



GeoShield Verification Plan



PROJECT DESCRIPTION

GEO102875

Neath Port Talbot Hospital (Orthopaedic Unit)
Baglan Way
Port Talbot
SA12 7BX

The proposed development for which gas protection measures are required involves a modular Orthopaedic Unit.

In accordance with BS8485:2015 + A1 2019 for a type C building and the building must conform to a Characteristic Gas Situation (CS) rating of 2, as a precautionary measure so mitigation will need to be 2.5 points.

Geoshield have adopted the highest design and verification principles associated with BS8485:2015 + A1 2019, BR 211, Public Health England, NHBC Technical Extra April 2016 and CIRIA 735.

This pre-verification plan reviews the design to ensure it is compliant with the developer and planning authority requirements and in conjunction with the relevant investigation report in accordance with BS8485:2015 + A1 2019.

In summary, the design does achieve a required level of attention to detail with its robust specific gas membrane design, and pressure relief system.

The pre-verification plan confirms how the installation will be tested in accordance with CIRIA735. The verification visits will be documented in verification reports during the project that are suitable for submission to the local planning authority in order to satisfy and discharge planning consent.

All faults identified during inspection and verification site visits of the ground gas membrane will be a required remediation before sign off.



GeoShield Verification Plan



PROJECT DESCRIPTION

Pre-Verification Plan

GeoShield are appointed by the Client to carry out independent validation, verification and integrity testing of the ground gas protection system on site. The Pre-Verification plan sets out the requirements and procedures that GeoShield will adopt to ensure that the installation is in line with the proposed design, relevant UK standards and guidance.

GeoShield take no responsibility for any warranties to third parties for the design of the system or the installation.

Limitations

The Pre-Verification plan prepared by GeoShield Limited is limited to the proposed ground gas protection measures installed. The Pre-Verification plan has been prepared in line with the relevance UK Standards and Guidance (BS8485:2015+A1:2019 & CIRIA 735) alongside the information made available to GeoShield by the Client. The conclusions made in the report are considered to be correct at the time of writing, but additional information provided/discovered may require amendments to the Plan. GeoShield recognises that changes to relevant standard and guidance may occur at any time which may cause the conclusions made to be incorrect - GeoShield do not accept any responsibility or liability for the implications of such changes.

The Pre-Verification plan does not in itself constitute verification that the membrane has been installed in accordance with this document. Validation and verification of the installed membrane will be covered in separate verification reports following physical inspection of the gas barrier and will include photographic evidence of the installation.

Waterproofing elements (where applicable) do not fall into the remit of this Pre-Verification plan or future inspections. GeoShield will provide the opinion on membrane's suitability for ground gas protection purposes – no liability is offered or implied for the waterproofing element which should be checked by others.



GeoShield Verification Plan



PROJECT REFERENCE:

GEO102875

PROJECT:

Neath Port Talbot Hospital (Orthopaedic Unit).

PROJECT ADDRESS:

Neath Port Talbot Hospital,

Baglan Way, Port Talbot

SA12 7BX

SPECIFICATION:

Verified in accordance CIRIA 735.

Design in accordance with BS8485 2015 + 2019 for Methane and Carbon Dioxide.

Substrate prepared in-accordance with manufactures instructions and BS8485:2019.

FC6 Cuspate Geocomposite

JUTA GP1 Gas Membrane

JUTA GP SAM

Telescopic Vents



GeoShield Verification Plan



NAME OF SURVEYOR:

John Cornish

VERIFICATION COMPANY:

GeoShield Limited

Icon Business Centre

4100 Park Approach

Thorpe Park

Leeds, LS15 8GB

CONTACT NUMBER:

07493769477

EMAIL ADDRESS:

jcornish@geoshield.co.uk

ORDER NUMBER:

To be confirmed

PER VISIT:

YES:

☐

NO:

☐

PROJECT:

YES:

☐

NO:

☐



GeoShield Verification Plan



INFORMATION INCLUDED

Geotechnical and Geoenvironmental Report

>Front Page

>Site Location

>Radon (No Radon)

>Characteristic Site Classification (CS2)

>Borehole Locations

Site Built Ground Floor Areas Layouts, Drawing No: 2325-PHG-V1-00-DR-S...

...-0404 Rev C03.

Foundations Sections and Details, Drawing No: 2325-PHG-V1-BG-DR...

...-S-0403 Rev C03.

Foundation Layout, Drawing No: 2325-PHG-V1-BG- DR-S-0402 Rev C05.

Piling Layout, Drawing No: 2325-PHG-V1-BG- DR-S-0401 Rev C04.

Site Built Ground Floor Areas Sections and Details, Drawing No: 2325-PHG...

...V1-BG- DR-S-0405 Rev C03.

Information presented to at the pre-verification stage assumed correct

Any change client will let GeoShield know or this Pre-verification Plan will be void.



GeoShield Verification Plan



INFORMATION INCLUDED

Module Gable - Base, Midband and Verge, Drawing No: H2201-MCO-01-...

...XX-DR-A-060003 Rev C01.

Non Standard Base and Midband, Drawing No: H2201-MCO-01-XX-DR...

...-A-060004 Rev C01.

Pressure Relief System Layout.

Perimeter Section.

FC6 Cuspate Geocomposite - Technical Data Sheet.

JUTA GP1 Gas Barrier - Technical Data Sheet.

JUTA GP SAM - Technical Data Sheet.

Information presented to at the pre-verification stage assumed correct

Any change client will let GeoShield know or this Pre-verification Plan will be void.



GeoShield Verification Plan



INFORMATION INCLUDED

Information presented to at the pre-verification stage assumed correct

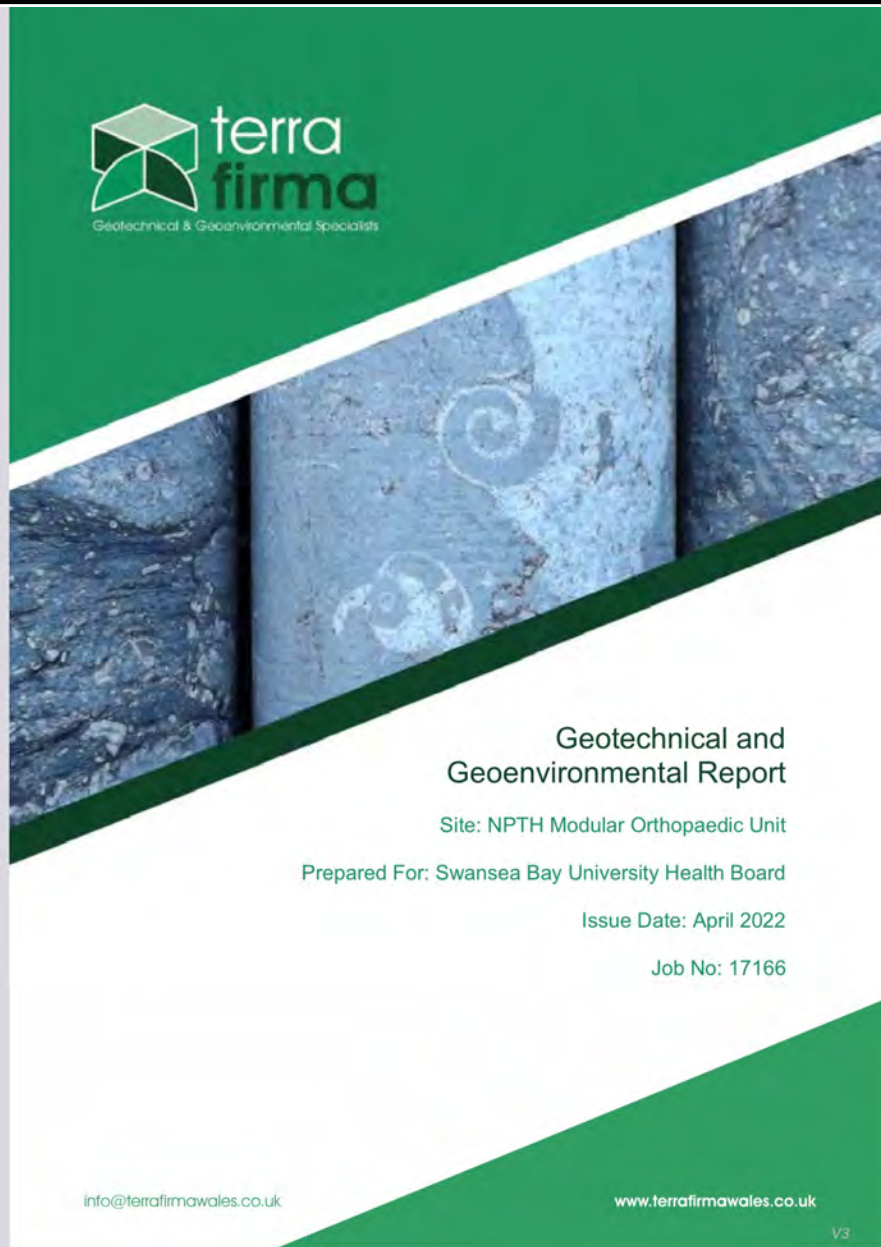
Any change client will let GeoShield know or this Pre-verification Plan will be void.

