DIG FOR VICTORY

65 GOLDHURST TERRACE
LONDON, NW6 3HB

Hydro-geological assessment & Flooding risk report

Issued: September 2014
Issued by Alex Efstathiou
Revision: A

1. INTRODUCTION

DFV have been commissioned by Mr and Mrs Mays-Smith to undertake a hydrogeological assessment and flood risk report to assess the impact of the proposed retro fit basement construction at 65 Goldhurst Terrace on the local groundwater regime and the risk posed by flooding.

This is in response to the London Borough of Camden's request for information regarding the impact of the proposed basement on groundwater levels and the possible changes subsequent to construction and the client's consulting engineers request for information regarding the water table and ground conditions.

This report presents the findings of a desk based study of the available ground and groundwater conditions in the surrounding area taking into account published geological records from the British Geological Survey, groundwater conditions from the Environment Agency and the available site investigation information from the site specific borehole, carried out in August 2014, (the report of this activity can be found in appendices of this document). Information regarding the proposed water management systems is also presented in the appendices of this report. Using this information conclusions are drawn on the possible impact of the proposed basement structure on the local groundwater and drainage regime in section 5.

It should be noted that this report does not comprise a geotechnical appraisal of the proposed development.

2. SITE LOCATION

2.1 General

The existing property is a mid-terrace brick built Victorian house.
The site is located at 65 Goldhurst Terrace, London NW6 3HB.
A site location plan can be found in the appendices of this document (Figure 6.1).

2.2 Proposed development

The proposal is to create a new basement storey below the footprint of the existing property complete with lightwells to the front and rear. The property is a family dwelling and the additional space is predominantly for recreational and ancillary use and is not intended to be solely habitable such as a self-contained dwelling.
As such the risk to life has been considerably reduced. Practical measures are taken to reduce the impact of flooding and low level upstands will be formed around the lightwells to reduce the risk of localised flooding.

Basement spaces are drained by a surface water pump and 'dual' pumps are installed as standard. These are fitted with a high level alarm with battery backup to warn in the event of pump failure. A further battery back-up system is available in high risk areas to ensure the pumps continue to operate in the event of mains failure; this is not considered necessary in this proposal and will not be fitted as standard.

Details of the water management systems are presented in appendix 6.4.

Scheme designs for the proposed basement structure are presented in appendix 6.5.

3. GEOLOGY AND GROUND CONDITIONS

3.1 Published geology

The British Geological Survey Map for this area suggests that the site geology comprises of
London Clay.

London Clay Formation

London Clay Up to 150m Fine, sandy, silty clay. The London Clay Formation is an over consolidated firm to very stiff, becoming hard with depth, fissured, blue to grey silty clay of low to very high plasticity. The upper and lower parts may contain silty or fine grained sand partings. It also contains, within it, laminated structured, nodular claystone and rare sand partings. The London Clay is approximately 90m thick in the area. The London Clay is relatively impermeable and this is confirmed by the relatively low permeability typically 1x10-9 m/s and lower.

3.2 Site investigation

A borehole investigation was undertaken by Chelmer Site Investigations in August 2014. Other reports to varying depths have been sourced and referenced from historic works previously carried out in the area.
The factual reports are included in Appendix 6.3.

4. GROUNDWATER

4.1 Aquifer classification

The London Clay is classified as an aquitard, although is slightly more permeable where weathered or where it has a higher proportion of sand.

4.2 Groundwater

The borehole encountered a slight water seepage at a depth of 2.6m below the ground floor level. This is not expected to be a problem as it was only minor and local.

Historic borehole records in the area found no water at depths of up to 7m below ground level, significantly below the proposed dig depth. A small amount of seepage is to be expected in the course of projects of this nature and would not present any undue challenges to the completion of same.

5. CONCLUSIONS

5.1 Current hydrological regime

The ground and groundwater conditions indicate that precipitation falling on the site, where not already collected by gulleys from roof and hard standing, has and will continue to infiltrate through the ground passing downwards until it reaches the top of the relatively low permeability London Clay Formation where the direction of flow will become lateral. Contribution to local groundwater from vertical infiltration of rainwater is to be limited at this site and the development will not alter this.

