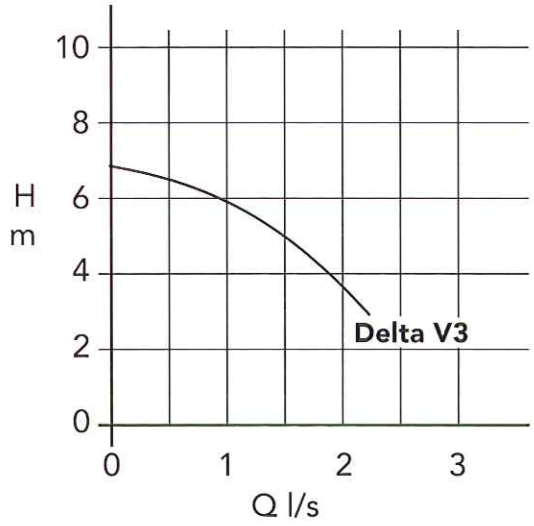
float(s)

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.

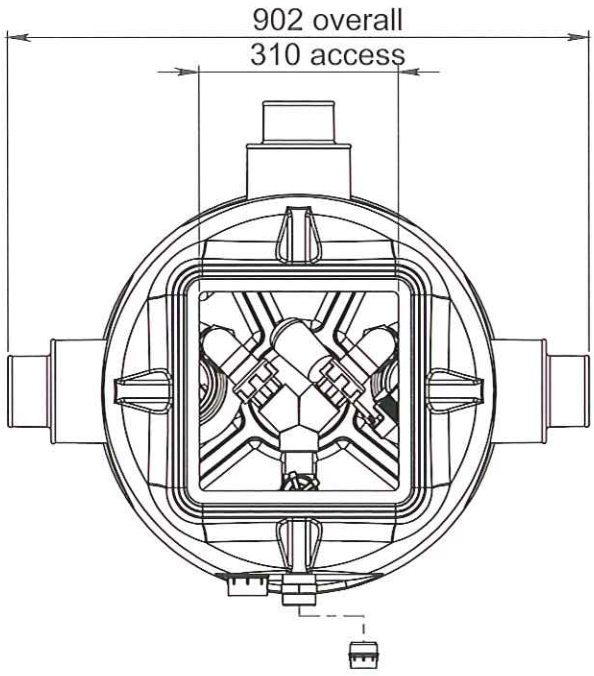


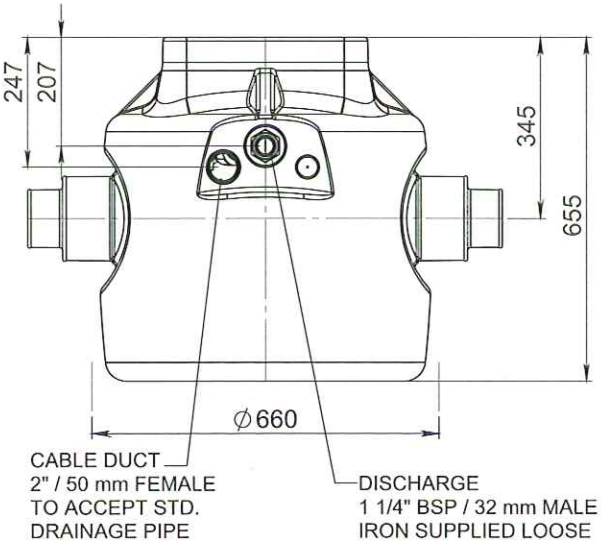
Cutaway of Delta Dual V3 Sump

delta dual V3 sump - Delta V3 technical details



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





high level alarm

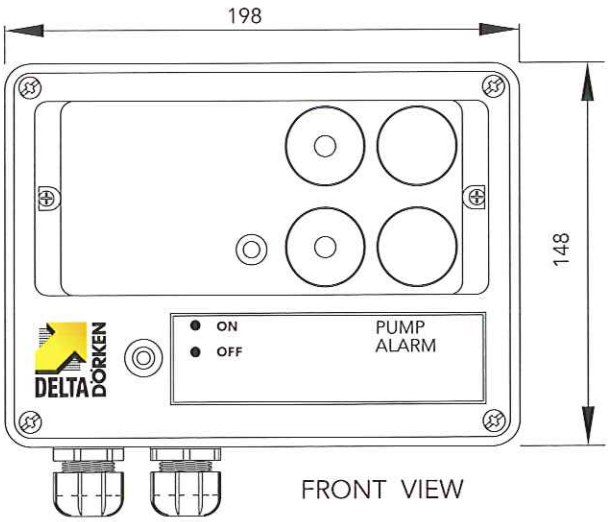
The Delta Dual V3 sump chamber can be fitted with a mains dependent / mains independent high-level alarm. An audible signal will be heard in case of pump failure. This alarm is normally operational from the mains power supply (240/1/50) however in case of a power cut the alarm is power by a built in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

Overall Size of Alarm Box:

