

The Hazardous Waste Regulations 2005:
Consignment Note

29340



PRODUCER'S/HOLDER'S/CONSIGNOR'S COPY (Delete as appropriate)

PART A Notification details

- 1 Consignment note code: **GROUNDS/00001**
- 2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):
**PARSONS DEPOT
WASHINGTON
NE37 1EQ**
- 3 The waste will be taken to (name, address and postcode):
**AUGMAN, PORT CLARANKE,
OFF HUNTSMAN DRIVE, TS2 1UE**
- 4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):
**ESH CONSTRUCTION
ESH HOUSE, BURNBOURN NORTH, DURHAM
DH6 5PF**

PART B Description of the waste

If continuation sheet used, tick here

- 1 The process giving rise to the waste(s) is:
- 2 SIC (2007) for the process giving rise to the waste: **42.9901**
- 3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are:		Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
			Component	Concentration (% or mg/kg)			
SOILS & STONES HAZARDOUS	170503	19,000	TOPSOIL	>2000 mg/kg	SOLID	H7H11	8WH

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements

PART C Carrier's certificate

PART D Consignor's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here.)

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are:

1

1 Carrier name: **NORTH EAST TRAPERS**
On behalf of (name, address, postcode, telephone, e-mail, facsimile):
**LITTLEBURN IND ESTATE, LANGLEY MOOR
DURHAM DH7 8HT**

2 Carrier registration no./reason for exemption: **CB04191566**

3 Vehicle registration no. (or mode of transport, if not road):

Signature: **[Signature]**
Date: **09/02/2023** Time: **06:00**

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name: **TOM GUNTER**
On behalf of (name, address, postcode, telephone, e-mail, facsimile): **ESH CONSTRUCTION**

**ESH HOUSE
DURHAM
DH6 5PF**

Signature: **[Signature]**
Date: **09/02/2023** Time: **06:02**

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170503	16340		DOR

1 I received this waste at the address given in A3 on: Date **09/02/2023** Time **07:30**

2 Vehicle registration no. (or mode of transport if not road): **NJ63NEF**

3 Where waste is rejected please provide details:

Name: **D Foreman**
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

I certify that waste permit/exempt waste operation number:

Y832344N0027

authorises the management of the waste described in B at the address given in A3.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

A543

Signature: **[Signature]**
Date: **09/02/2023** Time:

APPENDIX 7

VALIDATION REPORT FOR GAS PROTECTION MEASURES

VALIDATION REPORT FOR GAS PROTECTION MEASURES



**SUNDERLAND CITY COUNCIL – PARSONS DEPOT, PARSONS ROAD,
WASHINGTON, TYNE & WEAR, NE37 1EQ
PREPARED FOR ESH CONSTRUCTION / WATERSEAL LIMITED**

GEOL
CONSULTANTS LTD



QUALITY CONTROL

Project No.	GEOL21-8695	Client	Esh Construction / Waterseal Limited
Report Type	Validation Report for Gas Protection Measures		
Planning Ref.	21/00739/FU4		
Project Type	Demolition of existing workshop/horticulture building to facilitate the erection of a two storey vehicle storage depot, incorporating vehicle maintenance, storage, parking and associated office		
Site Address	Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, Tyne & Wear, NE37 1EQ		
NGR	429390, 557630		
Date	07/08/2022		
Prepared by	Richard Stripp		
Qualifications	BSc (Hons) MSc FGS MIEEnvSc		
Position	Director		
Approved by	Terry M^cMenam		
Qualifications	BSc (Hons) CSci CEnv FGS MIEEnvSc FCMI MIOd		
Position	Director		

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REPORT REVISION HISTORY				
Issue	Description	Date	Author	Approval
1	Final Issue	07/08/2022	RS	TMc

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VALIDATION REPORT

1.0 Introduction & Scope of Works

Geol Consultants Limited (GEOL) were instructed by Waterseal Limited on behalf of Esh Construction to compile a Validation Report to verify the implementation of hazardous ground gas protection measures within the construction of a new vehicle storage and maintenance depot for Sunderland City Council located on Parsons Road in Washington, Tyne & Wear. A copy of the proposed development layout plan can be seen attached in Appendix I. The purpose of this report is to provide information relating to the following.

- ▼ Provide independent validation to confirm that the construction / installation of hazardous ground gas protection measures has been successfully implemented in accordance with the Phase III Remediation Strategy (RS)

The information contained in this validation report is limited to the area of the site as shown on the proposed development layout plan in Appendix I. When considering the scope of works completed for this site / development, any features or issues not specifically mentioned cannot be assumed to have been covered.

All relevant details and descriptions relating to the site have been summarised in the Table below.

Detail	Description
Site Address	Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, Tyne & Wear, NE37 1EQ
Type of development and building / block inspected	Commercial – Construction of a proposed vehicle maintenance & storage depot with office areas – Type D & C Building (Table 3 BS8485:2015 + A1:2019)
Foundation type	The building foundations comprise strip and pad foundations. An insitu cast reinforced ground bearing concrete slab will form the ground floor finish level
Gas Regime	Characteristic Situation 2 – Points score required 2.5 for Type C & 1.5 for Type D (Table 4 BS8485:2015 + A1:2019)
Gas protection type	Construction of a structural barrier (in-situ cast reinforced concrete slab) scoring 0.5 points, and the installation of a hazardous ground gas barrier membrane placed below the slab scoring 2 points

The validation works undertaken comprised the inspection of the construction and installation of the gas protection measures in general accordance with the following documents.

- ▼ Remediation Strategy, reference 3955oR03 Rev00, dated August 2021, produced by FWS Consultants Limited
- ▼ BS8485:2015 + A1:2019 – Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

VALIDATION REPORT

1.0 Introduction & Scope of Works (Cont'd)

- ▼ CIRIA C735:2014 – Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gas

2.0 Details of Gas Protection Measures

2.1 Construction of Structural Barrier

The proposed vehicle maintenance depot with areas of office space will be constructed using an insitu cast mesh reinforced concrete ground bearing slab. The provision of a structural barrier will prevent the ingress of any hazardous ground gases into the building structures.

2.2 Ground Gas Membrane Details

The specifications / data sheets for the proposed ground gas membrane products to be installed on this site can be seen in Appendix II and are summarised below.

- ▼ Visqueen Gas Barrier – this is a 400 gsm multi-layer reinforced polyethylene membrane with an integral 20-micron aluminium foil which has a low permeability to Methane, Carbon Dioxide and Radon. The Gas Barrier is coloured blue on one side and silver on the reverse and should be laid blue side up. The barrier combines strength and performance with flexibility and easy installation. Visqueen Gas Barrier also acts as a damp-proof membrane
- ▼ Visqueen Ultimate Geoseal – this is a 1mm thick, robust and chemically co-extruded membrane, that is hydrocarbon, volatile organic compound (VOC) and a gas resistant waterproofing membrane. It is coloured grey on the upper surface and black on the reverse. The grey surface is textured to aid adhesion to cast concrete
- ▼ Visqueen Gas Resistant Self Adhesive Membrane (GR-SAM) – this membrane is designed to prevent the transmission of Carbon Dioxide, Methane and Radon gases in tanking applications or where hydrostatic pressure is present. Resistance to gas is achieved by an integral aluminium film
- ▼ Visqueen Gas Resistant Damp Proof Course (GR-DPC) – this is a flexible 0.5mm, multi-layer polyethylene damp proof course with an integral foil lining. The DPC is black on the upper surface and silver on the reverse
- ▼ Visqueen Liquid Gas Membrane – this is a blue-grey, single component liquid damp proof, gas proof and waterproof membrane

The use and installation of the chosen gas protection products mentioned above where required to be gas resistant are compliant with the criteria listed in Table 7 of BS8485:2015 + A1:2019, and therefore meets the requirements of this guidance.

VALIDATION REPORT

2.0 Details of Gas Protection Measures (Cont'd)

2.3 Installation Methodology

The installation of the gas barrier membrane products was carried out by Waterseal Limited. The site technicians attending site hold the NVQ Level 2 – Gas Membrane Installations qualification, and as such are classed as qualified and experienced installers.

The installation works were carried out in several stages in accordance with the manufacturer's recommendations and the client's phase of construction. The membrane to be installed across the entire footprint of the building area was first prepared by laying a layer of hardcore / subbase followed by a layer of fine grained sand to provide a flat, smooth and puncture free surface for the gas barrier membranes. Below ground structures were constructed a flat layer of blinding concrete. Once the surface has been prepared the membrane is laid out with all joints overlapped by 150mm to the next membrane roll. The overlapped membranes are then thermally joined using a double welded seam joint, or single weld joint where access is restricted. Where gas barrier membrane is joined to Ultimate Geoseal, double sided adhesive tape is used and the top lap reinforced with the use of GR-SAM. For internal partition walls and the perimeter wall, GR-DPC was installed and lapped on gas barrier membrane. Geoseal barrier membrane is installed in areas where structures extend below ground level, i.e. lift shafts, vehicle inspection pits, service pits, etc. Where service penetrations exist in the floor membrane these are sealed using GR-SAM.

Once the installation of the barrier membrane has been completed (and validated) steel mesh reinforcement is laid on concrete spacer bars and concrete is poured onto the floor area, to create an insitu cast ground bearing concrete slab. A pre-pour inspection is recommended following placement of the mesh reinforcement to determine if the membrane has been damaged during the installation process.

Where service ducts exist, and once services have been fed / pulled through, the annulus of the service duct are to be sealed with the use of liquid gas membrane.

All the installation works will be supervised and documented by an appropriately qualified and experienced Validation Consultant from GEOL for verification purposes. The whole of the building footprint and each phase of the installation process shall be inspected prior to the development advancing to the next construction phase.