5.2 Impact of proposed basement construction

The site investigation data confirms the anticipated shallow depth geology suggested by the desk study information. The site investigation information indicates that the basement should not encounter problematic groundwater or form an obstruction to regional flow. Furthermore, the available borehole information from the BGS in the area confirms that groundwater is not expected to a depth of 7m, which is considerably below the anticipated depth of the proposed construction. The level used for the 1:200 year flood is considered to be 5.32 AOD.
The AOD for this property is 39.6m.

The flood map from the area is shown in appendix 6.2. Please also refer to the Surface Water Run-Off Calculation in appendix 6.6.

We have received planning approval and carried out basement works on Goldhurst Terrace itself and roads surrounding the proposed works, including Aberdare Gardens and Canfield
Gardens, all with AOD's ranging well above the 1:200 year floodplain.

5.3 Conclusion

Based on the ground and groundwater conditions at the site, the proposed basement will have no discernable impact on the local hydrology and will therefore not impact or influence neighbouring properties. It is outside of 20 metres from a canal or watercourse and consequently the likelihood of flooding is minimal.

6. APPENDICES

6.1 Site location plan

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6.2 EA flood risk map

Environment Agency Flood Risk Map of NW6 3HB- any potential flood risk areas would be shown in blue, should there be any risks

6.3 Site investigation reports

6.3.1 British Geological Borehole Report

TQ28SE/ 276
2623.8410
256

GROUND EXPLORATIONS LIMITED

BOREHOLE SECTION SHEET

Date December 19 55

CONTRACT NAME: Swiss Cottage. — ORDER NO.

Bored for : Messrs. Goodhart-Rendel & Partners.

Address : Kirkland House, Whitehall S.W1.

Address of Site : Coleridge Gardens

District or Town : Swiss Cottage — County : London

Standing Water Level : - below surface — Dia. of Borehole : 6 Inches.

Water Struck (1) None (2) (3)

Boring Commenced : 5.12.55 — Boring Completed : 6.12.55

Special Remarks :

Jar Samples : 2871 2'0"; 2872 5'0"; 2879 9'0"; 2876 13'0"; 2878 17'0"; 2880 22'0";

Core Samples : 2873 5'6" - 7'0"; 2875 10'0" - 11'6"; 2877 14'6" - 16'0"; 2879 18'6" - 20'0"; 2881 23'6" - 25'0";

Sand/Gravel Samples :

DESCRIPTION OF STRATA	Thickness Feet	Thickness Inches	Depth Below Surface Feet	Depth Below Surface Inches
The descriptions are given in accordance with the Civil Engineering Code of Practice No. 1 "Site Investigations." No responsibility is accepted for these descriptions and clients should examine the samples submitted.				
No. 1 Boring				
Topsoil	1	6	(0-1½) 1	6
Loamy clay	3	6	(1-5) 5	0
Brown clay	20	0	(5-25) 25	0
TOTAL FROM SURFACE ...	25	0	25	0.

This form is to be returned to Head Office immediately the borehole is finished.

Foreman's Signature..... *Date*.....

P. & R. Ltd.—175

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

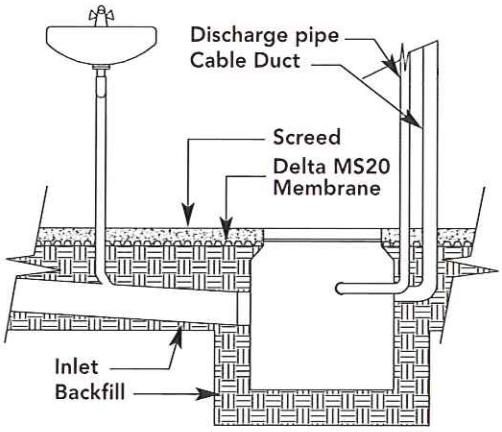
Each pump and high level alarm are to be electrically connected to a non switched fused spur (total of three). This spur should have it's own dedicated supply from the main fuse board.

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.