BGA
British Geomembrane Association

GeoShield Verification Plan



SPECIFICATION



Title Reference & Description:

Geotechnical and Geoenvironmental Report

Front Page

SPECIFICATION

Swansea Bay University Health Board



SECTION 2 Review of Existing Data

2.1 Physical Setting and Current Site Use

The development site is rectangular in shape and locates between the existing hospital structure to the west and energy centre to the east, within the wider hospital grounds. The site centres on an approximate National Grid Reference of 275440, 190540 occupying a plan area of approximately 0.07 Hectares.

The investigation area comprises open undeveloped land, with footpaths crossing to the northeast and southeast, areas of grass and gravel and a small concrete slab positioned centrally within the area.

The site elevation is approximately 7m AOD and relatively level.

The site location can be seen on **Figure 2.1** along with the site layout on **Drawing 01**.



Figure 2.1 Site Location (Google Satellite Imagery)

2.2 Site History

Historical maps of the site have been obtained in an Envirocheck Report, provided by Landmark Information Group. The history plans are supplied in **Annex A** of this report, and the most relevant editions are summarised in **Table 2.1**. Distances, where quoted are approximate, and any changes in-between map editions may not be recorded

Table 2.1 Historical Development from Map Information

Map Edition & Scale	Key Features on Site	Key Features off Site
1876/1877 (1:2,500)	The site is shown to comprise undeveloped	Land is generally undeveloped in the immediate vicinity. Drainage reens cross the area.
April 2022	2	17166

Title Reference & Description:

Geotechnical and Geoenvironmental Report

Site Location

SPECIFICATION

Swansea Bay University Health Board

 terra
firma

Table 2.2 Detailed Stratigraphical Information

Period	Formation
Quaternary	Tidal Flat Deposits – Sand, silt and clay
Carboniferous	South Wales Middle Coal Measures – Grey productive coal bearing mudstone, siltstone with seatearths and minor sandstones

Made ground is anticipated at the site.

2.4.2 BGS Borehole Information

The site may have been reprofiled since boreholes were performed.

BGS Borehole SS79SE396 locates within the study site at an elevation of 7.19m AOD. The borehole was performed in 1999 and encountered 3.80m of Made Ground, including slag, over firm, very silty clay. Water rose to 2.80m BGL.

BGS Borehole SS79SE397 locates south of the study site. The borehole was performed in 1999 and was commenced at 6.56m AOD. The borehole encountered 4.20m of Made Ground, including slag, over sandy, very silty clay with occasional gravel and lenses of peat. At 11.4m depth below ground level very dense sandy slightly silty gravel was encountered.

2.4.3 Radon

The Envirocheck Report (**Annex A**) details that no radon protective measures are required for new developments on the investigation site.

2.4.4 Mining

A Coal Authority CON29M Report was obtained for the site. The report revealed that the site is not in a surface area that could be affected by recorded underground coal mining. The Coal Authority Report is presented in **Annex B**.

There are no BGS mineral sites as recorded within 500m of the study site.

2.4.5 Natural Hazards

The underlying geology is not prone to dissolution and the risk of natural cavities in the bedrock is considered negligible.

Shallow superficial soils have the potential for compressible ground, sensitive clays and running sand conditions.

Peat is anticipated at depth beneath the site.

April 2022

4

17166

Title Reference & Description:

Geotechnical and Geoenvironmental Report

Radon

SPECIFICATION

Swansea Bay University Health Board



SECTION 8 Ground Gas Risk Assessment

8.1 Gas Risk Characterisation

8.1.1 Gas Source

Made ground was encountered with a thickness of between 5.10-6.50m and typically contained waste anthropogenic materials. However, the most significant potential gas source remains to be the off site landfill.

8.1.2 Gas Migration Pathways

Made ground soils were observed to be granular in composition. Moisture content of shallow soils suggests a high saturation. Subsequent monitoring visits have revealed water in boreholes between 2.40-2.50m below ground level.

8.1.3 Potential Receptors

Future site user including all staff, patients and visitors are considered potential receptors. Groundworks undertaken below ground level in confined space may present a risk to construction and maintenance workers.

8.2 Gas Screening Value

Three ground gas monitoring wells were installed in boreholes WS01 to WS03. Installation details are shown on the relevant log.

Two rounds of gas monitoring have been carried out to date. The installations were tested for carbon dioxide, methane, oxygen, carbon monoxide and hydrogen sulphide using a Gas Analyser GA5000.

Recorded gas concentrations are summarised in **Table 8.1**.

Table 8.1 Measured Gas Concentration Summary

Gas	Minimum (% V/V)	Maximum (% V/V)
Methane	0.2	10.5
Carbon Dioxide	0	0.5
Oxygen	17.3	21.5

The gas flow rate from the boreholes was also assessed, a maximum typical flow rate of 0.3l/hr was recorded.

Based on a flow rate of 0.3l/hr and the highest recorded methane concentration of 10.5%, a gas screening value of 0.0315l/hr is calculated, as follows:

$$(10.5/100) \times 0.3 = 0.0315\text{l/hr}$$

The results to date are presented in **Annex J**.

8.3 Conclusion

When this monitoring result is compared with Table 8.5 of CIRIA report C665, the site is classified as 'Gas Characteristic Situation 1' (CS1). However, as the peak methane has significantly risen above 1%, it is recommended that 'Gas Characteristic Situation 2' (GS2) is applied to the site in line with recommendations provided in CIRIA C665.

April 2022

20

17166

Title Reference & Description:

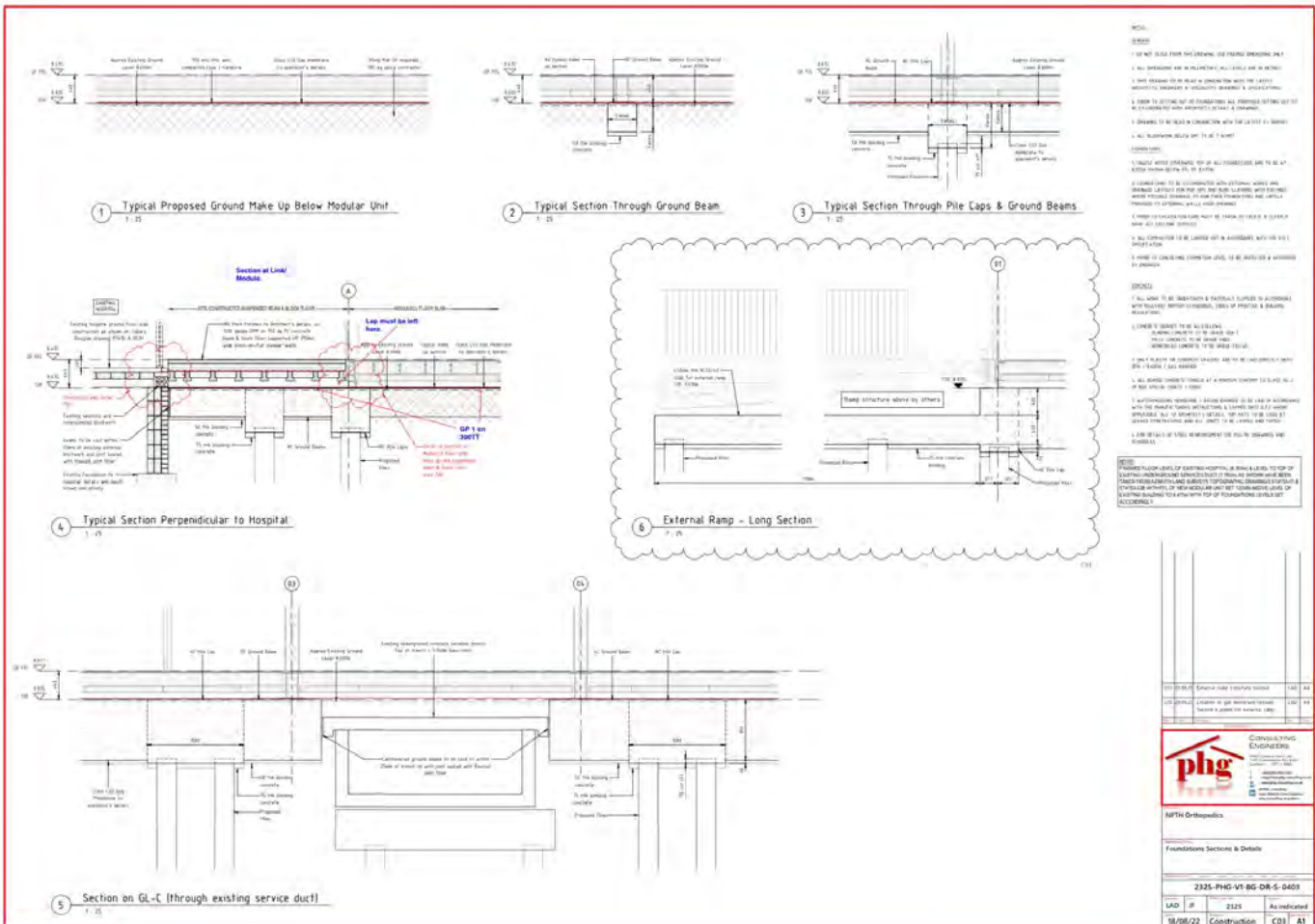
Geotechnical and Geoenvironmental Report

Characteristic Site Classification (CS2).



...-0404 Rev C03.

SPECIFICATION

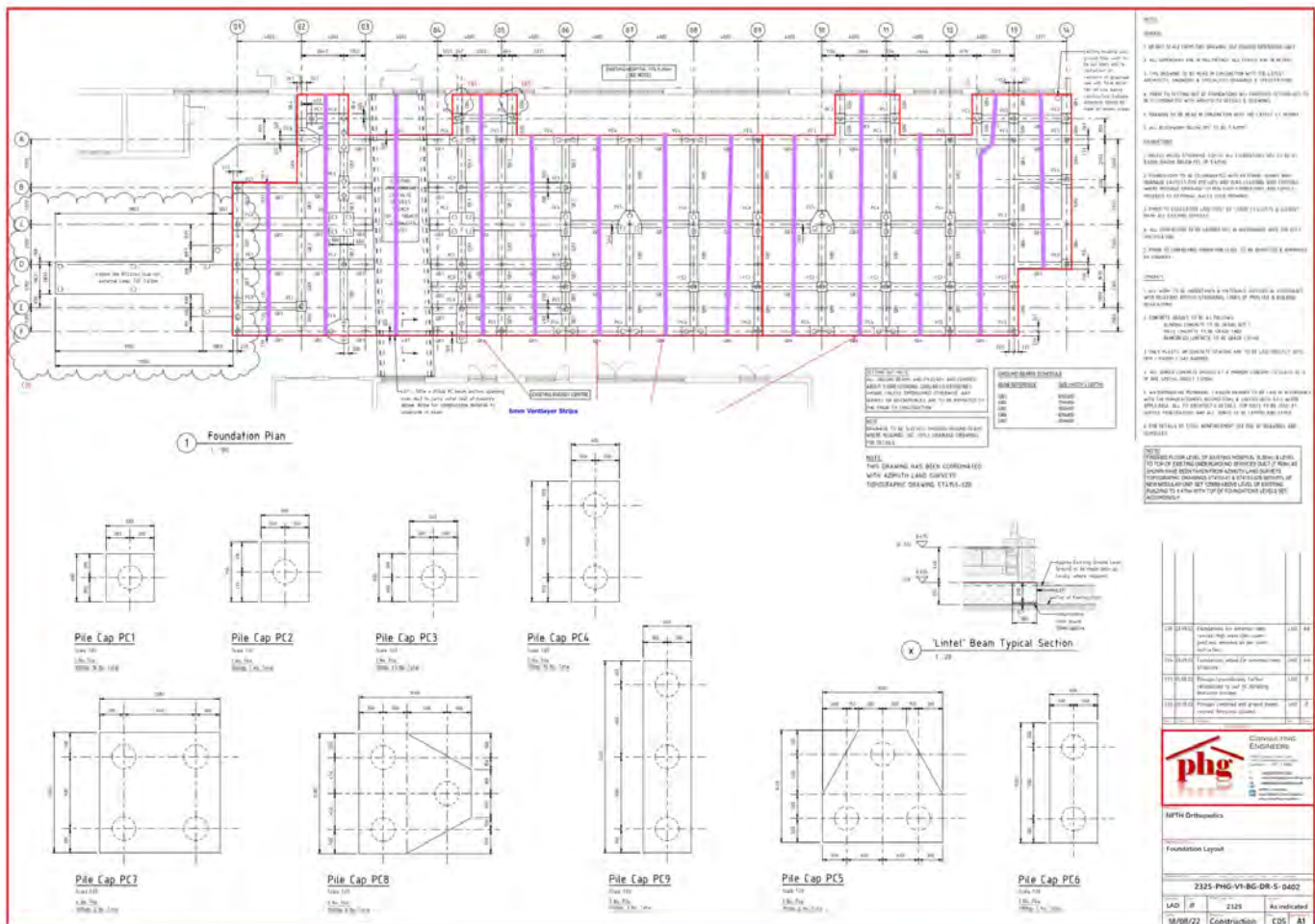


Title Reference & Description:

Foundations Sections and Details, Drawing No: 2325-PHG-V1-BG-DR...

...-S-0403 Rev C03.