VALIDATION REPORT

3.0 Validation of Gas Protection Measures

3.1 Validation Methodology


The verification of the gas protection measures by the validation consultant on this project will comprise a 100% thorough visual inspection of the surface area to identify any holes / punctures, ensure satisfactory lapping and sealing of joints of membranes, and to identify any defects in the membrane, and to ensure that the underlying sand sub-grade has been laid, and has been constructed / installed in accordance with the manufacturers recommendations.

Once services have been fed / pulled through any services ducts, the annulus of the duct will be appropriately sealed and this will be documented to ensure that any ducts cannot provide a pathway for ground gases into the building.

The frequency and number of independent visits, and inspection regime chosen for this site is generally in accordance with Section 3, Verification Procedures contained within the CIRIA C735 guidance document.

All seams and the entire surface area of the barrier membrane laid have been inspected by the validation consultant for the identification of defects, protruding / penetrating objects, punctures and tears. Any portion of the membrane identified to have a flaw, defect or failing a visual inspection shall be repaired. The final decision as to the appropriate repair procedure will be agreed between the validation consultant and the installer. Each repair will be visually re-inspected by the validation consultant and repairs passing the inspection will be considered satisfactory.

The Validation Consultant for this site was;

 Richard Stripp BSc (Hons) MSc, FGS, MIEEnvSc
Director of Geol Consultants Limited

The validation consultant has 20 years' experience in the industry of advising clients on contaminated land, remediation and hazardous ground gas impacted sites

3.2 Validation of Gas Protection Measures

Installation and validation of the protection measures across the building footprint commenced during November 2021 and was completed by the end of March 2022. Sealing of the service ducts was completed during July 2022. A summary of the validation findings can be seen in the Table on the following page.

VALIDATION REPORT

3.0 Validation of Gas Protection Measures (Cont'd)

Item No.	Item Inspected	Comments
1	Gas membrane types	Visqueen Gas Barrier Membrane, Ultimate Geoseal, Gas Resistant Self Adhesive Membrane (GR SAM), Gas Resistant Damp Proof Course (GR DPC) and Liquid Gas Membrane installed for this development. All gas membrane products utilised on this site were brought to site in vans by the installation team
2	Condition of sub-grade and underside of gas membrane (floor area)	The gas membrane across the floor area was laid on a blinding layer of fine grained sand. Below ground structures were laid on a smooth blinding layer of concrete, and GR DPC was placed directly onto brickwork. The general condition of the gas membrane surface was noted to be satisfactory following installation
3	Extent of Coverage	The extent of the Visqueen Gas Barrier Membrane, Ultimate Geoseal and GR DPC coverage was confirmed across and below the whole building footprint. GR-SAM was used to seal service penetrations
4	Slab / Membrane Condition	A thorough visual inspection of the condition of the gas barrier membranes was confirmed as being completed to a good standard. A pre-pour inspection was also carried out following placement of the mesh reinforcement. Where punctures or tears were present these were suitably repaired with a patch of GR-SAM
5	Joining Details	Gas barrier membrane to gas barrier membrane joints, of at least 150mm, were thermally welded or joined using double sided adhesive tape. A thorough visual inspection and pick test of the joints and seals in corners and service penetrations was carried out, and confirmed all laps and joints sealed to manufacturers' specifications
6	Damp Proof Membrane	Visqueen Gas Barrier Membrane, Ultimate Geoseal and GR DPC also used as damp-proofing (in accordance with manufacturers specifications) across the floor area of the building, internal partition walls and perimeter walls
7	Detailing Work	GR-SAM utilised for reinforcing corner joints, top laps, sealing service entries and sealing to columns / stanchions
8	Structural Barrier – Insitu cast concrete slab	The ground below the in-situ cast reinforced ground bearing concrete slab was prepared by rolling the sub-grade prior to laying compacted layers of granular sub-base and a sand blinding layer to the required formation level. An insitu cast concrete slab has been constructed using appropriate steel mesh reinforcement
9	Sealing of Service Ducts	Following the installation of services through service ducts, the annulus of the ducts and service pipes / cables were sealed using liquid gas membrane

The details of the inspections carried out above are documented within the photographic record sheets which can be seen in Appendix III. There were no significant variations from the construction design plans or the requirements of the BS8584:2015 + A1:2019 guidance.

VALIDATION REPORT

4.0 Conclusions

In accordance with the requirements of BS8584:2015 + A1:2019 guidance, and as detailed on the design construction plans produced for this development, the combination of a well-constructed in-situ cast reinforced ground bearing concrete slab (structural barrier), achieving 0.5 points, and the provision of compliant gas barrier membranes has been installed and constructed at the proposed vehicle maintenance depot development.

The selected gas barrier membrane products have been confirmed to meet the requirements of the BS8584:2015 + A1:2019 guidance and have been installed in accordance with the manufacturer's recommendations and to a good standard. The visual inspection of the appropriate barrier membrane products, coverage across the ground floor and the details around perimeter walls, columns & stanchions and around all service penetrations has been confirmed and is documented within the photographic record sheets provided in Appendix III. This achieves the required 2 points.

The works inspected and documented at the above site have achieved the required 1.5 & 2.5 points for the site end-use (Type C & D) and CS2 classification as detailed in the BS8485:2015 + A1:2019 guidance. As such, it has been confirmed that the gas protection measures implemented for this development have been satisfactorily installed / constructed and therefore have PASSED inspection.

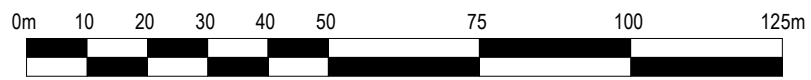
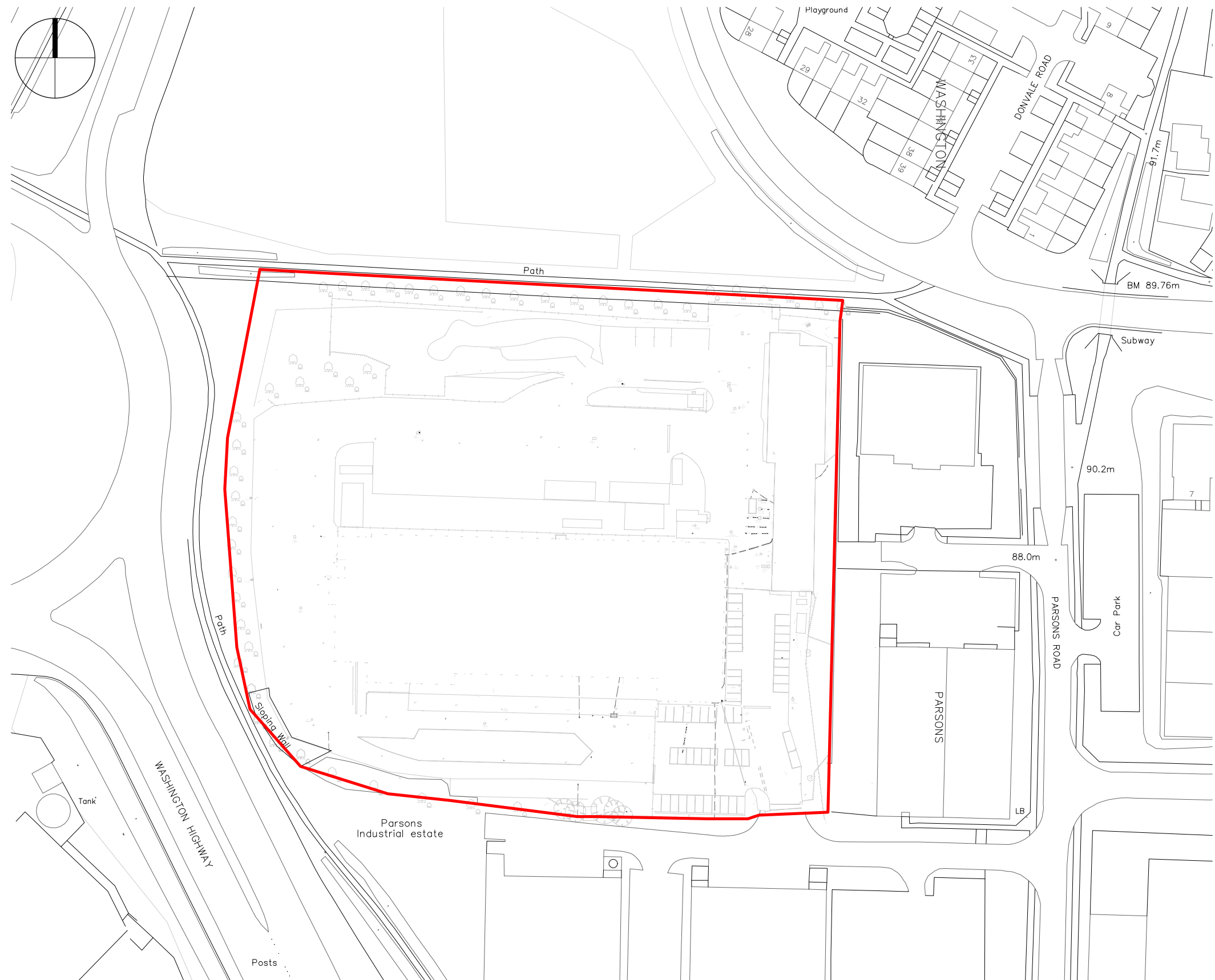
End of Report

APPENDIX I

Site Location Plan & Proposed Development Layout Plan

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REV:	DESCRIPTION:	BY:	CHK:	DATE:
P01	ISSUED FOR PLANNING.	AW	KH	2021/02/17.