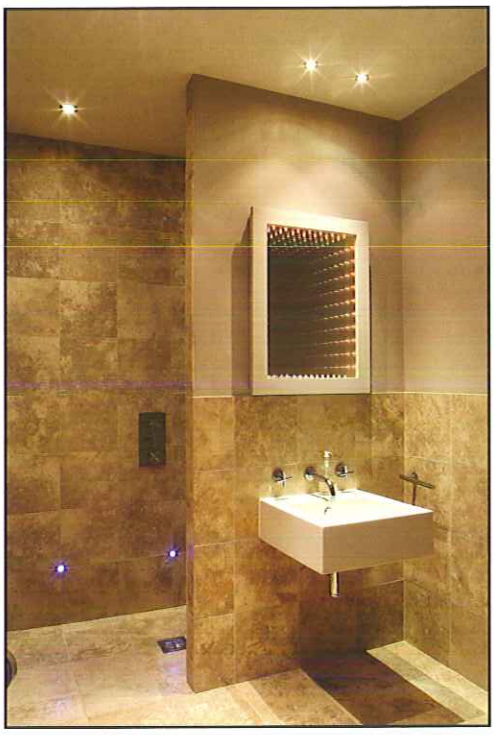
L = 198mm

W = 148mm

D = 106mm



FRONT VIEW



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

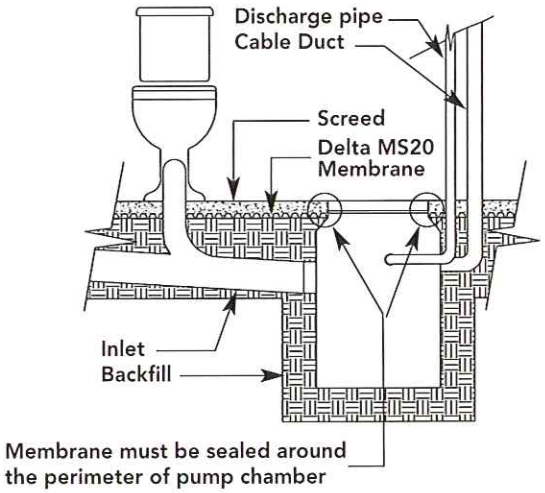
The 612SE pump and high level alarm are to be electrically connected to non switched fused spurs (total of two). These spurs should have their own dedicated supply from the main fuse board.

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.

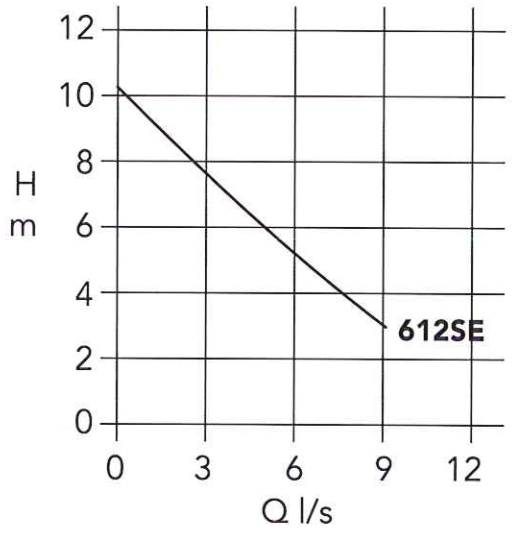
float

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.



Cutaway of Delta Foul V3 Sump

delta foul V3 sump - 612SE technical details



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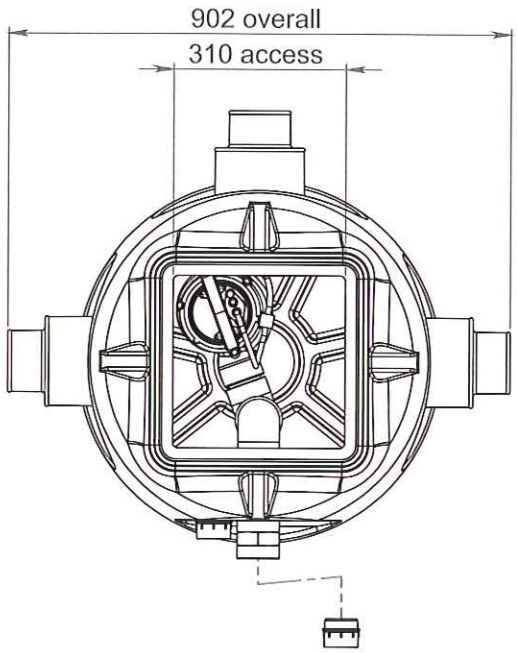

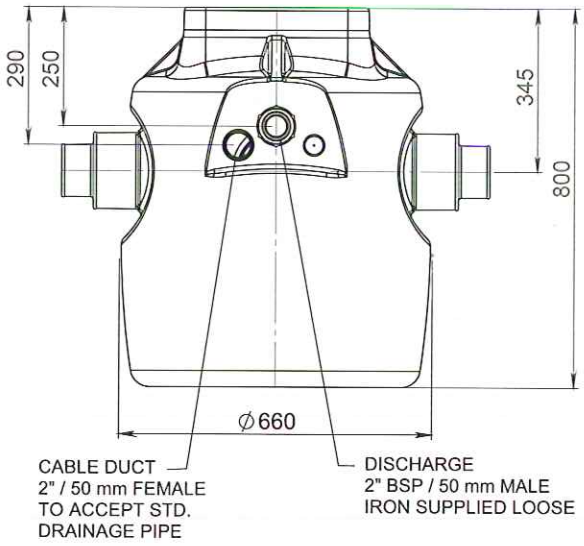

high level alarm

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:

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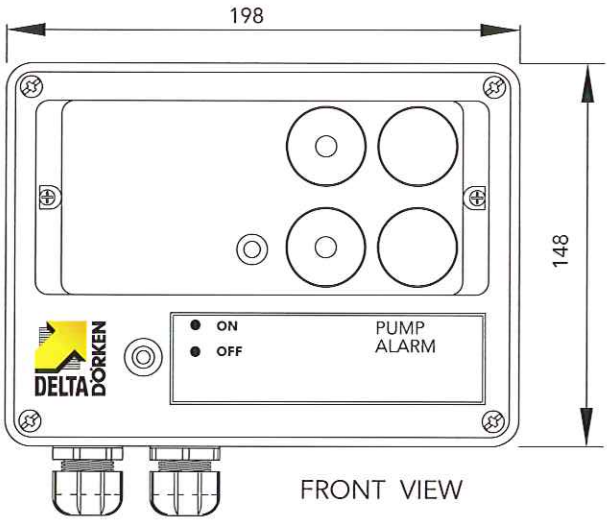
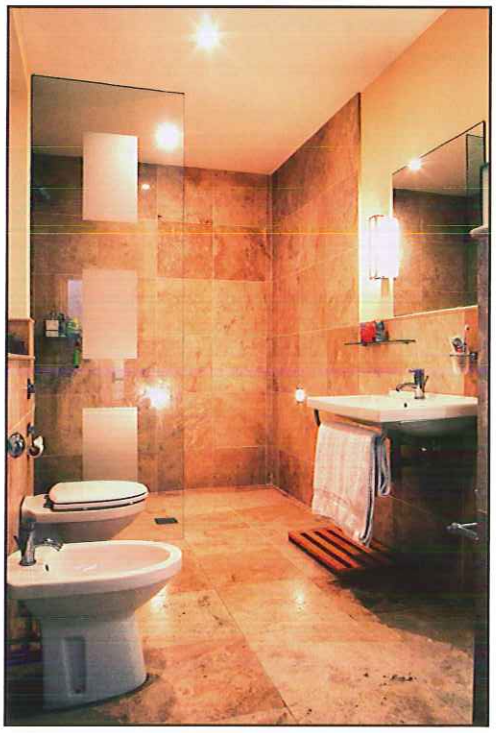
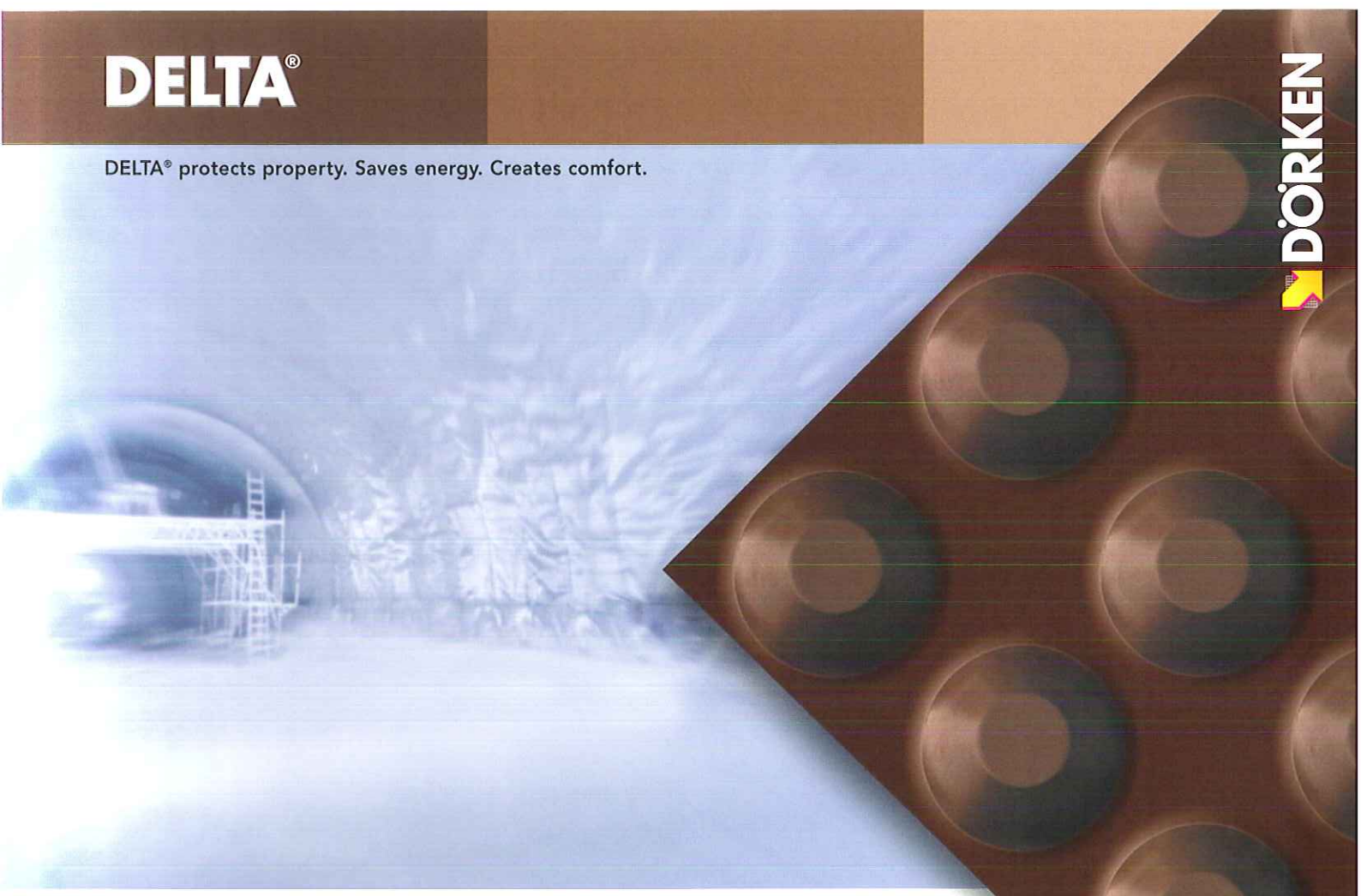