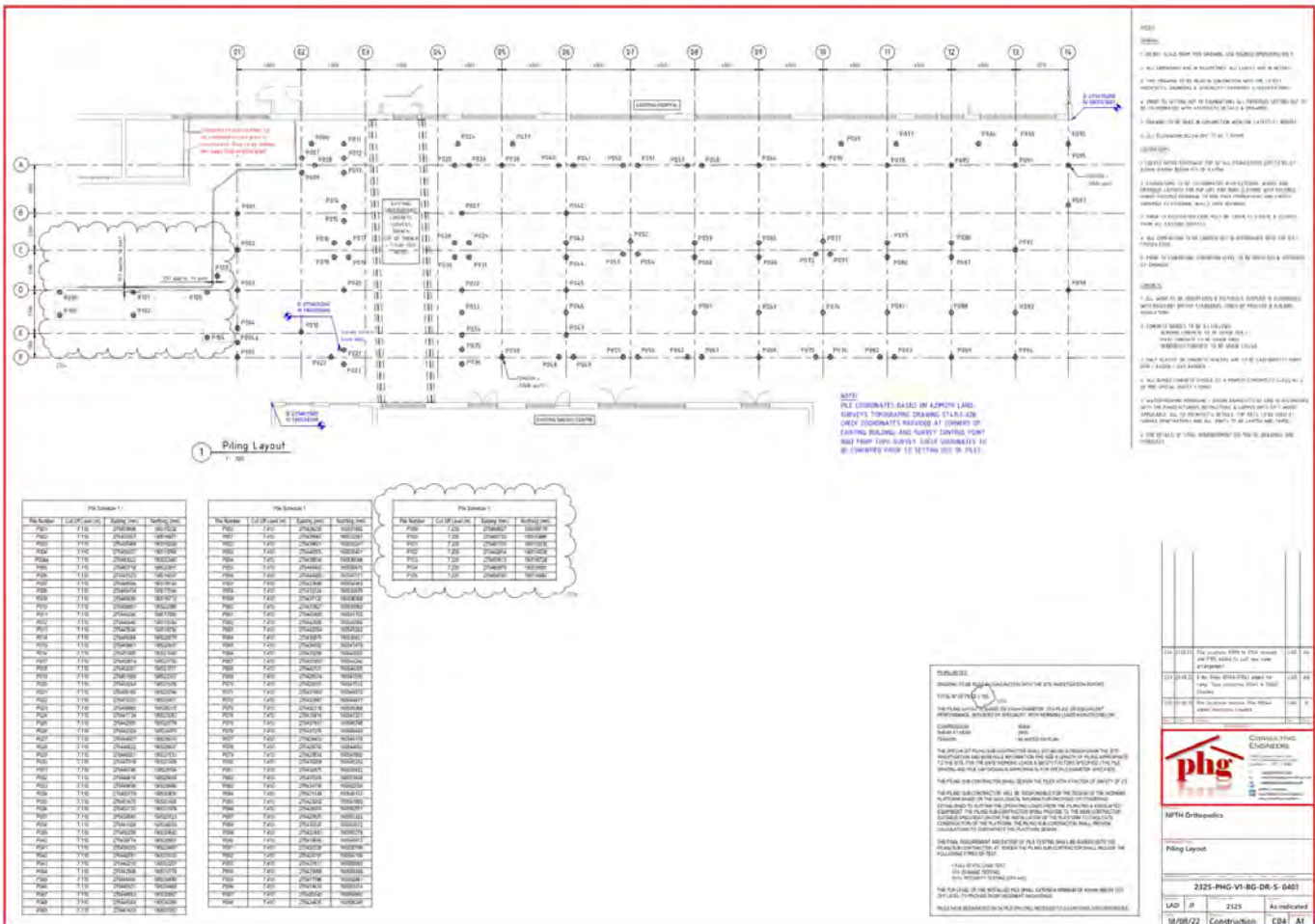
SPECIFICATION



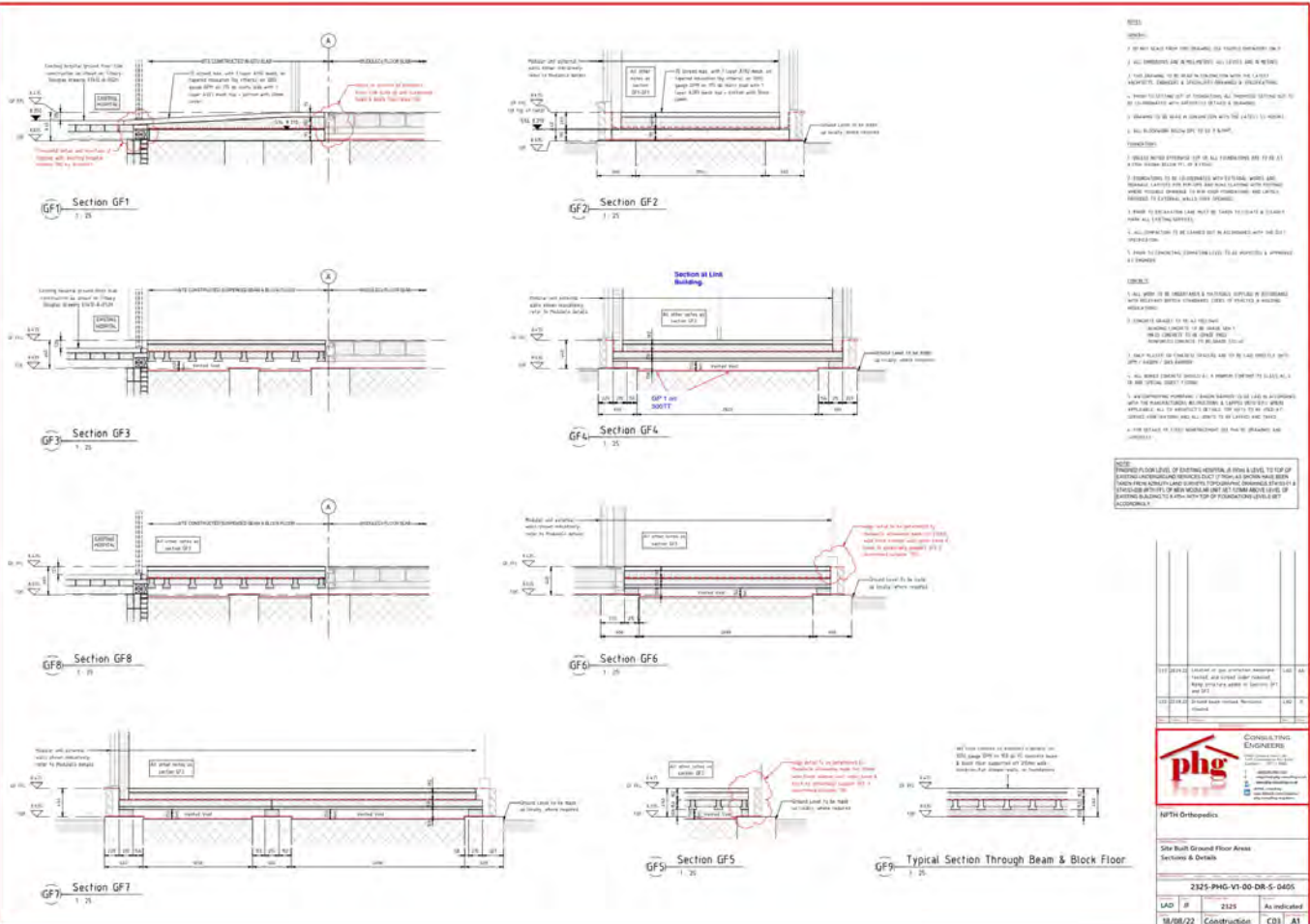
Title Reference & Description:

Foundation Layout, Drawing No: 2325-PHF-V1-BG- DR-S-0402 Rev C05.

SPECIFICATION



SPECIFICATION

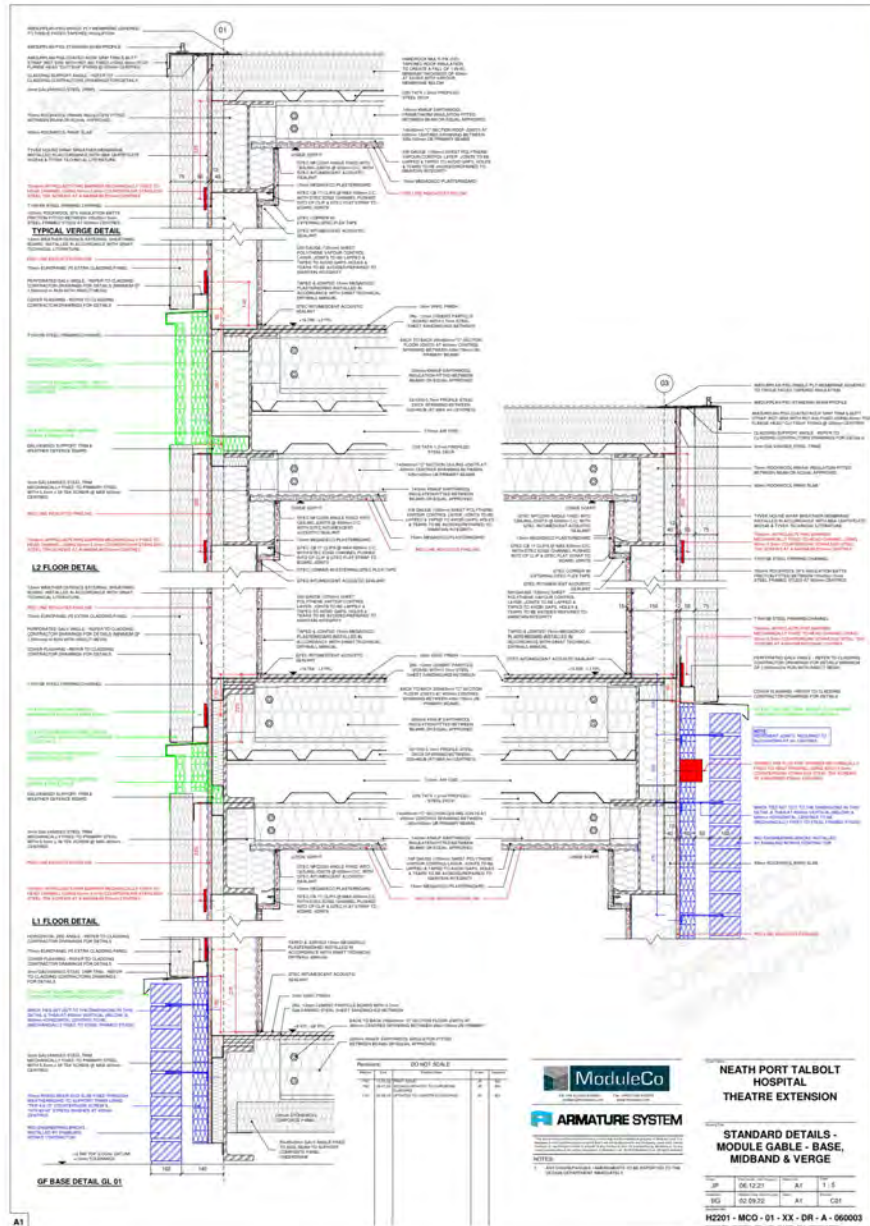


Title Reference & Description:

Site Built Ground Floor Areas Sections and Details, Drawing No: 2325-PHG...

...V1-BG- DR-S-0405 Rev C03.

SPECIFICATION

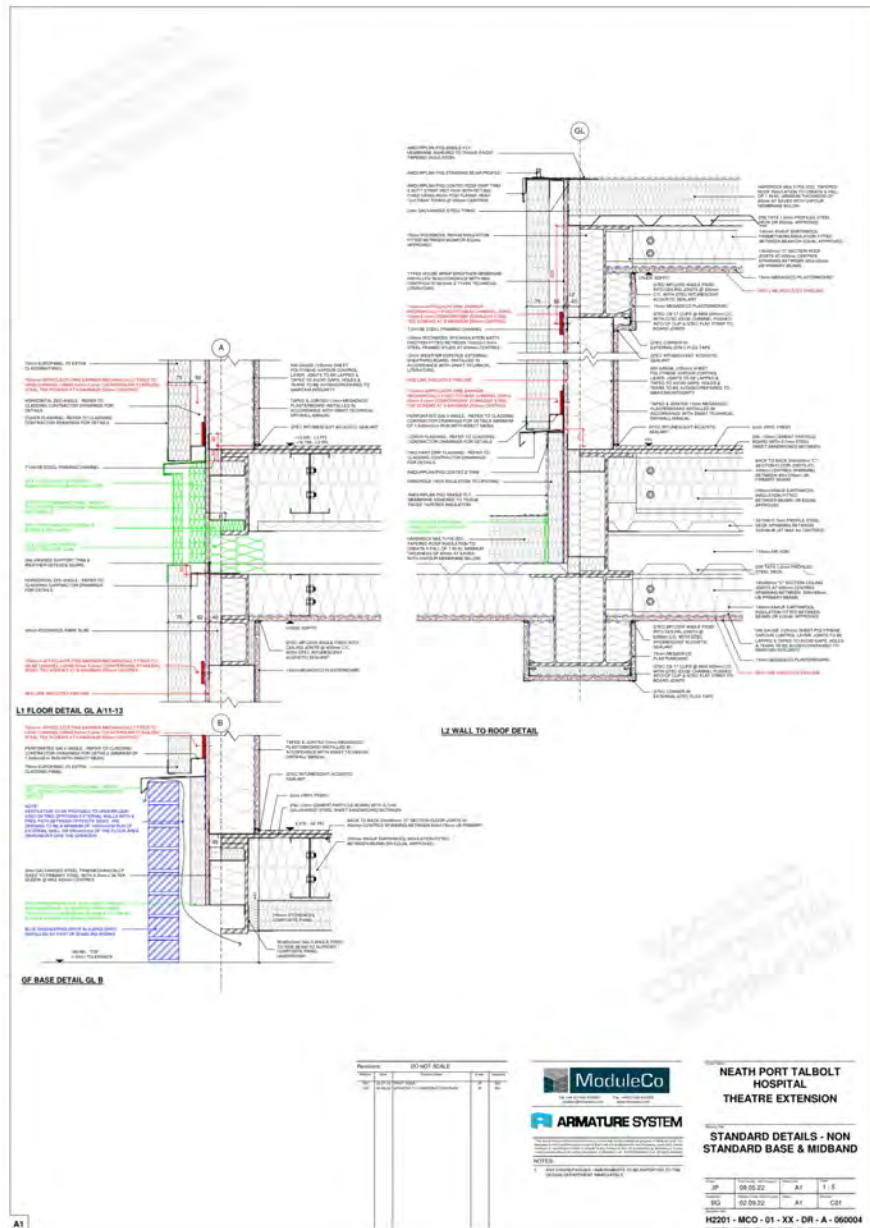


Title Reference & Description:

Module Gable - Base, Midband and Verge, Drawing No: H2201-MCO-01-...

...XX-DR-A-060003 Rev C01.

SPECIFICATION

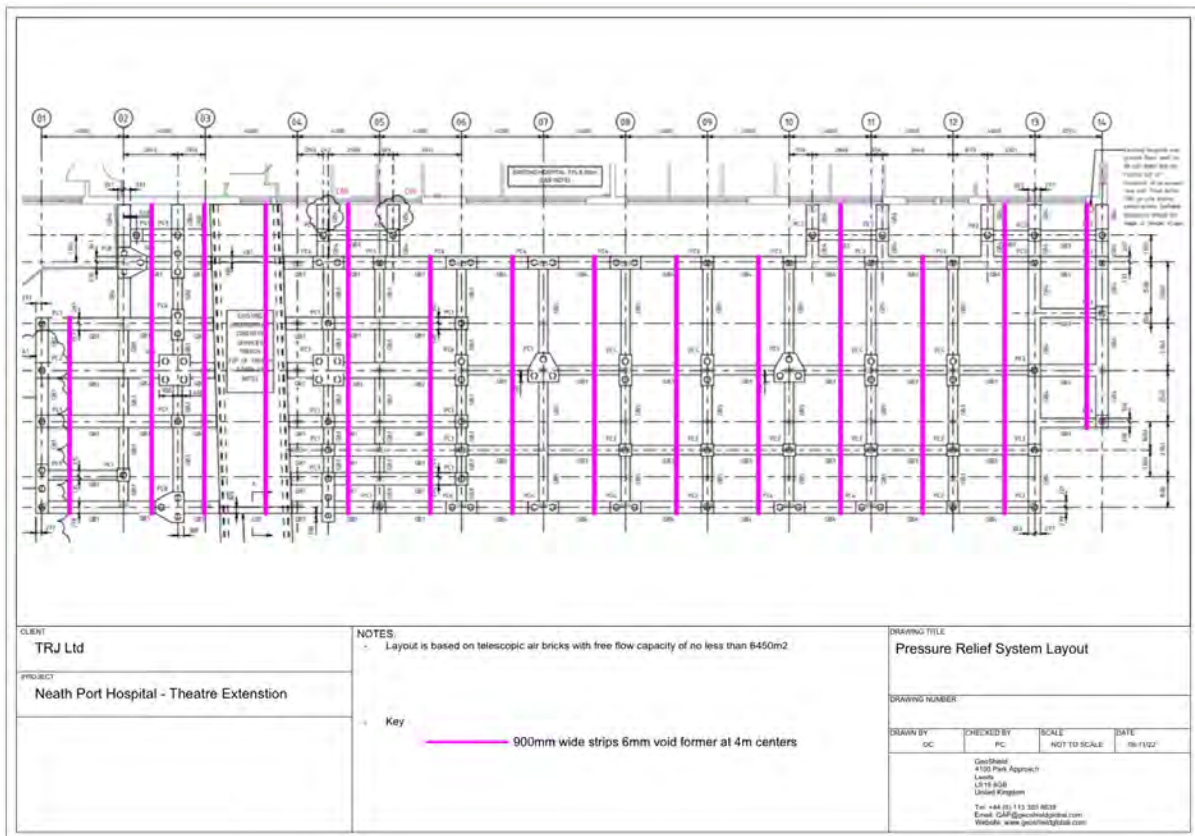


Title Reference & Description:

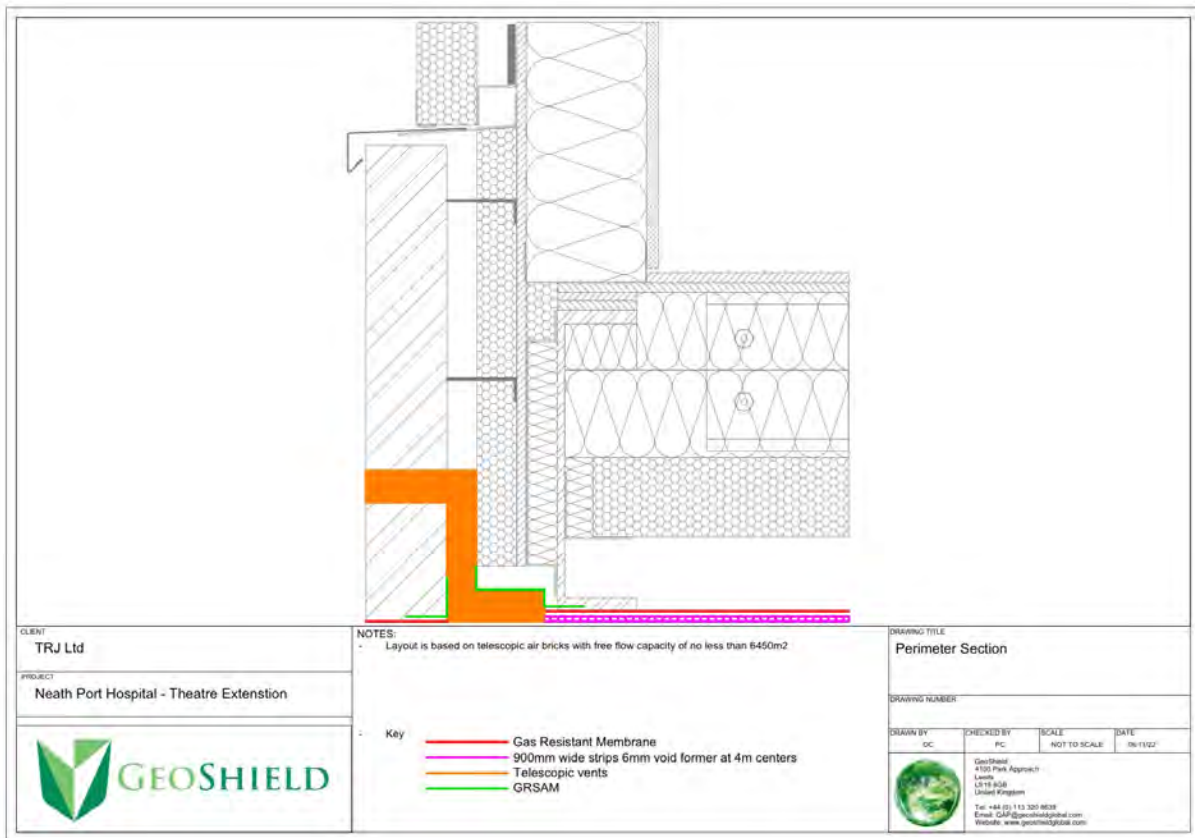
Non Standard Base and Midband, Drawing No: H2201-MCO-01-XX-DR...

...-A-060004 Rev C01.

SPECIFICATION



SPECIFICATION



Title Reference & Description:

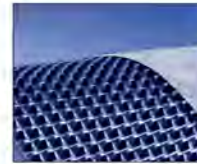
Perimeter Section.

SPECIFICATION

GEofabrics®

FC6 Cuspate Geocomposite

- 1. Description** 6mm HDPE cusped drainage board with a PP geotextile filter/separator bonded to a single side.
- 2. Applications** Geofabrics FC6 geocomposite has been designed to provide a passive venting system for gasses and liquids.
- 3. Features**
- Optimised for maximum strength and performance
 - UV stabilised
 - Very high crush resistance
 - Excellent flow rate



	Test Standard	Unit	Mean Values		
4. Mechanical Properties – Geocomposite					
Compressive strength	EN ISO 25619-2	kPa	800		
5. Mechanical Properties – Geotextile Filter					
Tensile strength (MD/CMD)	EN ISO 10319	kN/m	9		
Static puncture (CBR)	EN ISO 12236	kN	1.4		
6. Hydraulic Properties – Geotextile Filter					
Water permeability K_{fs}	EN ISO 11058	l/(m ² s)	100		
Apparent opening size	EN ISO 12956	µm	80		
7. Hydraulic Properties – Geocomposite					
In plane flow capacity (rigid/rigid)	EN ISO 12958	l/(m s)	$i = 1$	$i = 0.5$	$i = 0.1$
@ 20kPa			2.0	1.5	0.65
@ 100kPa			2.0	1.5	0.60
@ 200kPa			2.0	1.5	0.55
8. Physical Properties – Geocomposite					
Thickness @ 20kPa	EN ISO 9863-1	mm	7		
Standard colour – Cuspate			Black		
Polymer – Cuspate			HDPE		
Polymer – Geotextile			pp		

Notes:

- a) Mean values indicate the arithmetic mean derived from the samples taken for any one test as defined in the standard – usually an overall mean of five samples.
Mean values are subject to tolerances based on 95% confidence limits as published on the product CE declaration of performance.

- 9. Testing** All materials are tested every 6000m² in an UKAS accredited ISO 17025 laboratory to all mechanical properties prior to release.
- 10. Storage** The geocomposites are supplied in packaging designed to protect the product from damage during handling, storage, and degradation as a result of UV exposure. The product should be kept in appropriate packaging until such time that it is required for installation. The product is clearly and indelibly marked with the product name along the edge of the roll at regular intervals no greater than 5m. The packaging is labelled clearly to identify the product supplied in accordance with EN ISO 10320: Geotextile and Geotextile related products – Identification on site. Use slings where provided. Product weights are given on roll tickets. Use equipment appropriate to weight and dimension. Store and handle in accordance with good occupational hygiene and safety practice.

	Unit	Values
11. Dimensions		
Standard roll length	m	100
Standard roll width	m	0.97
Approximate roll weight	Kg	115

Geofabrics Limited, Skelton Grange Road, Stourton, Leeds LS10 1RZ, United Kingdom

+44 0113 202 5678

info@geofabrics.com

www.geofabrics.com

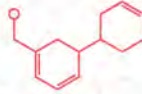
Title Reference & Description:

FC6 Cuspate Geocomposite - Technical Data Sheet.

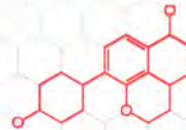
SPECIFICATION

GP® 1

Rev. June 2016

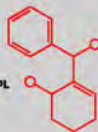
**Ground Gas
Protection**

Juta GP® 1 - Gas Barrier is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP® 1 is specifically designed and manufactured to perform as a Methane, Carbon Dioxide, Radon, Ground Gas, VOC/Hydrocarbon vapors, air & moisture protection system.



JUTA GP® 1			
Characteristics	Test Method	Unit	JUTA GP® 1
Physical Properties			
Thickness	EN 1849-2	mm	0.6
Thickness - Between Scrim	BS EN ISO 9863-1:2016	Mm	0.4
Width	EN 1849-2	m	Various
Length	EN 1849-2	m	Various
Weight	EN 1849-2	G/M ²	370
Hydraulic Properties			
Thickness	EN 20811	-	>300
Resistance to Water Penetration	EN 13967, EN 1928	-	Pass
Water Tightness	EN 1296, EN 1367, EN 1928	-	Pass
Mechanical Properties			
Resistance to Static Load	EN 12730-B	Kg	20
Tensile Strength (MD)	EN 12311-1	N/50mm	600
Tensile Strength (CMD)	EN 12311-1	N/50mm	480
Tensile Elongation (MD)	EN 12310-1	%	20
Tensile Elongation (CMD)	EN 12310-1	%	20
Puncture Resistance	EN 12236	kN	1.25
Resistance to Tearing (Nail Shank) MD	EN 12310-1	N	330
Resistance to Tearing (Nail Shank) CMD	EN 12310-1	N	400
Durability and Chemical Resistance			
Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	g/m ² /h	0.246
Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	g/m ² /h	0.571
Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	g/m ² /h	0.583
Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	g/m ² /h	0.135
Gas Permeability			
Methane Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Carbon Dioxide Permeability	BS EN ISO 15105-1	ml/m ² /day/atm	<0.09
Radon Permeability	K124/02/95	m ² /s	8.0 x 10 ⁻¹⁵
Compliance and Certification			
CE Mark - EN13967:2012			
NHBC Standards Compliant			
BS 8485:2015 + A1 2019 Accordant			
BBA Certified - Certificate No. 12/4912			

Contact us to find out more information.
info@juta.co.uk | 01774 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lycham, FY8 5PL

**JUTA****riba**
product
selector

Title Reference & Description:

JUTA GP1 Gas Barrier - Technical Data Sheet.