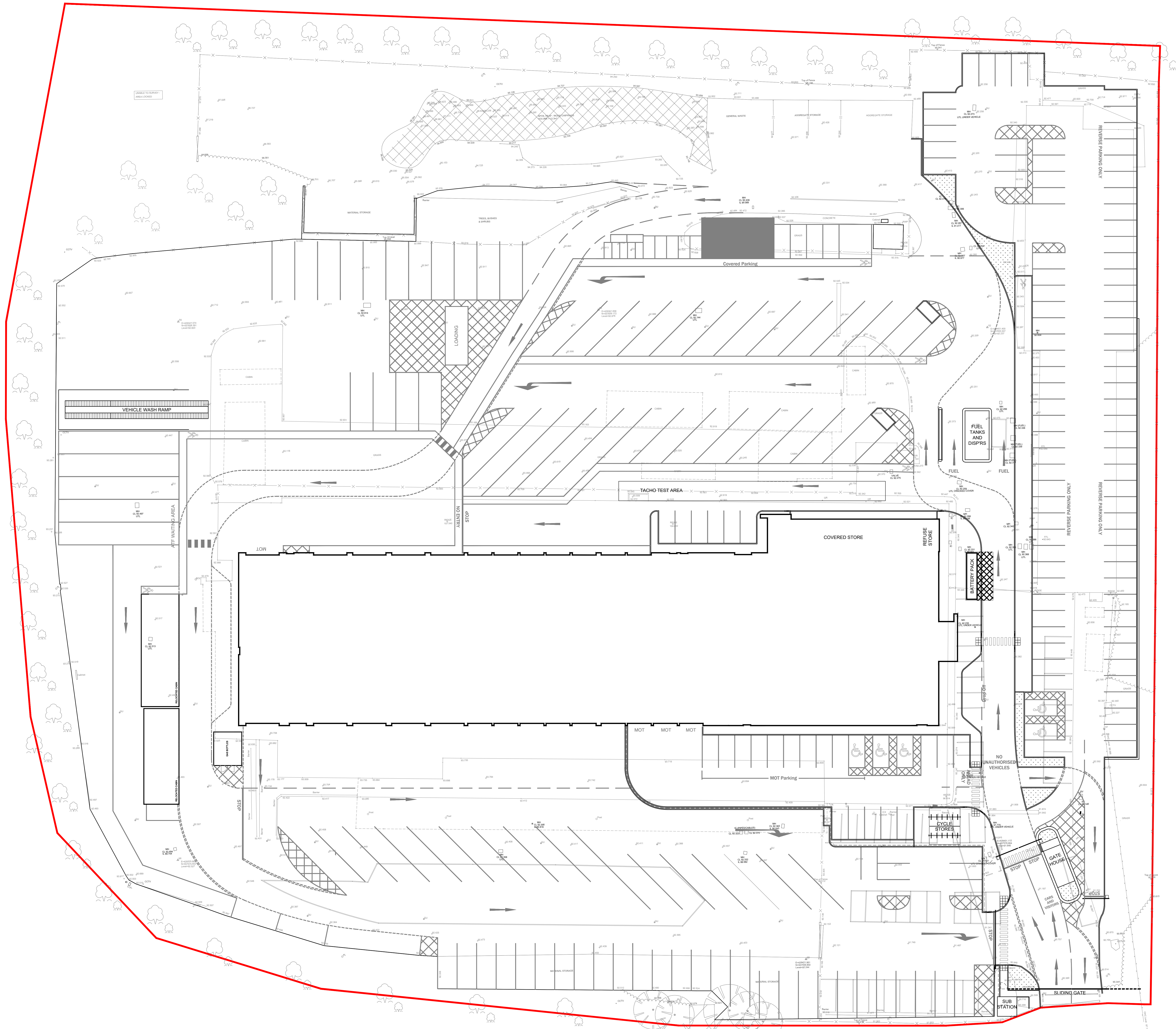
PURPOSE: PLANNING								
PROJECT: Parsons Depot - Sunderland CC								
DESCRIPTION: SITE LOCATION PLAN								
DRAWN BY: AW	SCALE: 1 : 1250							
SHEET SIZE: A3	DATE: 17/02/2021							
PRO. NO: 20068	ORIG: HL	VOLUME: XX	LEVEL: XX	TYPE: DR	ROLE: A	NUMBER: 1000	SUITABILITY: S4	REV: P01



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Health and Safety Notes:
 The following key residual health and safety risks have not been eliminated by design and are identified below:
 - Refer to Design Risk Assessment 2021002-DRA
 Safe methods and systems of work remain the responsibility of the contractor.



Rev.	Description	By	CHK	App	Date
D	Layout updated	BG	MG	MG	23/03/21
C	Battery pack & cycle store locations revised	BG	MG	MG	17/02/21
B	Revised to suit SAJ comments and general design development	BG	MG	MG	16/02/21
A	Final layout updated to suit latest fleet list	BG	MG	MG	10/02/21
0	Preliminary issue	MG	MG	MG	10/09/20

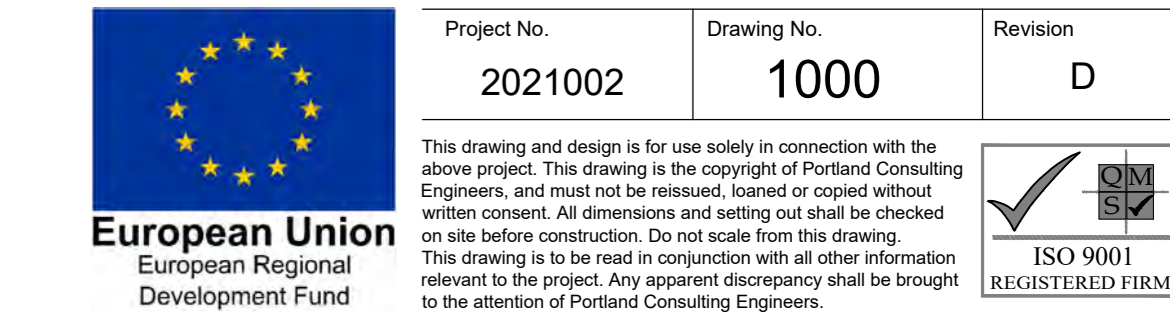
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Client: **ESH CONSTRUCTION**
 Project: **Parsons Depot Washington**
Sunderland City Council

Drawing Title: **Populated Site Layout**

Scale: 1:200	Sheet Size: A0
Drawn By: MQ	Checked By: MG
Approved By: MG	Date: 10/09/20
Drawing Status: Preliminary	

Project No. 2021002	Drawing No. 1000	Revision: D
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APPENDIX II

Gas Barrier Membrane Specification Data Sheets

Visqueen Gas Barrier

Features and benefits

- BBA certified - third party accreditation
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Dual jointing methods - lap joints can be taped or heat welded

Product description

Visqueen Gas Barrier is a multi-layer reinforced polyethylene gas barrier with a 20 micron aluminium foil. The barrier is coloured blue on the upper surface and silver on the reverse. The product is supplied in single wound rolls (not folded), 2m x 50m.

Approvals and standards

- Third party accreditation (BBA 13/5069)
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 45001:2018
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Barrier is suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g. methane, carbon dioxide and radon.

The barrier can be positioned above or below a solid concrete ground floor slab or above a precast suspended segmental ground floor system, e.g. beam and block floor.

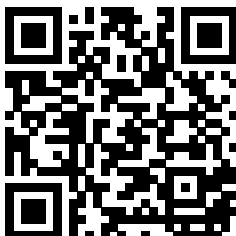
The barrier can also be used as a high performance radon membrane and/or damp proof membrane.

The product is not intended for use where there is a risk of hydrostatic pressure.

System components

- VisqueenPro Double Sided Jointing Tape, 50mm x 10m
- Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m
- Visqueen GR Lap Tape, 150mm x 10m
- Visqueen Ultimate Top Hat Units
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen TreadGUARD 1500, 1m x 2m

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- Specify
- Protect
- Peace of mind

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Full Design Liability for Structural Waterproofing and Gas Protection



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Visqueen Gas Barrier

Storage and handling

Visqueen Gas Barrier should be stored horizontally, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Gas Barrier should be installed on a smooth continuous surface e.g. grouted beam and block floor, a compacted blinding layer e.g. 50mm thick sand blinding, or smooth concrete blinding. The substrate should be free from irregularities such as voids or protrusions.

The barrier can be cut with a sharp retractable safety knife or robust scissors.

When installing the membrane in demanding site conditions, use Visqueen GR Lap Tape in place of Visqueen Gas Resistant Foil Lap Tape.

Installation

Visqueen Gas Barrier should be loose laid on the substrate with the blue side up so as to avoid sunlight glare.

The barrier should be clean and dry at the time of jointing. It should be overlapped by at least 150mm, bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape.

Alternatively lap joints can be heat welded to achieve an effective seal. Welded lap joints can be less than 150mm provided the joint integrity is not compromised.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. The upstand should be secured with the supplied jubilee clip.

Forming an effective barrier to gases may give rise to complex three-dimensional detailing where, it is recommended Visqueen Preformed Units are used e.g. corners. Alternatively Visqueen Pro Detailing Strip can be used to seal awkward junctions.

If the barrier is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. Alternatively a patch can be formed using Visqueen Pro Detailing Strip and lapped at least 150mm beyond the extents of the puncture.

Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane. The membrane should be covered by a protective layer immediately after installation to prevent damage from following trades, ultraviolet light, etc. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying a screed or final floor covering. A minimum thickness of 50mm screed is recommended. When reinforced concrete is to be laid over the barrier the wire reinforcements and spacers must be prevented from puncturing the barrier. Where there is a high risk of potential damage, the barrier should be covered with Visqueen TreadGuard protection, screed, or other approved protection material before positioning the reinforcement.

Usable temperature range

It is recommended that Visqueen Gas Barrier and all associated system components should not be installed below 5°C.