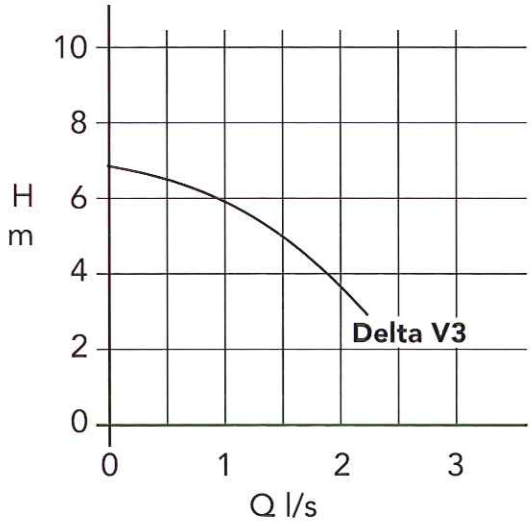
float(s)

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.

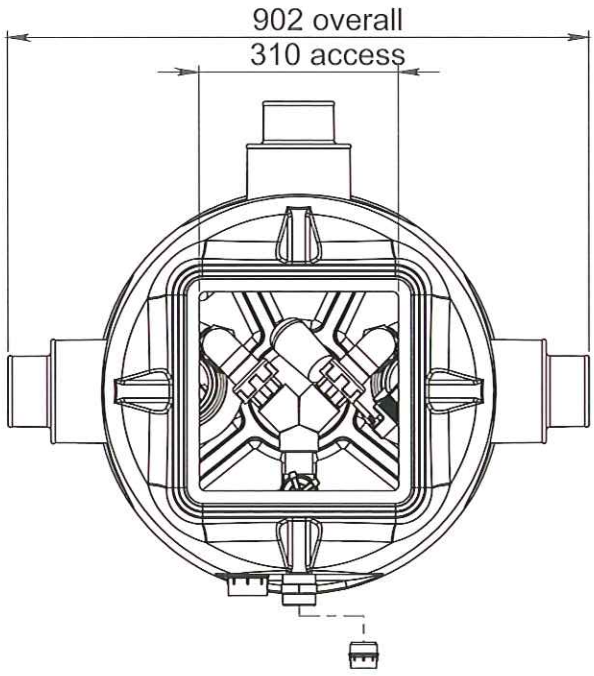


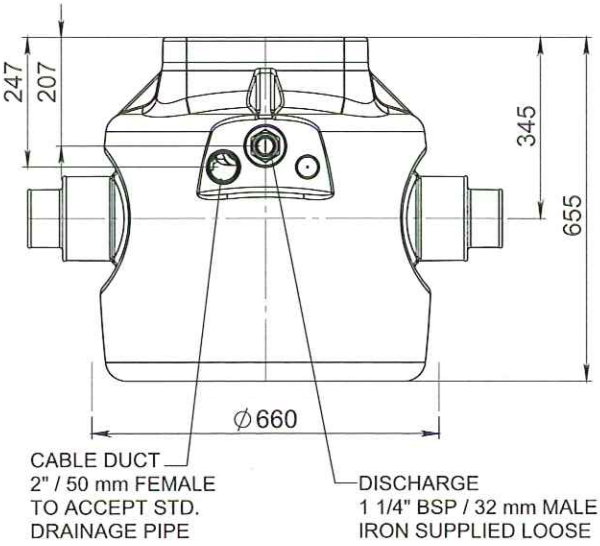
Cutaway of Delta Dual V3 Sump

delta dual V3 sump - Delta V3 technical details



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





high level alarm

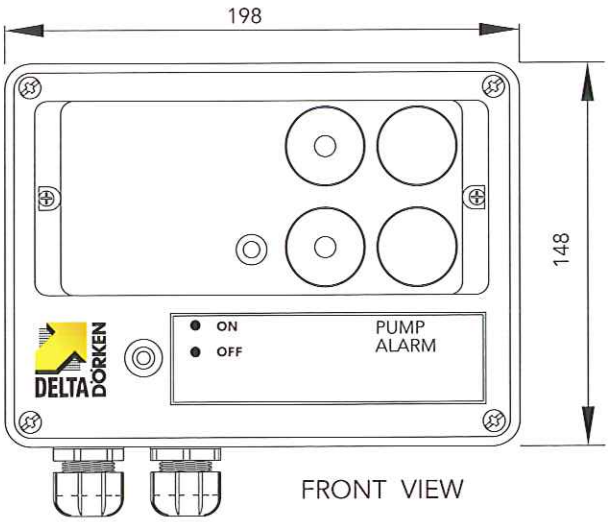
The Delta Dual V3 sump chamber can be fitted with a mains dependent / mains independent high-level alarm. An audible signal will be heard in case of pump failure. This alarm is normally operational from the mains power supply (240/1/50) however in case of a power cut the alarm is power by a built in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