SPECIFICATION

Additional Information

HANDLING

Roll weights can be in excess of 20kg and hence appropriate care and equipment is required for unloading and handling.

STORAGE

Rolls of JUTA GP[®] 1 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

INSTALLATION

JUTA GP[®] 1 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

JOINTING AND SEALING

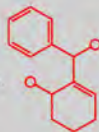
It is recommended JUTA GP[®] 1 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015. JUTA GP[®] 1 should be overlapped by at least 100mm. If taping joints, only suitable tape must be used, ensuring application with a silicone roller to remove trapped air. JUTA pre-formed details, or Self Adhesive Gas Membrane are available for sealing around protuberances.

ACCESSORY PRODUCTS

-  JUTA GP[®] 1 Starter Band
-  JUTA GP[®] Tape
-  JUTA GP[®] Self Adhesive Membrane
-  JUTA GP[®] Primer
-  JUTA GP[®] Top Hats and Preformed Corners
-  JUTA GP[®] Protection Fleece
-  JUTA GP[®] Void Vent (25/40mm)

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP[®] 1

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lytham, FY8 5PL



JUTA

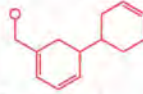
riba
product
selector

Title Reference & Description:

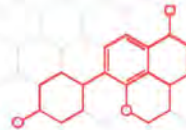
JUTA GP1 Gas Barrier - Technical Data Sheet.

SPECIFICATION

GP® SAM

Ground Gas
Protection

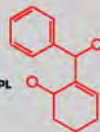
JUTA GP® SAM - Gas Protection - Self Adhesive Membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating an aluminium foil with an upper surface finish of white cross laminated HDPE, and a lower surface finish of siliconized paper release film. JUTA GP® SAM is used for the gas/waterproofing of underground structures where harmful ground gasses are anticipated.



JUTA GP® SAM			
Characteristic	Test Method	Unit	GP® SAM
Physical Properties			
Thickness	EN 1849-2	mm	1.00
Width	EN 1849-2	M	0.3 or 1
Length	EN 1849-2	M	20
Weight	EN 1849-2	g/m²	1100
Hydraulic Properties			
Watertightness	EN 1928	-	PA55
Water Vapour Transmission	EN 1931	g/m²/day	0.013
Mechanical Properties			
Tensile Strength (MD/CMD)	EN12311-2	N/mm²	3
Elongation (MD/CMD)	EN 12311-2	%	>120
Resistance to Static Load	EN 12370	kg	20kg
Joint Strength	EN 12317-2	N	>30
Durability and Water tightness (ageing and chemicals)	EN 1847	-	PA55
Resistance to Nail Tear (MD/CMD)	EN 12310-1	N	>100
Reaction to Fire	EN 13501	Euro Class	F
Gas Permeability			
Methane Permeability	BS EN ISO 15105 - 1	ml/m²/day/atm	< 0.53
Carbon Dioxide Permeability	BS EN ISO 15105 - 1	ml/m²/day/atm	< 0.53
Radon Permeability	K124/02/95	m²/s	5.0 x 10 ⁻¹⁴

JUTA GP® SAM complies with the latest codes of practice as published by BRE, CIRIA and BSI (BS 8485:2015).

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lycham, FY8 5PL



JUTA

riba
product
selector

Title Reference & Description:

JUTA GP SAM - Technical Data Sheet.

SPECIFICATION

Additional Information**HANDLING**

Roll weights can be in excess of 20kg (approx. 33kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

STORAGE

Rolls of JUTA GP® SAM should be stored horizontally, and pallets should not be stacked on top of one another.

JUTA GP® SAM should be stored in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

INSTALLATION

JUTA GP® SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

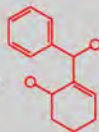
It is recommended that JUTA GP® SAM is not applied in temperatures below 10 °C, in colder weather the material can be warmed slightly to aid adhesion.

ACCESSORY PRODUCTS

-  JUTA GP® Primer
-  JUTA GP® Protection Board
-  JUTA GP® Protection Fleece

PLEASE CONTACT JUTA UK DIRECTLY FOR MORE INFORMATION ON JUTA GP® SAM

Contact us to find out more information.
info@juta.co.uk | 01772 754177 | JUTA.CO.UK
Melton Grove Works, Church Road, Lytham, FY8 5PL

**JUTA**riba
product
selector

Title Reference & Description:

JUTA GP SAM - Technical Data Sheet.



GeoShield Verification Plan



CLIENT DETAILS

CLIENT CONTACT:	Jon Taylor
CONTACTS ROLE:	
MOBILE PHONE:	01269591103
EMAIL ADDRESS:	JonTaylor@trjltd.co.uk

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	



GeoShield Verification Plan



APPLICATOR'S DETAILS

APPLICATOR NAME: TBC

COMPANY: MB Membranes

APPLICATOR TEL:

APPLICATOR EMAIL:

APPLICATOR NAME: TBC

COMPANY: MB Membranes

APPLICATOR TEL:

APPLICATOR EMAIL:

NOTES: The name of the installers are unknown at this point so the installers will

either be identified at the pre-verification meeting or the first site visit.

At least one member of each team group will have a NVQ Level 2

qualification in the gas membrane installation.



GeoShield Verification Plan



APPLICATOR'S DETAILS

TRAINING LEVEL:

SPECIALIST CONTRACTOR:	YES	☒	NO	☐
NVQ LEVEL 2:	YES	☒	NO	☐
NVQ LEVEL 4:	YES	☐	NO	☒
COMPETENT APPLICATOR :	YES	☒	NO	☐

REASON FOR VISIT:

DURING INSTALLATION:	☒	UNDERSLAB VENTILATION	☐
PRE - POUR:	☐	DPC MEMBRANE CONNECTION	☐
TESTING:	☒	OTHER (PLEASE SPECIFY):	☒

NOTES: When modular building is being dropped into place.

NOTES: Having worked with MB Membranes on numerous successful projects

these applicators will be deemed to be at an appropriate skill level for the

job of installing the ground gas protection measures.



GeoShield Verification Plan



In accordance with guidance from
CIRIA 735 & CIRIA C748.

Radon gas protection measures
specify to the guidance from the
BR 211 document:

VOC/Hydrocarbons

☐

RADON BASIC

☐

RADON FULL

☐

Characteristic Specification (CS) Rating

CS2

Building Type:

TYPE C

POINTS REQUIRED UNDER BS8485:2019

2.5 POINTS

POINTS GAINED FROM BS8485:2019

Score for Structural Barrier:

N/A

Grade 2 Basement:

N/A

Grade 3 Basement:

N/A

Score for Venting:

0.5 POINTS

Car Park:

N/A

Score for Membrane:

2.0 POINTS

POINTS ACHIEVED UNDER BS8485 2019:

2.5 POINTS



GeoShield Verification Plan



TESTING

VISUAL: PICK & PROBE/MECHANICAL POINT STRESS TEST:



NON-DESTRUCTIVE COMPRESSED AIR LANCE TEST:



NON-DESTRUCTIVE SMOKE TEST:



DESTRUCTIVE JOINT TESTING:



NON-DESTRUCTIVE TRACER GAS TESTING:



DIELECTRIC POROSITY TEST:



PUMP TEST FOR "Twinny" WELD



NOTES: From the risk assessment GeoShield will initially conduct a visual

NOTES: and pick and probe testing regime for this project.