Additional information

When used in accordance BS8485:2015 + A1:2019 a subfloor ventilation system or pressure relief maybe required

Where hydrocarbon or VOC contamination is present use Visqueen Ultimate VOC or HC Blok gas protection systems

To assist build sequencing, Visqueen GR DPC is available for gas protection through the wall constructions

For suspended beam and block floor detailing see GB-01

Visqueen Preformed Top Hat Units should be used at service pipe penetrations see GB-51

For internal and external corners Visqueen Ultimate Preformed Units should be used see PFU-553

To seal around steel columns use Visqueen Pro Detailing Strip see GB-52

For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

Visqueen Gas Barrier

Property	Test method	Units	Compliance criteria	Result
Dimensions	EN 1848-2	m		2 x 50
Overall thickness including scrim mesh	EN 1849-2	mm	+/-10%	0.52
Mass	EN 1849-2	g/m ²	-0%/+5%	400
Tensile strength - MD	EN 12311	N	MLV	350
Tensile strength - CD	EN 12311	N	MLV	350
Tensile elongation - MD	EN 12311	%	MLV	20
Tensile elongation - CD	EN 12311	%	MLV	21
Joint strength	EN 12317-2	N	MLV	332
Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	MDV	150
Dart impact	BS 2782	g	MDV	731
Low temperature flexibility	EN 495-5	°C	MDV	-40
Durability against ageing	EN 1296 and EN 1928	-	Pass/Fail	Pass
Durability chemical resistance	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	358
Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	368
Resistance to static loading	EN 12730	kg	MLV	20
Water vapour transmission - resistance	EN 1931	MNs/g	MDV	7000
Water vapour transmission - permeability	EN 1931	g/m ² /d	MDV	0.03
Visible defects	EN 1850 -2	-	Pass/Fail	Pass
Reaction to fire	EN 13501-1	Class	MDV	F
BS 8485:2015 + A1:2019 testing requirements				
Mass	EN 1849-2	g/m ²	Average >370	400
Methane permeability	ISO 15105-1	mls/m ² /d/atm	Pass/Fail	<0.15
Puncture CBR	BS EN ISO 12236	N	MDV	1114
Tensiles yield strength MD	ASTM D4885-01	kN/m	MDV	12.5
Tensiles yield strength CD	ASTM D4885-02	kN/m	MDV	7.3
Resistance to static loading	EN 12730	kg	>MLV	20
Yield elongation CD	ASTM D4885-04	%	MDV	19
Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	48.2
Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	44.8
Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	53.5
Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	60.6

Health and safety information

Refer to the Visqueen Gas Barrier material safety datasheet (MSDS).

Visqueen Gas Barrier

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Complete Range, Complete Solution



Structural
Waterproofing



Gas
Protection



Damp Proof
Membrane



Tapes



Damp Proof
Course



Stormwater



Vapour
Control

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Visqueen Ultimate GeoSeal

Features and benefits

- Agreement certified - third party accreditation
- Complies with CIRIA C748:2014 - industry standard for volatile organic compounds (VOC) protection
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Type A Barrier Membrane (Tanking Membrane) - resistant to ground water in accordance with BS 8102:2009
- High resistance to puncture - greatly reduces risk of barrier becoming damaged during the build process
- Multi functional - also acts as a radon and damp proof membrane
- Dual jointing methods - lap joints can be taped or heat welded

Product description

Visqueen Ultimate Geoseal is a 1mm thick, robust and chemically co-extruded product, that is hydrocarbon, volatile organic compound (VOC) and a gas resistant waterproofing membrane. It is coloured grey on the upper surface and black on the reverse. The grey surface is textured to aid adhesion to cast concrete.

The barrier is supplied in single wound rolls (not folded), 2.44m x 41m.

Approvals and standards

- Third party accreditation (BDA BAF-18-056-P-A-UK)
- Suitable for use as a Type A Barrier Membrane (Tanking Membrane) to BS 8102:2009
- Complies with CIRIA C748:2014
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2012
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 45001:2018
- Environmental Management System ISO 14001:2015

Usage

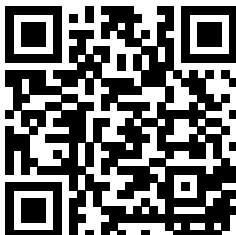
Visqueen Ultimate GeoSeal is a pre-applied fully bonded Type A Barrier Membrane (Tanking Membrane) for use with below ground reinforced concrete structures e.g. basements, retaining walls, lift pits and car parks. The barrier also prevents the ingress of harmful levels of volatile organic compounds (VOCs) and hazardous ground gases.

The pre-applied barrier can be used to achieve waterproofing to Grades 1, 2 and 3 as defined in BS 8102:2009.

System components

- Visqueen Ultimate Double Sided Jointing Tape, 100mm x 15m
- Visqueen GR Lap Tape, 150mm x 10m
- Visqueen Ultimate Retaining Discs, 50mm long x 35mm head diameter x 500 per box
- Visqueen Ultimate Top Hat Units
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen Pile Cap Sealer, 25kg
- Visqueen IGW5 and IGW10 Waterstops

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Visqueen Ultimate GeoSeal

Storage and handling

Visqueen Ultimate GeoSeal should be stored horizontally, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Ultimate GeoSeal should be installed on a smooth continuous surface e.g. compacted blinding layer, smooth concrete blinding or well consolidated MOT Type 1. The substrate should be free from irregularities such as voids or protrusions.

Where protection against hydrostatic water pressure is required, the barrier should be applied with welded joints.

The barrier can be cut with a sharp retractable safety knife or robust scissors.

Installation

Visqueen Ultimate GeoSeal should be loose laid on horizontal substrates and pre-applied to vertical substrate with the grey textured side facing towards the wet cast concrete so that a key to the concrete can be achieved.

The barrier has been designed to exhibit superior welding properties using hot wedge, hot air or extrusion welding, therefore onsite welding of all lap joints is recommended for all applications, and should be employed when hydrostatic water pressure or hydrocarbon/VOC contamination is present.

Alternatively, when the barrier is used for damp proofing, ground gas protection and sites where hydrostatic water pressure or hydrocarbon/VOC contamination is of low risk, lap joints can be bonded with Visqueen Ultimate Double Sided Jointing Tape and sealed with Visqueen GR Lap Tape. When using tapes to secure laps, the overlap should be minimum 150mm and the membrane surfaces to be jointed should be dry and free from contamination such as dust or sand. Once the tapes are applied, the lap should be well rolled with a seam roller to ensure full adhesion and continuity.

The barrier should not be taken through any masonry wall. The relevant Visqueen damp proof or gas proof course should be taken through and extended beyond the wall by a minimum of 250mm where it can be jointed to the barrier with the above tapes.

When installed vertically, the barrier should be pre-applied to temporary formwork or the adjoining structure. Visqueen Retaining Discs are available to provide a means for securing the leading edge of the membrane to the temporary formwork. The barrier should be installed with the smooth black surface facing the formwork. Visqueen Retaining Discs should be mechanically fixed at maximum 400mm centres to the internal face of the shuttering using oval nails. A suitable power tool and 6mm drill bit to create a pilot hole in the barrier, it should be secured over the protruding section of the retaining disc. The top edge of the barrier should be trimmed to approximately 10mm below the top edge of the slab. Once the concrete has set, the oval nails should be removed by pulling through from the external face of the shuttering. When the temporary formwork is removed the Visqueen Retaining Discs should be visible on the external (smooth black) face of the barrier. Continuity of the barrier system with the damp or gas proof course is maintained using Visqueen Gas Resistant Self Adhesive Membrane.

Visqueen Ultimate Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Ultimate Double Sided Jointing Tape and sealed with Visqueen GR Lap Tape. The upstand should be secured with the supplied jubilee clip.

Forming an effective barrier to gases may give rise to complex three-dimensional detailing where, it is recommended that welded membrane or Visqueen Ultimate Preformed Units are used e.g. corners. Alternatively Visqueen Pro Detailing Strip can be used to seal awkward junctions.

If the barrier is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and, depending on the specified jointing method, either welded in position or bonded with Visqueen Ultimate Double Sided Jointing Tape and sealed with Visqueen GR Lap Tape. Alternatively a patch can be formed using Visqueen Pro Detailing Strip and lapped at least 150mm beyond the perimeter of the puncture.

Due to the robust nature of the product, the barrier can withstand normal on-site foot traffic and the activities associated with the laying of a reinforced concrete slab without the need for additional protection. However, care should still be taken to ensure that the barrier is not punctured, stretched or displaced when applying the reinforced concrete.

In high temperature conditions the barrier should be covered immediately after installation.

Usable temperature range

It is recommended that Visqueen Ultimate GeoSeal and all associated system components should not be installed below 5°C.



Visqueen Ultimate GeoSeal

Additional information

Where required, Visqueen's network of preferred installers can install the barrier and offer the client a fully warranted system

When using Visqueen Ultimate GeoSeal in an external waterproofing application hydrostatic pressure can be relieved by using Visqueen Protect&Drain

To assist build sequencing, Visqueen Ultimate DPC is available for gas protection through the wall constructions

Visqueen Ultimate Preformed Top Hat Units should be used at service pipe penetrations, see GEO-51

For internal and external corners Visqueen Ultimate Preformed Corner Units are available see PFU-553

To seal around steel columns use Visqueen Pro Detailing Strip see GEO-52

When used in accordance with CIRIA C748:2014 or BS8485:2015 + A1:2019, a subfloor ventilation system or pressure relief maybe required

For additional detailing information contact Visqueen Technical Services +44 (0) 333 202 6800.