DELTA®

DELTA® protects property. Saves energy. Creates comfort.

DÖRKEN



DELTA®-MS 20

PREMIUM QUALITY

General-purpose seepage layer for long-term safety.

Resistant to compression and degradation in soil.

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

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

Date of Third issue: 2 July 2010
Originally certificated on 24 November 2000

Simon Wroe
Head of Approvals — Materials

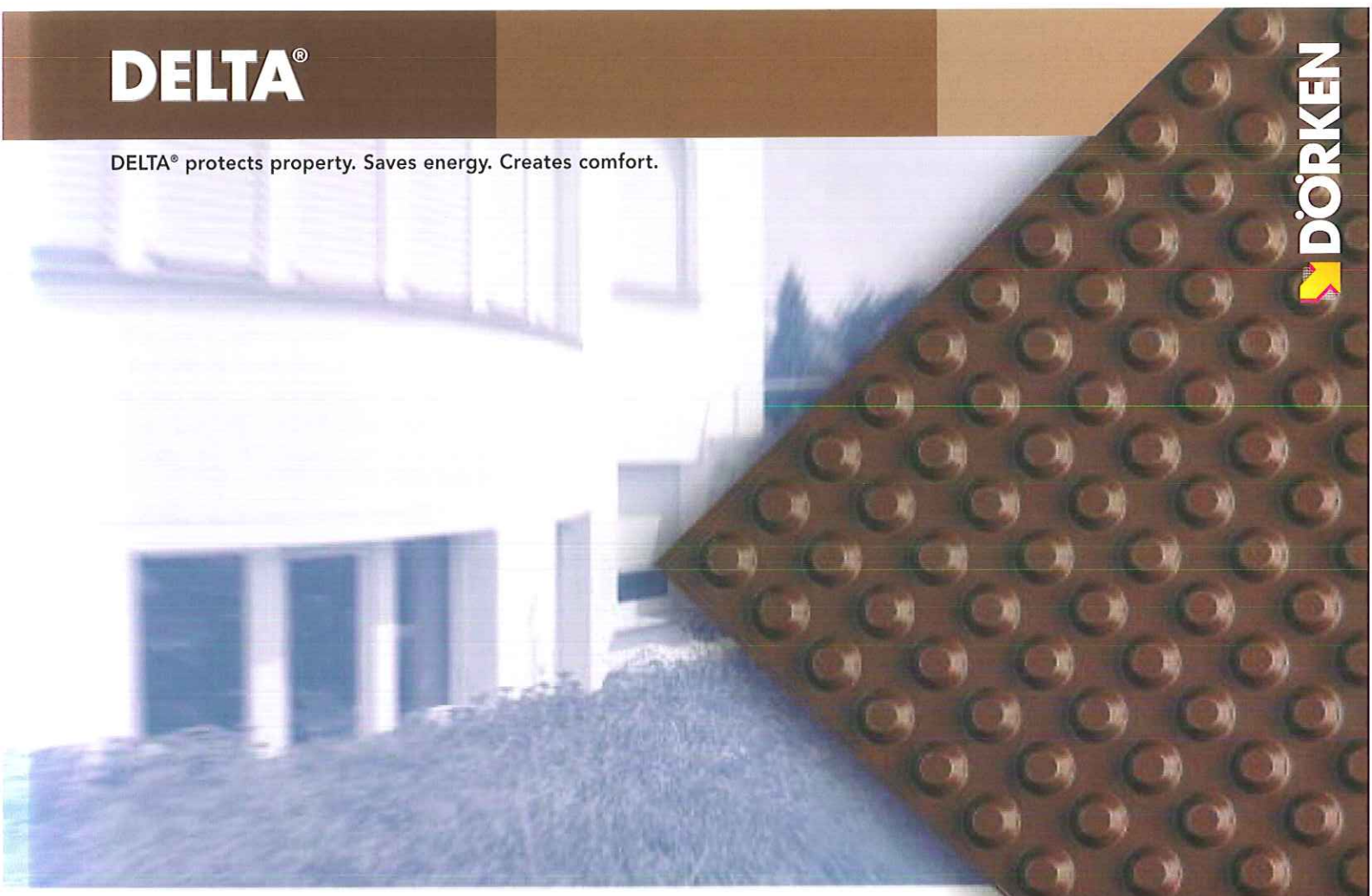
Greg Cooper
Chief Executive

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

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.