Overall Size of Alarm Box:

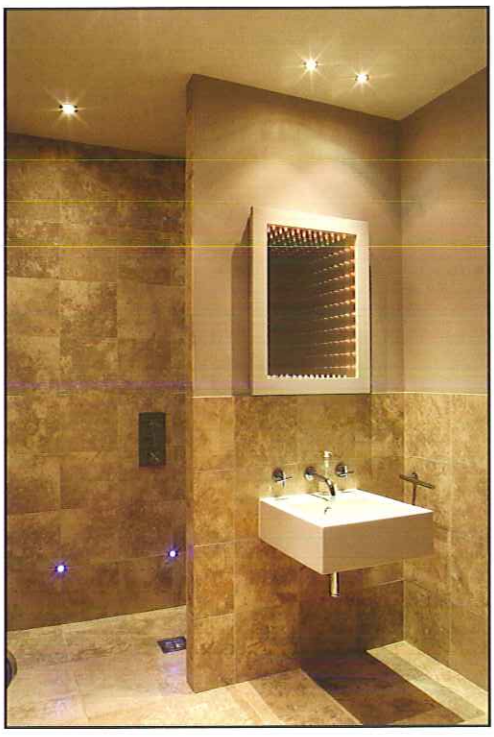
L = 198mm

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

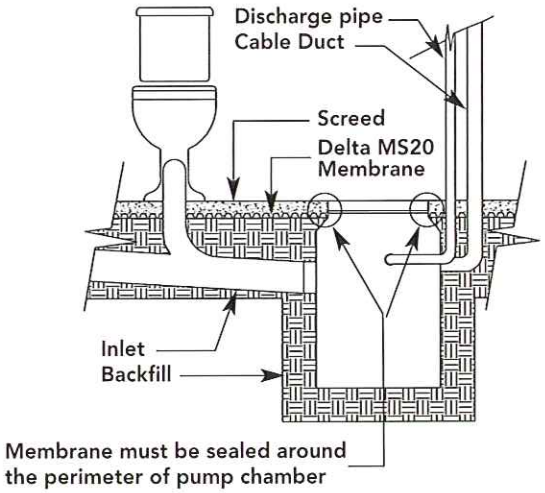
The 612SE pump and high level alarm are to be electrically connected to non switched fused spurs (total of two). These spurs should have their own dedicated supply from the main fuse board.

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.