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

Visqueen Ultimate GeoSeal

Property	Test method	Units	Criteria	Result
Colour				Grey/black
Weight		kg		97
Length	EN 1848-2	m	-0/+10%	41
Width	EN 1848-2	m	-0/+10%	2.44
BS 8485:2015 + A1:2019 and C748:2014 data				
Puncture	EN 12236	N	MDV	2850
Impact resistance Method A hard surface	EN 12691	mm	MDV	750
Impact resistance Method B soft surface	EN 12691	mm	MDV	>2000
Tensile strength MD (1) equipment unable to break the barrier	ASTM D4885-01	kN/m	MDV	11.9
Tensile strength CD (1) equipment unable to break the barrier	ASTM D4885-01	kN/m	MDV	12.7
Elongation MD (1) equipment unable to break the barrier	ASTM D4885-01	%	MDV	>500
Elongation CD (1) equipment unable to break the barrier	ASTM D4885-01	%	MDV	>501
Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	79.6
Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	75.8
Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	128.3
Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	126.9
C748:2014 - Permeation vapour tests @ 100% conc.				
Benzene	ISO 15105-2	ml/m ² /d	MDV	<1
Toluene	ISO 15105-2	ml/m ² /d	MDV	<1
Ethyl benzene	ISO 15105-2	ml/m ² /d	MDV	<1
m,p xylene	ISO 15105-2	ml/m ² /d	MDV	<1
Hexane	ISO 15105-2	ml/m ² /d	MDV	<1
Vinyl chloride	ISO 15105-2	ml/m ² /d	MDV	<1
Tetrachloroethene (PCE)	ISO 15105-2	ml/m ² /d	MDV	<1
Trichloroethene (TCE)	ISO 15105-2	ml/m ² /d	MDV	<1
Naphthalene	ISO 15105-2	ml/m ² /d	MDV	<1
C748:2014 - Chemical immersion testing (2) (2) Pass achieved if barrier under test is within 25% of untested barrier				
Benzene	EN 14414	Pass	Pass	Pass
Toluene	EN 14414	Pass	Pass	Pass
Ethyl benzene	EN 14414	Pass	Pass	Pass
(m,p, and o) xylenes	EN 14414	Pass	Pass	Pass
Hexane	EN 14414	Pass	Pass	Pass
Vinyl chloride	EN 14414	Pass	Pass	Pass
Tetrachloroethene (PCE)	EN 14414	Pass	Pass	Pass
Trichloroethene (TCE)	EN 14414	Pass	Pass	Pass
Naphthalene	EN 14414	Pass	Pass	Pass
CE Marking to EN 13967:2017				
Characteristic	Test method	Units	Criteria	Result

Visqueen Ultimate GeoSeal

Property	Test method	Units	Criteria	Result
Tensile Strength - MD	EN 12311	N/mm ²	MDV	23.6
Tensile Strength - CD	EN 12311	N/mm ²	MDV	22.4
Tensile Elongation - MD	EN 12311	%	MDV	701
Tensile Elongation - CD	EN 12311	%	MDV	706
Joint Strength	EN 12317-2	N	MDV	598
Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	MDV	700
Durability watertightness after heat ageing	EN 1296	60kPa	Pass/Fail	Pass
Durability watertightness against chemicals	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	720
Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	750
Resistance to static loading	EN 12730	kg	>MLV	20
Water vapour transmission - resistance	EN 1931	MNs/g	MDV	2142
Water vapour transmission - permeability	EN 1931	g/m ² /d	MDV	0.063
Watertightness welded and taped joint	EN1928	60kPa	Pass/Fail	Pass
Methane permeability unjointed	ISO 15105-1	ml/m ² /d/atm	<40	3.2
Methane permeability jointed	ISO 15105-1	ml/m ² /d/atm	<40	34.7
Carbon dioxide unjointed	ISO 15105-1	ml/m ² /d/atm	<40	7
Radon permeability	SP RI.SE	m ² /s		3.0 x 10 ⁻¹²

Health and safety information

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Visqueen Ultimate GeoSeal

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Visqueen Gas Resistant Damp Proof Course

Features and benefits

- Manufactured in excess of British Standard - achieves minimum DPC requirements
- Gas resistant - part of the Visqueen Gas Barrier system to provide gas protection to BS 8485:2015 + A1:2019
- Multi functional - also acts as a radon resistant damp proof course

Product description

Visqueen Gas Resistant Damp Proof Course (DPC) is a flexible 0.5mm, multi-layer polyethylene damp proof course with an integral foil lining. The DPC is black on the upper surface and silver on the reverse.

It is supplied in 30m length rolls and the following widths: 300mm, 400mm, 500mm, 600mm, 700mm, 800mm, 900mm and 1000mm

Approvals and standards

- Manufactured in excess of BS 6515:1984
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 14909
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 18001:2007
- Environmental Management System ISO 14001:2015

Usage

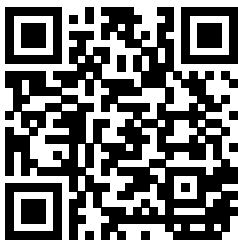
Visqueen Gas Resistant Damp Proof Course is suitable for all masonry applications including residential, commercial and multi-storey buildings. It can be site formed into a built-in or surface fixed cavity tray to manage the downward passage of water in cavity wall applications.

The DPC also prevents harmful ground gases from entering the building via the cavity, and is suitable for use as a gas DPC for BS 8485:2015 + A1:2019 gas regimes (methane and carbon dioxide), NHBC Amber 1 and Amber 2 conditions or where radon gas exists.

System components

- Visqueen Zedex Jointing Tape, 100mm x 15m
- Visqueen Zedex DPC Surface Fixing System
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

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NON-COMBUSTIBLE DPC

Visqueen Zedex Non-Combustible Damp Proof Course
A2 - s1, d0 to BS EN 13501-1:2018

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Visqueen Gas Resistant Damp Proof Course

Storage and handling

Visqueen Gas Resistant Damp Proof Course should be stored vertically, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Gas Resistant Damp Proof Course can be cut with a sharp retractable safety knife or robust scissors.

Installation

When built into a masonry wall construction Visqueen Gas Resistant Damp Proof Course should be installed on an even bed of wet mortar, and any perforations in adjacent courses of masonry should be completely filled with mortar. To ensure mortar adhesion, as soon as possible after laying the DPC, lay at least one further course of masonry including a bed of mortar. The DPC must extend through the full thickness of the masonry wall, including pointing, applied rendering or other facing materials.

When used as a site formed cavity tray, the DPC can be either built-in to the inner leaf or surface fixed to the cavity face of the inner leaf. When surface fixing the cavity tray, the substrate should be primed with Visqueen HP Tanking Primer and allowed to dry. The DPC should be bonded to the inner leaf using Visqueen Zedex Jointing Tape and permanently secured using Visqueen Fixing Strip and fixing suitable for the substrate. Visqueen Fixing Pins for both rigid urethane foam insulation boards, and pins for masonry substrates are available.

To simplify complex or awkward junctions e.g. corners, door thresholds, changes of level, etc an extensive range of Visqueen Preformed Units are available.

All DPC to DPC laps and DPC to Visqueen Preformed Unit laps should be a minimum of 100mm and bonded with Visqueen Zedex Jointing Tape.

Usable temperature range

It is recommended that Visqueen Gas Resistant Damp Proof Course and all associated system components should not be used below 5°C.

Additional information

Where a heat bonded gas DPC conforming to the specification requirements of BS 8485:2015 + A1:2019 is required, use Visqueen Zedex High Bond Damp Proof Course

For built-in internal and external corners Visqueen Ulimite Preformed Units should be used see PFU-553 (90° unit) or PFU-501 (sloping unit)

For surface fixed internal and external corners Visqueen Ulimite Preformed Units should be used see PFU-554 (90° unit) or PFU-502 (sloping unit)

For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800

Visqueen Gas Resistant Damp Proof Course

Property	Test method	Units	Compliance criteria	Result
Visible defect	EN 1850 -2	-	Pass/Fail	Pass
Length	EN 1848-2	m	-0%/+10%	30
Width	EN 1848-2	m	-0%/+10%	0.3 to 1
Straightness	EN 1848-2	-	Pass/Fail	Pass
Thickness	EN 1849-2	mm	-20%/+20%	0.5
Mass	EN 1849-2	g/m ²	-12%/+12%	475
Watertightness	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	>MLV	40
Durability (artificial ageing)	EN 1296 and EN 1928	-	Pass/Fail	Pass
Durability (alkali)	Annex C	-	Pass/Fail	NPD
Resistance to low temperature	EN 495-5	°C	<MLV	-40
Resistance to tearing (nail shank)	EN 12310-1	N	MDV	280 310
Water vapour permeability	EN 1931	g/m ² /d	+20%	0.13
Resistance to static loading	EN 12730	kg	>MLV	20
Methane permeability	ISO 15105-1	ml/m ² /d/atm	MDV	13
Reaction to fire	EN 13501-1	Class	MDV	F

Health and safety information

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Visqueen Gas Resistant Damp Proof Course

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Visqueen Gas Resistant Self Adhesive Membrane

Features and benefits

- BBA certified - third party accreditation
- Type A Barrier Membrane (Tanking Membrane) - resistant to ground water in accordance with BS 8102:2009
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Self adhesive application - no jointing tapes required

Product description

Visqueen Gas Resistant Self Adhesive Membrane is a foil lined modified bitumen rubber membrane with a self adhesive coating protected by a removable polyethylene release film. The product is silver on the upper surface and supplied in rolls 1m x 20m.

Approvals and standards

- Third party accreditation (BBA 15/5208)
- Suitable for use as a Type A Barrier Membrane (Tanking Membrane) to BS 8102:2009
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Conforms to the specification requirements of BR 211: 2015
- CE Mark EN 13969:2004
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 45001:2018
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Resistant Self Adhesive Membrane is a cold applied product, suitable for use as a Type A Barrier Membrane (Tanking Membrane) for above and below ground applications e.g. basements, retaining walls and lift pits.