DELTA®

DELTA® protects property. Saves energy. Creates comfort.



DÖRKEN

DELTA®-MS

PREMIUM QUALITY

High compressive strength for extra safety.

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

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

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

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

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Simon Wroe
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Chelmer
Site Investigations
'Groundbreaking Services'

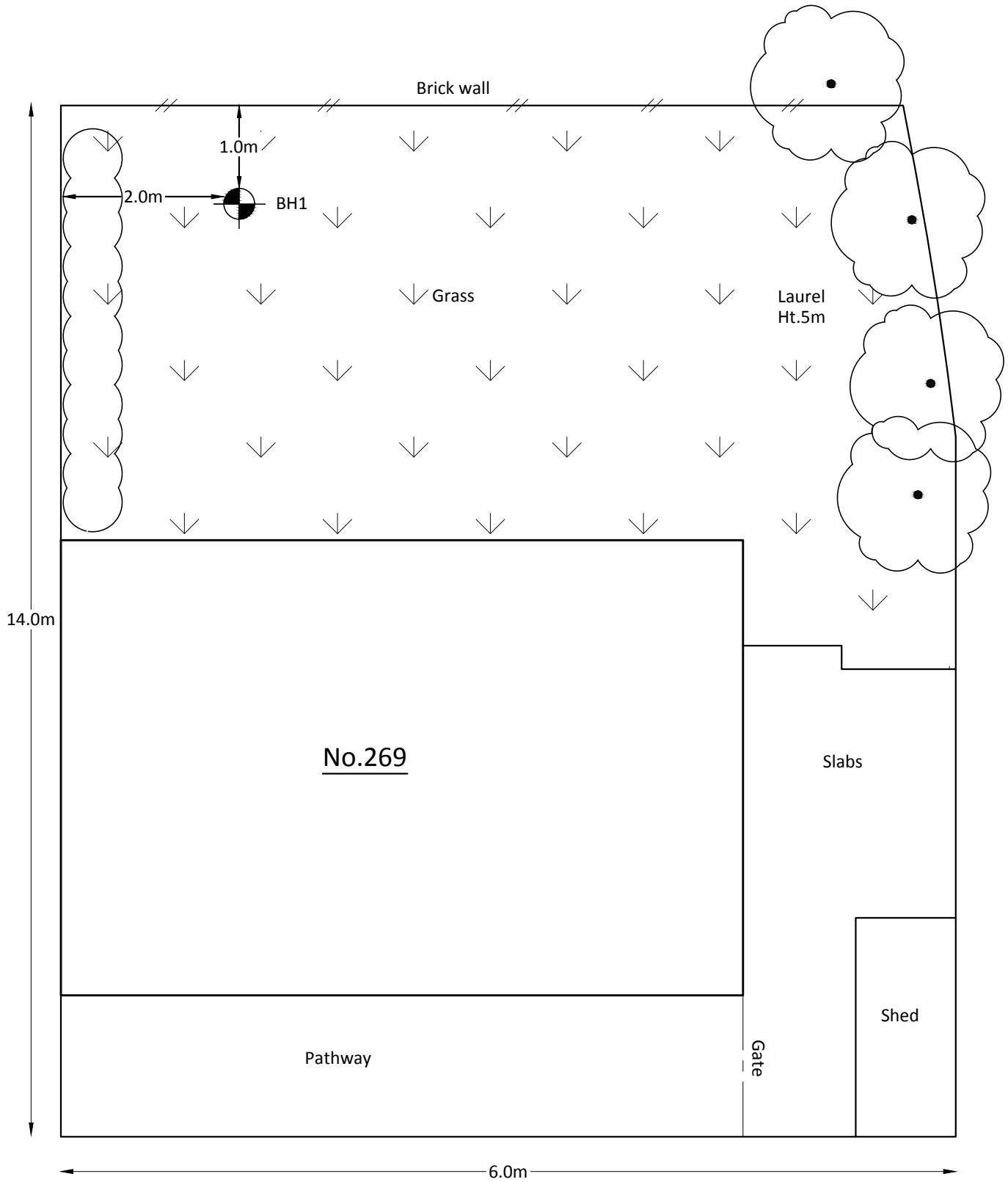
Factual Report

Site	269 Goldhurst Terrace, London, NW6 3EP
Client	Dig for Victory
Date	27th April 2015
Our Ref	FACT/5268

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 67409136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

Chelmer Site Investigations
'Groundbreaking Services'

Client: Dig for Victory		**Scale:** N.T.S.	**Sheet:** 1 of 1	**Date:** 27.04.15	
Location: 269 Goldhurst Terrace, London, NW6 3EP		**Job No:** 5268	**Weather:** Sunny	**Drawn by: PL**	**Checked by: ME**



Notes: *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

Chelmer Site Investigations 'Groundbreaking Services'