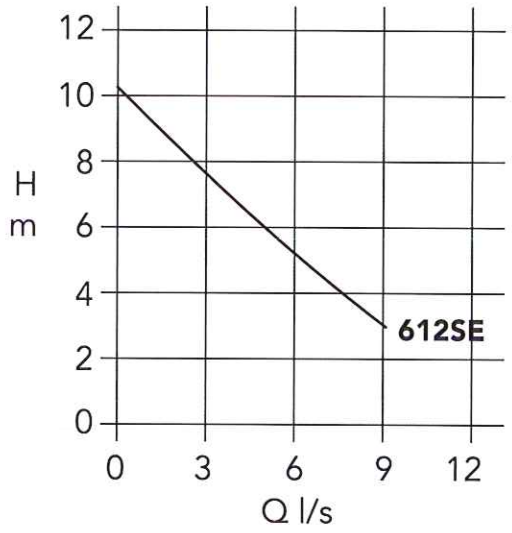
float

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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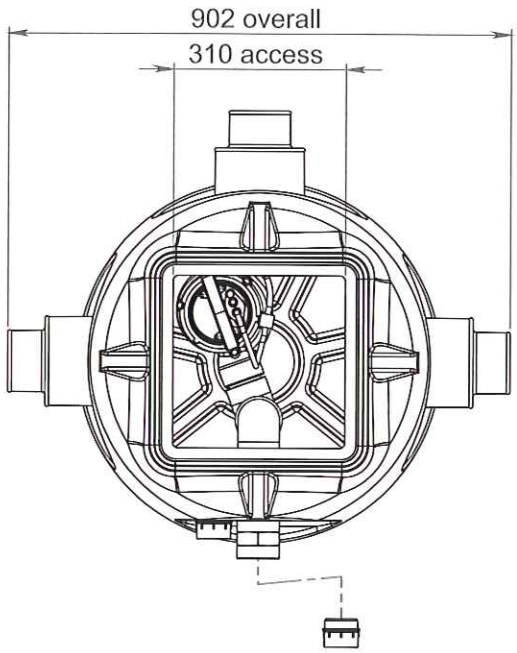

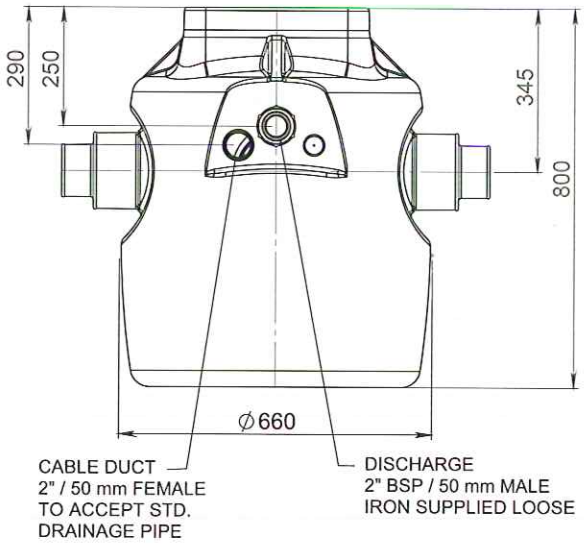

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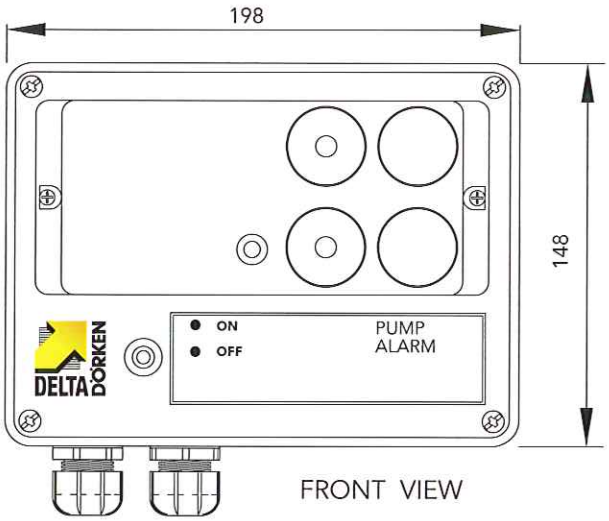

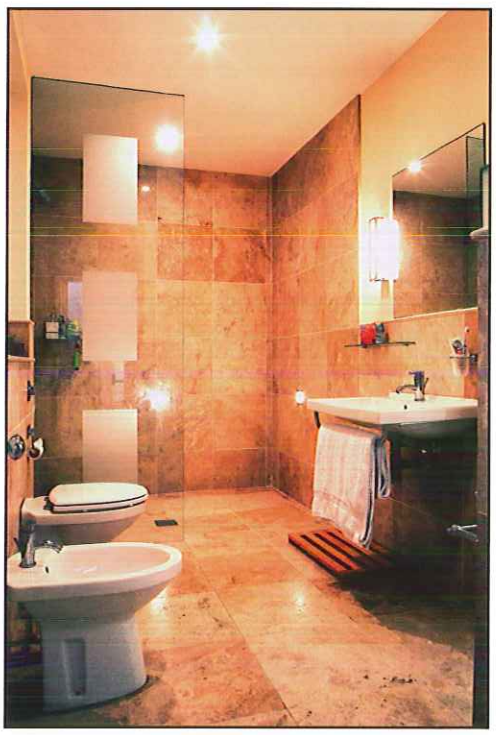

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DELTA® protects property. Saves energy. Creates comfort.