It is also suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g. methane, carbon dioxide and radon.

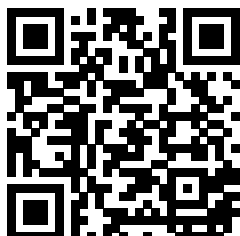
The membrane can be applied to a variety of substrates including concrete, blockwork, brickwork, particle boards and steelwork, in both vertical and horizontal applications.

The membrane can be used to achieve waterproofing to Grades 1, 2 and 3 as defined in BS 8102:2009.

System components

- Visqueen HP Tanking Primer, 5L
- Visqueen Ultimate Top Hat Units
- Visqueen TreadGUARD 1500, 1m x 2m
- Visqueen Protect&Drain
- Visqueen Pile Cap Sealer, 25kg
- Visqueen VX25 Waterstop, 20mm x 25mm x 5m

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Visqueen Gas Resistant Self Adhesive Membrane

Storage and handling

Visqueen Gas Resistant Self Adhesive Membrane should be stored vertically under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

All surfaces to which Visqueen Gas Resistant Self Adhesive Membrane are to be applied should be free from cavities or projections, have a smooth finish, be dry and free from dust, loose particles and frost. Masonry, concrete or metal surfaces should be primed using Visqueen HP Tanking Primer and allowed to dry thoroughly.

When applying to blockwork or brickwork the joints must be flush pointed or the masonry rendered prior to applying the membrane.

The membrane can be cut with a sharp retractable safety knife.

Installation

Visqueen Gas Resistant Self Adhesive Membrane lap joints should be a minimum of 150mm and should be pressed and rolled to form a continuous bond and to ensure watertightness.

At 90 degree changes of direction a Visqueen Axiom UniSeal fillet should be formed prior to membrane installation.

For vertical applications cut the membrane to a suitable length allowing an additional 150mm for laps. Position and peel back release film and apply the self adhesive face to the substrate. Apply pressure to ensure a full bond is achieved. Commence at the top of the wall and work downwards, progressively removing the release film.

For horizontal applications unroll the membrane where required allowing an additional 150mm for laps. Re-roll one half of the membrane and cut release film taking care not to damage the membrane. Roll out the membrane progressively removing the release film. Press the membrane onto the substrate e.g. using a soft broom to ensure full adhesion. Repeat for the other half of the roll.

Watertight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes.

If the membrane is punctured or perforated, a patch of the same material should be lapped and bonded at least 150mm beyond the extents of the puncture.

The membrane should always be fully protected immediately after it is installed. When used externally on a retaining wall, the membrane should be protected from backfill with Visqueen Protect&Drain, which also provides a preferential pathway for ground gases.

When forming day joints, the upper edge of the membrane should be adequately secured e.g. bonding onto the top of the retaining wall, or if terminated on a vertical face, the upper edge should be secured with Visqueen Fixing Strip and Visqueen Fixings Pins for Masonry.

Usable temperature range

It is recommended that Visqueen Gas Resistant Self Adhesive Membrane and all associated system components should not be installed below 5°C.

The membrane requires no additional bonding methods however during cold weather conditions the application of hot air to the self adhesive coating will aid adhesion.

Additional information

Where hazardous ground gases are not present use Visqueen Self Adhesive Membrane

Where concrete construction joints occur Visqueen VX25 Waterstop system should be incorporated see T-04

Where wall ties penetrate the membrane, seal with Visqueen Axiom UniSeal see T-41

When waterproof concrete is required, or for additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800.

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

Visqueen Gas Resistant Self Adhesive Membrane

Property	Test method	Units	Compliance criteria	Result
Length	EN 1848-2	m	-0%/+5%	20
Width	EN 1848-2	m	-5%/+5%	1
Thickness	EN 1849-2	mm	-5%/+10%	1.2
Mass	EN 1849-2	g/m ²	-10%/+10%	1100
Watertightness	EN 1928	kPa	MDV	60
Durability after artificial ageing	EN 1847	-	Pass/Fail	Pass
Durability against chemicals	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) MD	EN 12310-1	N	>	100
Resistance to tearing (nail shank) CD	EN 12310-1	N	>	100
Resistance to static loading	EN 12730	kg	MLV	20
Resistance to Impact method A and B	EN 12691	mm	>	A >500 B >1000
Reaction to fire	EN 13501-1		Class	E
Joint Resistance	EN 12317-1	N	>	30
Tensile properties - MD	EN 12311-2	N/mm ²	>	2
Tensile properties - CD	EN 12311-2	N/mm ²	>	2
Tensile elongation - MD	EN 12311-1	%	>	130
Tensile elongation - CD	EN 12311-2	%	>	130
Reaction to fire	EN 13501-1	Class	MDV	F
Methane permeability	ISO 15105-1	ml/m ² /d	MDV	<1
Radon transmission rate	SP RI.SE	m/s	MDV	4.7 x 10 ⁻⁹
Radon permeability	SP RI.SE	m ² /s	MDV	0.56 x 10 ⁻¹²
Mean water vapour resistance factor	EN 1931	(μ)	MDV	3960000
Mean water vapour diffusion equivalent air layer thickness	EN 1931	(Sd) in m	MDV	4752
Mean water vapour resistance	EN 1931	MNs/g	MDV	23760
Mean water vapour permeability	EN 1931	g/m ² /day	MDV	0.03

Health and safety information

Refer to the Visqueen Gas Resistant Self Adhesive Membrane material safety datasheet (MSDS).

Visqueen Gas Resistant Self Adhesive Membrane

About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

Complete Range, Complete Solution



Structural Waterproofing



Gas Protection



Damp Proof Membrane



Tapes



Damp Proof Course



Stormwater



Vapour Control

Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

Visqueen CPD Seminars

The Visqueen Continuing Professional Development (CPD) Seminars provide up-to-date information on changes within Building Regulations/Building Standards and nationally recognised industry guidance affecting damp proofing, water vapour control, hazardous ground gas protection and below ground structural waterproofing.

The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

Visqueen PI designs and special projects

From initial design to the completed project, Visqueen are with you every step of the way. Whether it be hazardous ground gas protection and/or below ground waterproofing protection employing barrier, structurally integral or drained systems, Visqueen can offer professional indemnity (PI) insurance for bespoke Visqueen design solutions.

Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.

Visqueen Liquid Gas Membrane

Features and benefits

- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Type A Barrier Membrane (Tanking Membrane) - resistant to ground water in accordance with BS 8102:2009
- No mixing required - use straight from the tin
- Versatile - ideal for complex detailing and difficult to reach areas
- Fully bonded system - self terminating at the perimeter of the installation
- Seamless application - no lap joints
- Can be applied to damp surfaces or green concrete - assists build sequencing

Product description

Visqueen Liquid Gas Membrane is a blue-grey, single component liquid damp proof, gas proof and waterproof membrane. It is supplied in 20kg tins.

Approvals and standards

- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 45001:2018
- Environmental Management System ISO 14001:2015

Usage

Visqueen Liquid Gas Membrane is suitable for damp proofing, gas proofing and waterproofing a variety of substrates including concrete, masonry and metal, above and below ground level including retaining walls, cast concrete, precast concrete and steelwork. The product is ideal for complex detailing and difficult to reach areas.

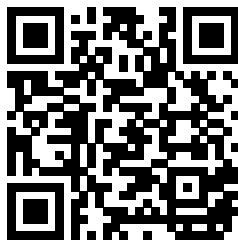
The liquid is suitable for use on insulated concrete formwork (ICF) as a priming solution to provide the optimum surface prior to the application of Visqueen Self Adhesive Membrane, Visqueen Gas Resistant Self Adhesive Membrane or VisqueenPro Detailing Strip.

The product is not designed as a decorative coating.

System components

- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m

Find your local stockist



Professional Indemnity Design
Full Design Liability for Structural Waterproofing and Gas Protection



Start your next project with us today, visit www.visqueen.com or call us on +44 (0) 333 202 6800

Visqueen Liquid Gas Membrane

Storage and handling

Visqueen Liquid Gas Membrane should be stored upright, undercover and in its original packaging. Store at temperatures between 5°C and 35°C. Temperatures below 5°C will render the products unfit for use.

To avoid the risk of spillage, always store and transport in a secure upright position. The product has a minimum shelf life of 12 months.

Keep the container closed when not in use.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Liquid Gas Membrane system should be applied to substrates that are smooth, clean, and free from frost, dust, laitance, loose material and standing water. Any surface contamination e.g. oil, paint, mortar spots, fungal growth, etc must be removed. All substrate cracks, or surface irregularities must be repaired and filled prior to product application. Masonry units should be flush pointed.

Visqueen Liquid Gas Membrane does not require mixing however the product should be stirred for 5 minutes before use and after every 2 hour period. Apply with a brush or roller. Brushes and rollers can be cleaned with water immediately after use. Brushes and rollers contaminated with dry product are not reusable and must be disposed appropriately after use.

The system should not be applied during rainfall or when rain is expected before the membrane has fully dried.

Installation

Visqueen Liquid Gas Membrane can be applied directly from the tin using a roller or brush, or transferred to a more appropriate container and applied by roller. Do not pour directly onto the surface.

The liquid is suitable for use on insulated concrete formwork (ICF) as a priming solution to provide the optimum surface prior to the application of Visqueen Self Adhesive Membrane, Visqueen Gas Resistant Self Adhesive Membrane or VisqueenPro Detailing Strip. For this specific application, apply one coat at a coverage rate of 0.25 litre/m² and allow to dry.

For gas or waterproofing applications to either horizontal or vertical substrates, apply three coats at a coverage rate of 0.5 litre/m²/coat. Allow each coat to dry before application of the following coat.