Client: Dig for Victory	Scale: N.T.S.	Sheet No: 1 of 2	Weather: Sunny	Date: 27.04.15
Site: 269 Goldhurst Terrace, London, NW6 3EP	Job No: 5268	Borehole No: 1	Boring method: CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
G.L.	TURF over TOPSOIL	0.2							
0.2	Firm, brown, sandy silty CLAY with fine gravel.	2.3		D			No roots observed.		0.5
				D	V	70 72			1.0
				D					1.5
				D	V	110 114			2.0
2.5	Stiff, brown, silty CLAY with partings of brown and orange silt and fine sand, claystone nodules and crystals. Becoming very stiff from 3.0m.			D					2.5
				D	V	130+ 130+			3.0
				D					3.5
				D	V	130+ 130+			4.0
				D					4.5
				D	V	130+ 130+			5.0
		6.0		D					5.5
				D	V	130+ 130+			6.0
				D	V	130+ 130+			7.0
				D	V	130+ 130+			8.0

Drawn by: PL **Approved by:** ME

Remarks:

CONTINUED ON SHEET 2 OF 2

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 'Groundbreaking Services'

Client: Dig for Victory	Scale: N.T.S.	Sheet No: 2 of 2	Weather: Sunny	Date: 27.04.15
Site: 269 Goldhurst Terrace, London, NW6 3EP	Job No: 5268	Borehole No: 1	Boring method: CFA 100mmØ Secondman	

Depth Mtrs.	Description of Strata	Thick-ness	Legend	Sample	Test Type	Test Result	Root Information	Depth to Water	Depth Mtrs
8.5									
	Very stiff, grey silty CLAY with crystals.	6.5		D	V	130+ 130+			9.0
				D	V	130+ 130+			10.0
				D	V	130+ 130+			11.0
				D	V	130+ 130+			12.0
				D	V	130+ 130+			13.0
				D	V	130+ 130+			14.0
15.0	Borehole ends at 15.0 m			D	V	130+ 130+			15.0

Drawn by: PL **Approved by:** ME

Remarks: *Borehole dry and open 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

UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
'Groundbreaking Services'

Laboratory Report

Site	**269 Goldhurst Terrace London NW6**
Client	**Dig for Victory**
Date	**08-May-15**
Our Ref	**CSI5268**
CGL Ref	**CGL5268**

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 6409136 |info@siteinvestigations.co.uk | www.siteinvestigations.com

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Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference : CGL5268
Client Reference : CSI5268
For the attention of : Dig for Victory
This report comprises of the following :

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Chelmer Site Investigations

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Chelmer Geotechnical Laboratories "Groundbreaking Services"

Job Number : CGL5268
Client : Dig for Victory
Client Reference : CSI5268
Site Name : 269 Goldhurst Terrace London NW6

Date Received : 05/05/2015
Date Testing Started : 06/05/2015
Date Testing Completed : 08/05/2015
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
BH1	1.0	62400	D	30	<5	68	23	45	0.17	45	CH			71					
BH1	1.5	62401	D	30	<5														
BH1	2.0	62402	D	29	<5	64	23	42	0.16	42	CH			112					
BH1	2.5	62403	D	27	<5														
BH1	3.0	62404	D	28	<5	67	23	44	0.11	44	CH			130+					
BH1	3.5	62405	D	31	<5														
BH1	4.0	62406	D	30	<5	70	21	49	0.18	49	CV			130+					
BH1	5.0	62408	D	31	<5	72	24	48	0.15	48	CV			130+					
BH1	8.0	62412	D	32	<5	75	23	52	0.16	52	CV			130+					
BH1	10.0	62414	D	32	<5	76	27	50	0.10	50	CV			130+					
BH1	12.0	62416	D	31	<5	75	23	53	0.16	53	CV			130+					
BH1	15.0	62419	D	29	<5	79	27	52	0.04	52	CV			130+					

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2
[2] Estimated if <5%, otherwise measured
[3] BS 1377 : Part 2 : 1990, Test No 4.4
[4] BS 1377 : Part 2 : 1990, Test No 5.3
[5] BS 1377 : Part 2 : 1990, Test No 5.4
[6] BRE Digest 240 : 1993
[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils
[8] In-house method S9a adapted from BRE IP 4/93
[9] Values of shear strength were determined in situ by Chelmer Site Investigations using a Pilcon hand vane or Geonor vane (GV).
[10] BS 1377 : Part 3 : 1990, Test No 4
[11] BS 1377 : Part 2 : 1990, Test No 9
[12] BS 1377 : Part 3 : 1990, Test No 5.6
[13] $SO_4 = 1.2 \times SO_3$
[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