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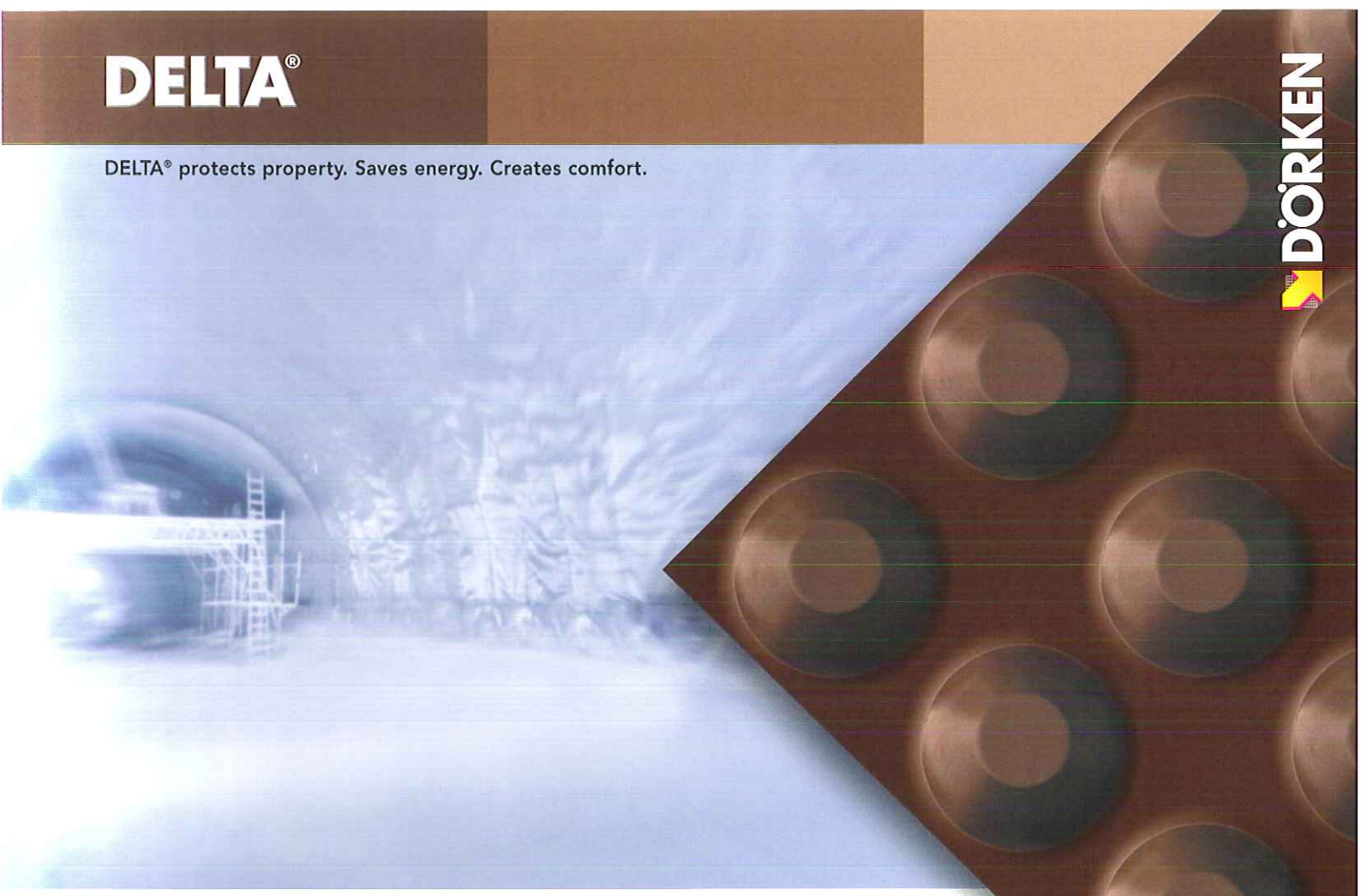

DELTA®-MS 20

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.