Each coat of the product will dry in approximately 6 hours depending upon temperature, humidity and ventilation. Visually the membrane will turn black as it dries. Apply successive coats at right angles to the previous coat. To reduce risk of inter-layer contamination, apply successive coats within 24 hours.

Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane. The membrane should be covered by a protective layer immediately after installation to prevent damage from following trades, ultraviolet light, etc.

Any joints where movement may occur e.g. construction joints or horizontal to vertical joints, should be reinforced with VisqueenPro Detailing Strip once all the coats of Liquid Gas Membrane have been applied and each have fully dried.

In order to form an effective seal with adjacent sheet membranes e.g. Visqueen Gas Barrier, form a butt joint with the cured Visqueen Liquid Gas Membrane and seal the junction with Visqueen Pro Detailing Strip bonded 150mm onto each material.

Usable temperature range

It is recommended that Visqueen Liquid Gas Membrane should not be installed below 5°C or when temperatures can be expected to fall below 5°C before the membrane has dried. Temperatures below 5°C will render the products unfit for use.

Additional information

Visqueen Liquid Gas Membrane is not designed for use as a gas or damp proof course (DPC) or to pass through structural zones where a concrete to concrete bond is required e.g. pile heads or shear walls
For additional information contact Visqueen Technical Services +44 (0) 333 202 6800.

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Visqueen Liquid Gas Membrane

Property	Test method	Units	Results
Tin size		kg	20
Colour when wet (dry)			Blue-grey (black)
Application temperature		°C	>5
Cured membrane			
Methane permeability	ISO 15105-1	ml/m ² /d/atm	<40
Adhesion to concrete		N/mm ²	1.1
Water penetration		3 bar pressure	Pass
Elongation	ASTM D2370	%	>100
Tensile strength	ASTM D2370	N/mm ²	11

Health and safety information

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Visqueen Liquid Gas Membrane

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Complete Range, Complete Solution



Structural
Waterproofing



Gas
Protection



Damp Proof
Membrane



Tapes



Damp Proof
Course



Stormwater



Vapour
Control

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APPENDIX III
Photographic Record Sheets



PHOTOGRAPHIC RECORD SHEET 1

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695



PHOTOGRAPHIC RECORD SHEET 2

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695

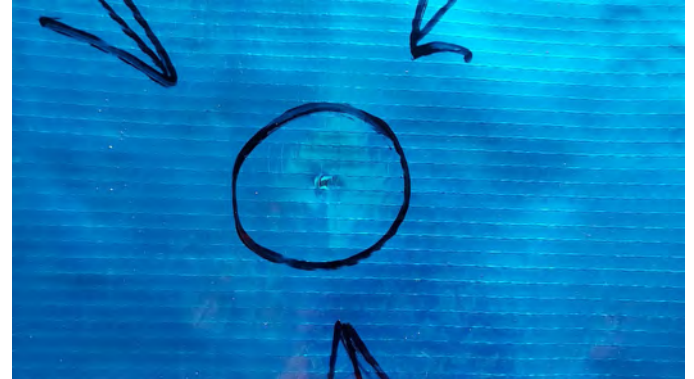
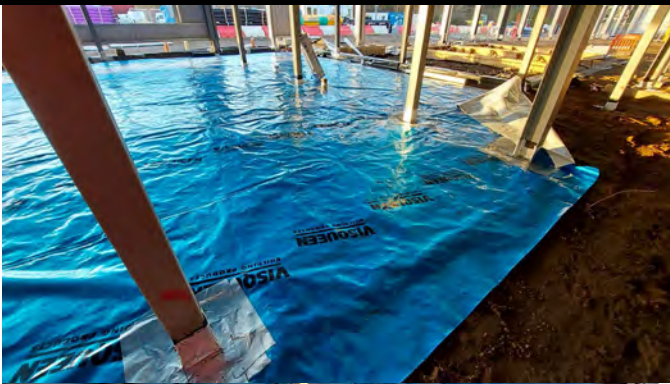


PHOTOGRAPHIC RECORD SHEET 3

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695



PHOTOGRAPHIC RECORD SHEET 4

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695

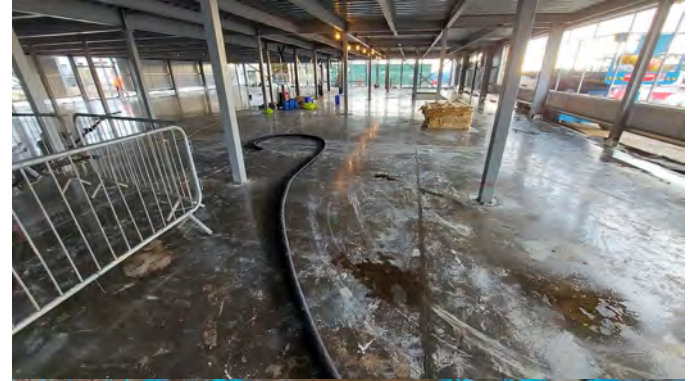


PHOTOGRAPHIC RECORD SHEET 5

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695



PHOTOGRAPHIC RECORD SHEET 6

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695

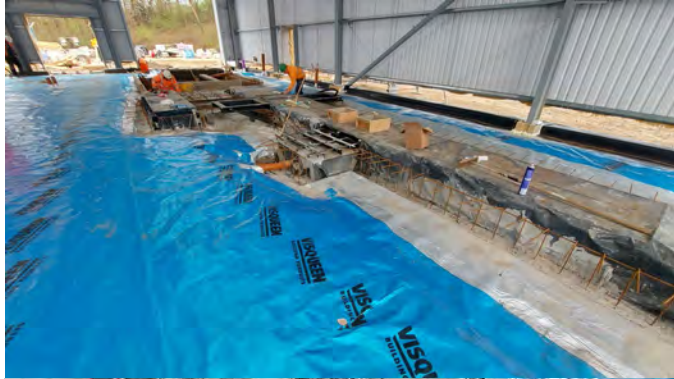


PHOTOGRAPHIC RECORD SHEET 7

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695



PHOTOGRAPHIC RECORD SHEET 8

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695



PHOTOGRAPHIC RECORD SHEET 9

Report Type: Validation Report

Site Address: Sunderland City Council – Parsons Depot, Parsons Road, Parsons, Washington, NE37 1EQ

Project No.: GEOL21-8695

APPENDIX 8

CONCRETE DESIGN CERTIFICATE

CONCRETE DESIGN CERTIFICATE

Mix Design Certificate Dated	1006525972 25.08.2021	Quotation Number	1006517924
		Your Ref.	

Tarmac Trading Limited
Northern Area Sales Office
Fell Bank, Birtley, DH3 2ST
Sales: 0191 490 1755
Orders: 0191 490 1758

To: LUMSDEN & CARROLL ESH CONSTRUCTION LTD T/A ESH HOUSE BOWBURN NORTH INDUSTRIAL ESTATE DURHAM DH6 5PF	Site: PARSONS ROAD DEPOT, NE37 1EX WASHINGTON TYNE & WEAR NE37 1EX
Our Representative: Mr Dean McGargill	

Specification	Our Ref.:			
Plant	Sunderland	Sunderland	Sunderland	Sunderland
Concrete Grade	Concrete	Concrete	Concrete	Concrete
Mix Type	PAV2	C32/40	C28/35	C40/50
Cement Type	AE	O/SANDED	O/SANDED	NORMAL
Cement Type	CIIB-S	CEM I	CEM I	CEM I
Maximum Aggregate Size (mm)	20	20	20	20
Target Slump (mm)	S2	S3	100	S2
Minimum Cement Content	340	325	320	380
Max Water / Cement Ratio	0.45	0.50	0.55	
Chloride Class	0.40	0.40	0.40	0.40
Maximum Alkali Content	3.50	3.50	3.50	3.50
Exposure Class	XF4			
Brand	CONCRETE	CONCRETE	CONCRETE	CONCRETE

Mix Design: Materials & Mix Proportions: kg/m³ at SSD unless otherwise specified

CEM I_52,5N Tarmac, Dunbar	243	355	320	390
Regen (GGBS) Standard Hanson, Teesport	104			
4/20mm Limestone (EN 12620) Tarmac, Thrislington	1179	1080	1075	1216
0/4mm Sand MP (EN 12620) Tarmac, Thrislington	626	791	835	661
ChrysoAIR G150 Chryso UK, Daventry	1.39 L			
Chryso Quad 420 Chryso UK, Daventry	2.05 L	2.09 L	1.89 L	2.30 L
Water	151	176	171	164
Aggregate/ Cement Ratio	5.20	5.27	5.97	4.81
Water/ Cement Ratio	0.44	0.50	0.53	0.42
Percentage Fines	34.68	42.28	43.72	35.22
Actual Chloride Content	0.06	0.08	0.08	0.07
Actual Alkali Content	1.85	2.33	2.10	2.56

HEALTH & SAFETY

There is a real danger of contact dermatitis or serious burns if skin comes into contact with wet cement mixes such as fresh concrete, mortar or screed. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly or through saturated clothing wash immediately with soap and water. For eye contact, immediately wash out the eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water.

For and on behalf of
Tarmac Trading Limited

Technical Services Department

Tarmac Trading Limited

Registered in England and Wales No. 453791

Registered Office: Portland House, Bickenhill Lane, Solihull, Birmingham, B37 7BQ

Tarmac and the 'circle' logo are registered trademarks

This design is relevant to the above quotation of which it is a part thereof and subject to our Standard Conditions of Sale

This certificate is for illustrative purposes only, the materials and mix design(s) are those in current production, these may be changed and/or modified when material properties vary or supply sources change.



KM 75822

KM 613473

CONCRETE DESIGN CERTIFICATE

Mix Design Certificate Dated	1006525972 25.08.2021	Quotation Number	1006517924
		Your Ref.	