UKAS TESTING 8284

Comments :-

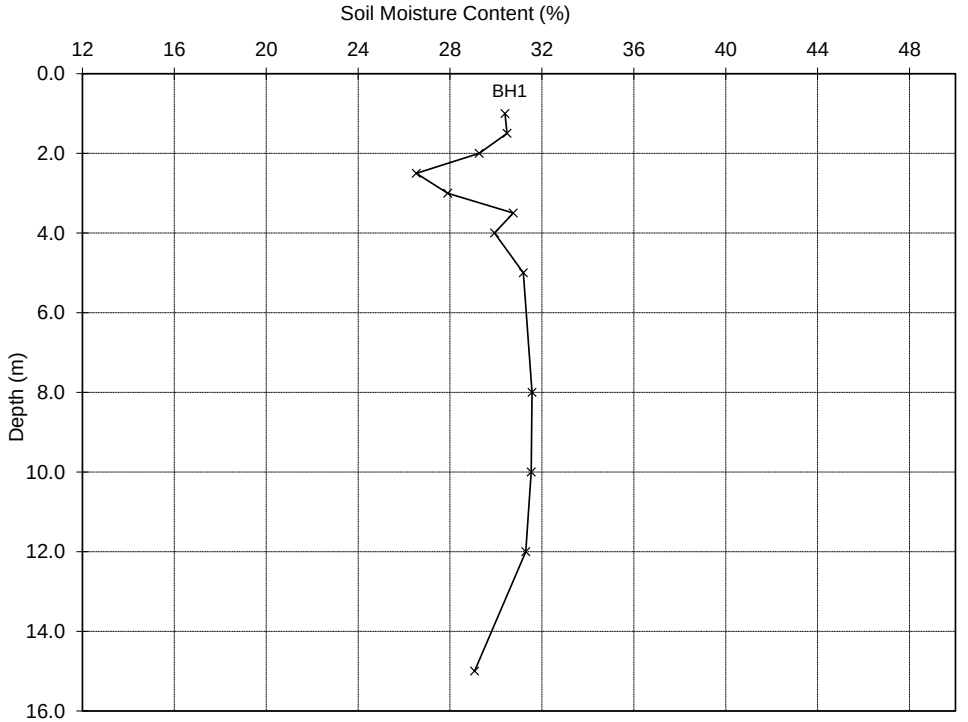
Technician :- HS
Checked By :- MC
Date Checked :- 12-May-15

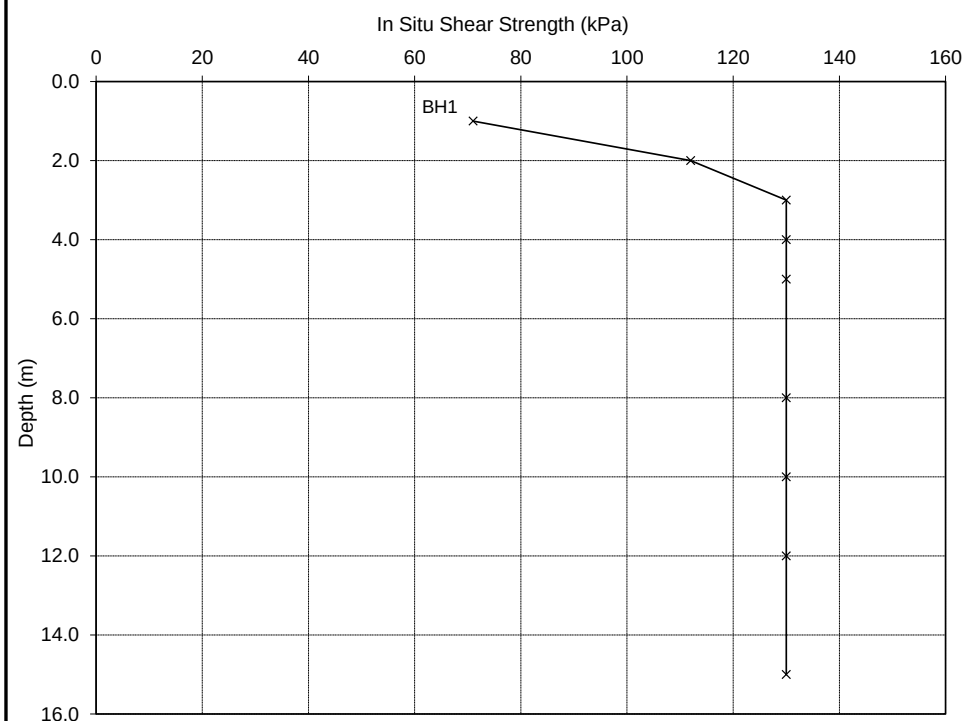
Laboratory Testing Results

Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories 'Groundbreaking Services'

Job Number :	CGL5268	Date Received :	05/05/2015
Client :	Dig for Victory	Date Testing Started :	06/05/2015
Client Reference :	CSI5268	Date Testing Completed :	08/05/2015
Site Name :	269 Goldhurst Terrace London NW6	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Site Investigations using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa. (Not UKAS accredited)