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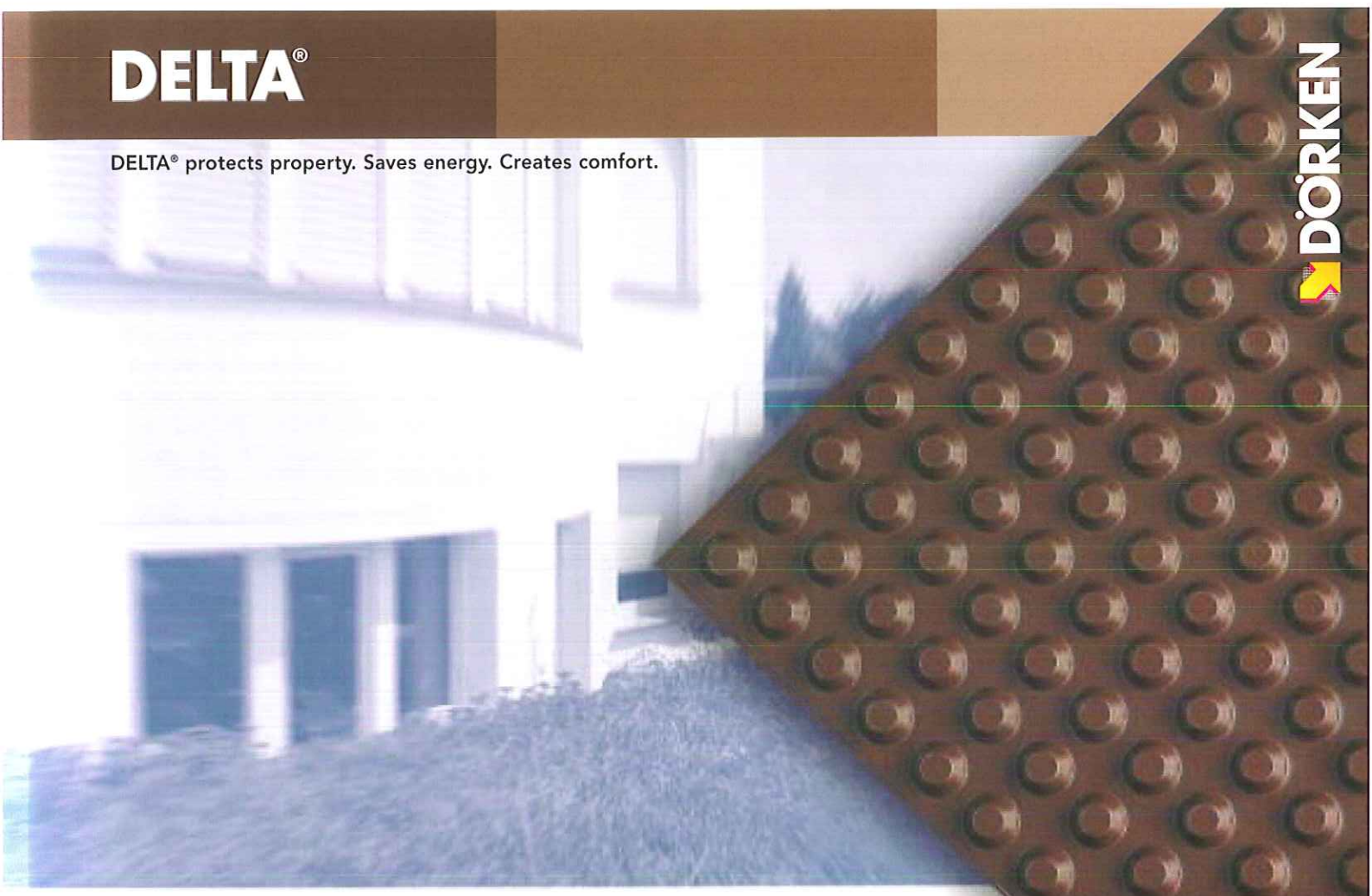

DELTA®-MS

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
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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).

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