Tarmac Trading Limited
Northern Area Sales Office
Fell Bank, Birtley, DH3 2ST
Sales: 0191 490 1755
Orders: 0191 490 1758

To: LUMSDEN & CARROLL ESH CONSTRUCTION LTD T/A ESH HOUSE BOWBURN NORTH INDUSTRIAL ESTATE DURHAM DH6 5PF	Site: PARSONS ROAD DEPOT, NE37 1EX WASHINGTON TYNE & WEAR NE37 1EX
Our Representative: Mr Dean McGargill	

Specification	Our Ref.:			
Plant	Sunderland	Sunderland	Sunderland	Sunderland
Concrete Grade	Concrete	Concrete	Concrete	Concrete
Mix Type	ST4-S2	C16/20	ST2-S2	GEN3
Cement Type	NORMAL	NORMAL	NORMAL	NORMAL
Cement Type	CIIIA	CIIIA	CIIIA	CIIIA
Maximum Aggregate Size (mm)	20	20	20	20
Target Slump (mm)	S2	S2	S2	S2
Minimum Cement Content				220
Chloride Class	0.40	0.40	1.00	1.00
Maximum Alkali Content	3.50	3.50	3.50	3.50
Brand	CONCRETE	CONCRETE	CONCRETE	CONCRETE

Mix Design: Materials & Mix Proportions: kg/m³ at SSD unless otherwise specified

CEM I_52,5N Tarmac, Dunbar	163	85	131	110
Regen (GGBS) Standard Hanson, Teesport	134	85	108	110
4/20mm Limestone (EN 12620) Tarmac, Thrislington	1137	1138	1118	1162
0/4mm Sand MP (EN 12620) Tarmac, Thrislington	736	915	800	858
Chryso Quad 420 Chryso UK, Daventry		1.00 L		1.30 L
Water	193	169	195	161
Aggregate/ Cement Ratio	6.31	12.08	8.03	9.18
Water/ Cement Ratio	0.65	0.99	0.82	0.73
Percentage Fines	39.30	44.57	41.71	42.48
Actual Chloride Content	0.05	0.05	0.05	0.05
Actual Alkali Content	1.06	0.56	0.85	0.73

Please Note:

HEALTH & SAFETY

There is a real danger of contact dermatitis or serious burns if skin comes into contact with wet cement mixes such as fresh concrete, mortar or screed. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly or through saturated clothing wash immediately with soap and water. For eye contact, immediately wash out the eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water.

For and on behalf of
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KM 75822

KM 613473

APPENDIX 9

DATASHEETS FOR IN-GROUND SERVICE PIPEWORK

Customer Quotation

INFRASTRUCTURE SOLUTIONS

CIVILS | UTILITIES | POWER & FIBRE | HIRE

To:	7290P35 - GEMINI MECHANICAL SVS ENGINEERS LTD	NORTH SHIELDS BURDENS
		UNIT 11
FAO:	GAVIN	BURFORD WAY
Quotation Number:	P25 19441	BOLDON COLLIERY
Your Ref:		NE35 9PZ
Job/Site Ref:	PARSONS DEPOT NE37 1EQ	0191 5377440
Quotation Date:	17/11/2021	0191 5365044

Cat No	Product Description	Quantity	Per	Each (£)	Total Line Value (£)
	125MM GAS				
P80461	GPS 125MMX6M YELL MDPE PIPE SDR17	9		55.480	499.32
CA8675	FUS AUTO EF COUPLERS HDPE100 BLACK 125	8		12.000	96.00
CA8531	FLANGE KIT 125X100NP16 SDR17.6 YEL GIS	2		57.350	114.70
CA0369	BLANK FL M/STEEL 100NP16 N-DRI- GAS ONLY	1		13.433	13.43
CA0370	BLANK FL M/STEEL 100NP16 DR&TAP 1IN GAS	1		22.883	22.88
CA0276	GASKET FULL FACE GAS 100MM NP16 NITRILE	2		1.863	3.73
CA0224	FL JNT SET GAS 100MM MM NBR GASK M16X90	2		8.392	16.78
	90MM WATER BARRIER PIPE				
P84462	GPS 90MMX6M P-LINE PIPE SDR17	16		123.095	1,969.52
P82694	GPS 32MMX25M P-LINE COIL SDR11	1		175.020	175.02
P44727	GPS 90MMX45D P-LINE ELBOW E/F	6		26.420	158.52
P76096	GPS 90-125X32MM P-LINE FERRULE STRAP	1		88.912	88.91
P28705	GPS 32MM P-LINE STOP COCK BS-5433	1		93.226	93.23
	THE BELOW IS A 32MM END CAP				
P28746	GPS 32MMX1" P-LINE PE-FI BSP CON	1		5.864	5.86
505644	BRASS HEX HEAD FLANGED PLUG 1	1		2.642	2.64
P44713	GPS 90X80MM P-LINE FLG ADAP KIT SDR11	1		40.888	40.89
CA0219	FL SET 80MM M16X75 EPDM F/F WAT RILSAN	1		9.948	9.95
K83102	AVK 80MM R/S SLUICE VLV + SCAP RHC S21	1		85.779	85.78
CA0085	CSL 80MM BLANK FL BITUMEN COAT	1		14.288	14.29
CA0217	FL SET 80MM M16X65 EPDM F/F WAT RILSAN	1		8.854	8.85
P44740	GPS 90MM P-LINE SLIDE OVER COUPLER	12		7.954	95.45
P43918	GPS FRI 90MM END CAP BLK E/F	1		16.412	16.41
MP3558	BRU 75MMX50M FOIL BACKED TAPE	4		4.014	16.06
	HIRE				
	HIRE E/F BOX P/WEEK	1		27.000	27.00
	HIRE GENERATOR P/WEEK	1		25.000	25.00
	HIRE FOR END PREP TOOL FOR 125MM GAS	1		24.000	24.00
	HIRE FOR END PREP TOOL FOR 90MM P/LINE	1		36.000	36.00
	HIRE FOR 180MM STRAP CLAMP P/WEEK	1		17.000	17.00
	HIRE FOR SMALL SHELTER	1		25.000	25.00
	HIRE DELIVERY CHARGE	1		25.000	25.00
	HIRE COLLECTION CHARGE	1		25.000	25.00
Quotation Total					£3,752.22
Cat No	Product Description	Quantity	Per	Each (£)	Total Line Value (£)

PRICES CORRECT ONLY AS AT QUOTATION DATE SHOWN. Price as at INVOICE date may differ due to market fluctuations. Carriage charges may apply. Prices quoted include the cost of packaging and Insurance etc. Prices quoted EXCLUDE VAT unless stated otherwise. Wolsley UK Conditions of Business apply at all times. To view Wolsley UK Terms and Conditions please visit <http://www.wolsley-terms.co.uk/>



APPENDIX 10

NOTES ON LIMITATIONS

NOTES ON LIMITATIONS

- 1 FWS Consultants Ltd (“FWS”) has prepared this report solely for the use of the client and/or his agent (the “Client”) on the basis of exchange(s) of written proposals and instructions, and FWS accepts no responsibility or liability:-
 - a) for use of this report by any party other than the person for whom it was commissioned, or;
 - b) for the consequences of the report being used for any purpose other than that for which FWS was instructed to prepare it.

Should any third party wish to use or rely upon the contents of the report, written approval from FWS must be sought.

- 2 All information supplied by the Client, the Client’s staff and professional advisers, local authorities, other statutory bodies, investigation agencies and publicly accessible databases, shall be provided to FWS in writing, and is accepted as being correct unless otherwise specified in writing by the discloser of the information.
- 3 The conclusions and recommendations in this report represent the professional opinions of FWS derived from currently accepted industry practices, and through the exercising of reasonable skill and care to be expected of a professional geosciences and environmental consultancy of similar size and experience. The assessments and judgments given in this report are directed by and limited to both the finite data on which they are based and the proposed works to which they are addressed.
- 4 Environmental and geotechnical desk studies comprise a study of available information obtained from various identified sources, authorities and parties. The information reviewed cannot be exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. For clarity, no independent verification of this data is carried out by FWS and it is accepted at face value. Any identified risks in desk study reports are perceived risks based on the information available at the time. Actual risks can only be assessed after carrying out a thorough physical investigation of the site that serves to validate such identified risks.
- 5 Data acquisition during site investigations is subject to the limitations of the methods of investigation used, site conditions and access constraints. Exploratory holes undertaken during fieldwork, particularly boreholes and/or trial pits, investigate a small volume of ground in relation to the size of the site and thus can only provide an indication of site conditions. The opinions provided and recommendations given in this report are based on the desk study information and ground conditions apparent at the site of each of the exploratory holes. There may be ground conditions elsewhere onsite that have not been disclosed by the investigation and which therefore have not been taken into account in this report. FWS will take all due care and make commentary on the adequacy of data collection and therefore the ability to highlight the presence or otherwise of exceptional conditions.
- 6 Owing to the natural variation of the systems that are being investigated, and the anthropological impact similarly changing through time, the findings and opinions in this report are relevant to the dates of the site works and should not be relied upon to represent conditions after a reasonable passing of time. Site conditions will change over time due to natural variations and human activities. The comments made on groundwater, surface water and soil gas conditions are based on observations made at the time that the site work was carried out. It should be noted that these conditions will vary owing to seasonal, tidal and meteorological effects. Variation in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, or subsequent developments or activities on the site or adjacent area.
- 7 The scope of the investigation, as agreed between FWS and the Client, was undertaken based on the specific development proposals of the Client and may be inappropriate to another form of development or scheme.
- 8 The opinions expressed in this report regarding contamination, geotechnical and/or waste assessments are based on simple statistical analysis and comparison with available guidance values. No liability can be accepted for the retrospective effects of any changes or amendments to these values.