NOTES: Air lance testing will be conducted to test the installed membrane in

NOTES: accordance with CIRIA 735.

NOTES:

NOTES: Only if the application falls below the accepted standard will other testing

NOTES: be used.

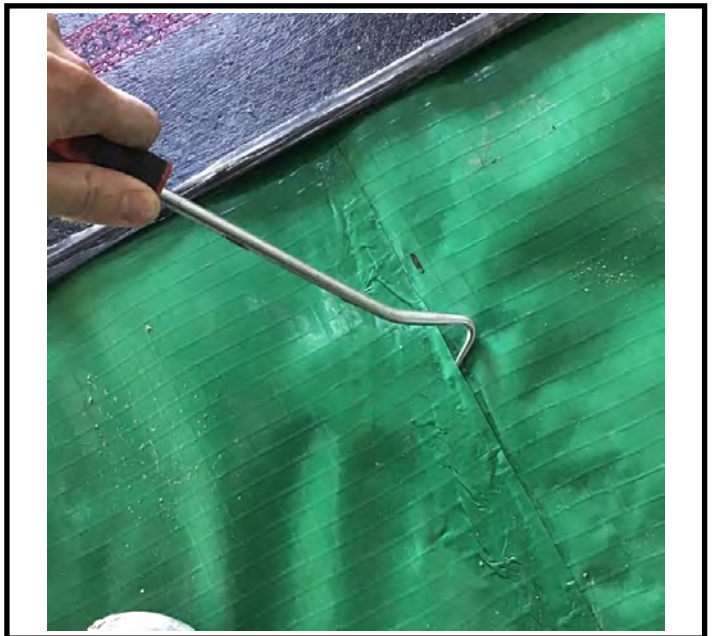
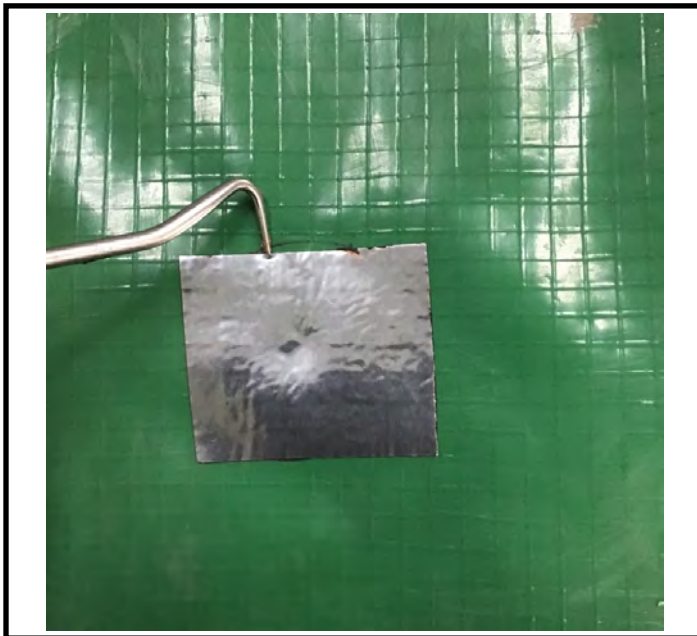


GeoShield Verification Plan



SPECIFICATION

Mechanical Point Stress/ 'Pick and Probe' Testing



CIRIA 735

4.3.2 - Mechanical point stress tests involve running a blunt instrument (e.g. a screwdriver) along the edge of a seam to identify any unbonded seams. This method is not as effective as air lancing but it can be especially useful in hard to reach areas where it is not possible to air lance.

The instrument used should not puncture the gas membrane. This method is less appropriate for materials that are easily punctured where an air lance test is more suitable (although if a gas membrane can be easily punctured its suitability as a membrane is open to question).

SPECIFICATION

Air Lance Testing



CIRIA 735

4.3.3 - Air lance testing identifies unbonded areas of seam by directing a high pressure jet of air at the seam. The air is at a minimum pressure of 345kPa via a 4.8mm nozzle and is located no more than 50mm from the seam being tested.

In order to achieve the requirements of ASTM D4437-08:2013 bespoke specialist equipment is required to maintain the required pressure.



GeoShield Verification Plan



RISK ASSESSMENT

SITE SPECIFIC CIRCUMSTANCES	1	2	3	4	5
Complexity of Design	1	✓ 2	3	4	5
Repetition of Design	1	2	✓ 3	4	5
Experience of Workforce	1	✓ 2	3	4	5
Gas Regime	1	✓ 2	3	4	5
Project Management Experience	1	✓ 2	3	4	5
Installation Conditions (exposed?)	1	2	✓ 3	4	5
Robust Project Specific Gas Design	1	✓ 2	3	4	5

TYPE OF RISK	RANGE	RISK
High Risk	23 - 30	
Medium High Risk	19 - 22	
Medium Risk	15 - 18	16
Medium Low Risk	11 - 14	
Low Risk	0 - 10	

GeoShield have classed this project as a medium risk.

GeoShield will lay all parameters down for standards at the pre-verification meeting to assist both the installer and the main contractor.



GeoShield Verification Plan



VERIFICATION PLAN

METHOD STATEMENT

EXPECTED VISITS:- 4 site visits are deemed necessary for verification, however extra visits may be considered for potential remediations before sign off.

TESTING:- Mechanical Point Stress (Pick & Probe) testing on taped and welded laps/details. Air lance testing will be conducted where access allows for use of equipment.

PURPOSE:- Geoshield are 3rd party gas membrane verifiers and in order of this project to be compliant with BS8485:2019 and in accordance with CIRIA 735.

This project will NOT achieve sign off for gas membrane installation unless independent verification is carried out.

REPORTING:- Each site visit be accompanied with a written and electronic report.

Any remediations either completed on the visit or outstanding for a later date will be recorded and logged, sign off will not be achieved for each section area until all remediations has been completed. This will be fully recorded at all times.



GeoShield Verification Plan



VERIFICATION PLAN

METHOD STATEMENT

GROUND GAS RISK:- From detail design drawings this project has been classified as a Type C building and a CS2 rating in accordance with BS8485:2019.

This will require to mitigate a minimum score of 2.5 points. This will be achieved by 3rd party verification of gas membrane and pressure relief.

A combination of which will achieve the necessary requirements.

GAS MEMBRANE PROTECTION:- It is essential that upon satisfactory install of gas membrane and after verification work is completed.

In addition warning labels will be issued by Geoshield to advise on the need to restrict access to the installed area by follow on trades and their due diligence.

This will help to reduce potential damage caused.

FINAL:- Geoshield will liaise with the projects site supervision and all relevant parties prior to the installation start. This plan will be presented and reviewed, all points made clear as previously stated. Any alterations will be listed at the end of this plan as an all party agreed way forward.



GeoShield Verification Plan



PRE-CONTRACT MEETING

Items for discussion at the Pre-Contract meeting:-	☐
>Induction Procedure	☐
>Identification of installation team and point of contact	☐
>Identification of Project Management team	☐
>Identification of Sub-Contractors associated with membrane installation	☐
>Validation of Membrane and Design Specification	☐
>Verification Procedure	☐
>Notifications for Verification	☐
>Preparation of Substrate	☐
>Program of Works	☐
>Utility Entry	☐
>Protection of Membrane	☐
>Remediation Procedure	☐
>Testing Procedures	☐
>Sign off Procedure	☐
>Installer PI	☐

All information is assumed correct at time of issue.

DATE:	
-------	--



GeoShield Verification Plan



PRE-CONTRACT MEETING SUMMARY

A proforma quality assurance document will be discussed during the Pre-Verification meeting and training undertaken with the management team for non verified areas.

The Pre-Verification meeting will be led by Geoshield and should include all relevant parties who have an impact on the installation and future protection. Geoshield will provide guidance and strategy for all parties.

The site specific checklist will be covered as well as the risk assessment.

This site has been classified as a CS2 gas regime rating for precautionary measures.

Any design alterations will be discussed and included in a revised Pre-Verification Plan.

Any specification changes must also be included in a revised Pre-Verification Plan.

All items will be minuted by the Geoshield representative.

This Pre-Verification plan follows all current guidance and the aim is to make all parties aware of the ramifications of poor installation and their responsibilities if they damage the membrane.