UKAS TESTING 8284

Comments :-

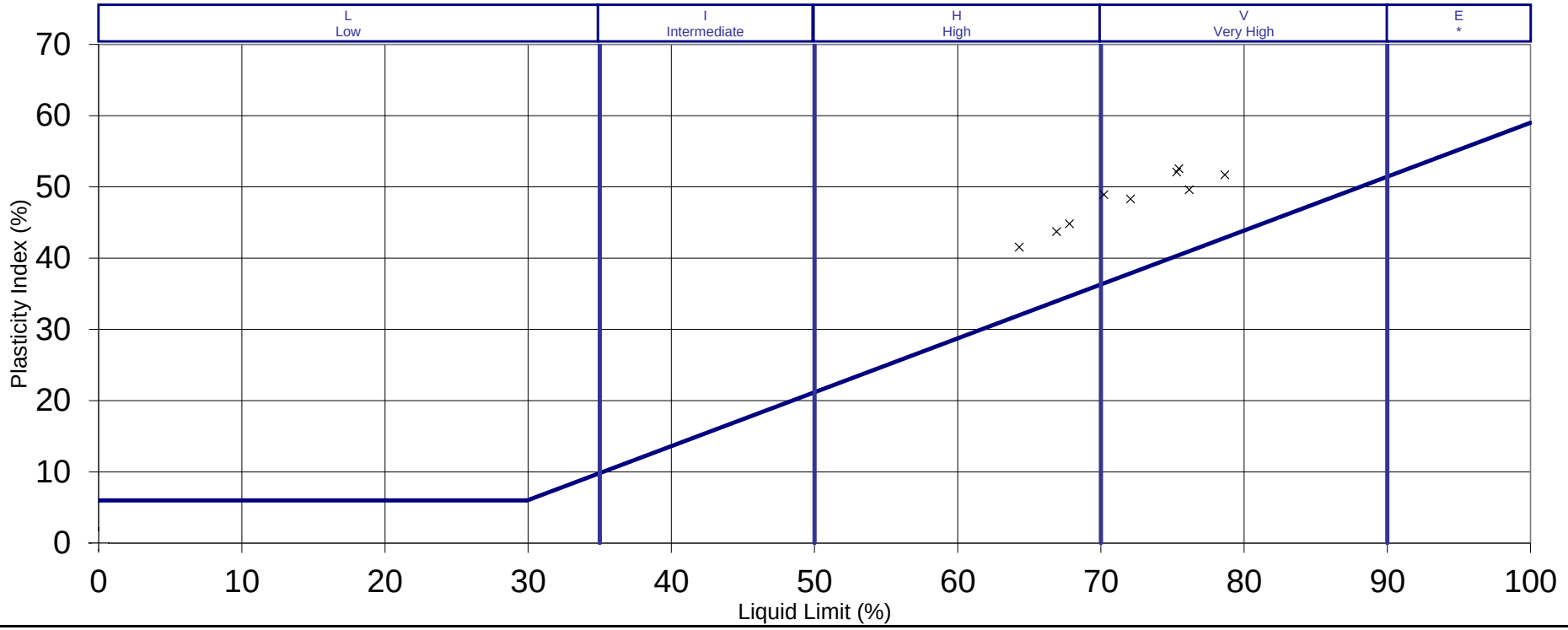
Checked By :- MC Date Checked :- 12-May-15

Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Chelmer Geotechnical Laboratories
'Groundbreaking Services'

Job Number :	CGL5268	Date Received :	05/05/2015
Client :	Dig for Victory	Date Testing Started :	06/05/2015
Client Reference :	CSI5268	Date Testing Completed :	08/05/2015
Site Name :	269 Goldhurst Terrace London NW6	Laboratory :	Chelmer Geotechnical Laboratories, CM3 8AB



Notes :-

SILT (M-SOIL), M, plots below A-Line
CLAY, C, plots above A-Line }M and C may be combined as FINE SOIL, F.

Key :- BH1

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8284

Comments :-

Checked By :- MC

Date Checked :- 12-May-15

Mark Collyer
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Old Church Road
East Hanningfield
Essex
CM3 8AB

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-31241

Site Reference:	269 Goldhurst Terrace London NW6
Project / Job Ref:	CGL5268
Order No:	PO/4305/5268/MC
Sample Receipt Date:	07/05/2015
Sample Scheduled Date:	07/05/2015
Report Issue Number:	1
Reporting Date:	13/05/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 15-31241	**Date Sampled**	27/04/15	27/04/15				
Chelmer Site Investigation Laboratories Ltd	**Time Sampled**	None Supplied	None Supplied				
Site Reference: 269 Goldhurst Terrace London NW6	**TP / BH No**	62400	62414				
Project / Job Ref: CGL5268	**Additional Refs**	BH1	BH1				
Order No: PO/4305/5268/MC	**Depth (m)**	1.00	10.00				
Reporting Date: 13/05/2015	**QTSE Sample No**	147666	147667				

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	**MCERTS**	7.5	7.3			
Total Sulphate as SO_4	mg/kg	< 200	NONE	461	6127			
W/S Sulphate as SO4 (2:1)	g/l	< 0.01	**MCERTS**	0.15	1.87			
Total Sulphur	mg/kg	< 200	NONE	< 200	3690			
Ammonium as NH_4	mg/kg	< 0.5	NONE	6.6	18.2			
W/S Chloride (2:1)	mg/kg	< 1	**MCERTS**	18	151			
Water Soluble Nitrate (2:1) as NO_3	mg/kg	< 3	**MCERTS**	16	< 3			
W/S Magnesium	g/l	< 0.0001	NONE	0.0079	0.2740			

Analytical results are expressed on a dry weight basis where samples are dried at less than $30^{O}C$
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 15-31241	
Chelmer Site Investigation Laboratories Ltd	
Site Reference: 269 Goldhurst Terrace London NW6	
Project / Job Ref: CGL5268	
Order No: PO/4305/5268/MC	
Reporting Date: 13/05/2015	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
147666	62400	BH1	1.00	20.9	Brown clay
147667	62414	BH1	10.00	20.9	Brown clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample I/S

Unsuitable Sample U/S

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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 15-31241
Chelmer Site Investigation Laboratories Ltd
Site Reference: 269 Goldhurst Terrace London NW6
Project / Job Ref: CGL5268
Order No: PO/4305/5268/MC
Reporting Date: 13/05/2015

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

8284

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This report shall not be reproduced, except in full, without the written approval of Chelmer Site Investigations Laboratories Ltd.

Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

Chelmer
Site Investigations
'Groundbreaking Services'

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.