GeoEnginSeer Ltd
Geological Services
Gas Protection Verification
Site Supervision
Ground Gas Sampling

GeoEnginSeer Ltd Geological Services

10 School Street, Wheldon Road, Castleford, West Yorkshire, WF10 2FD

Ground Gas Protection System Verification Plan

Building Warrant Application

Prepared for

The Client: Prima Homes Group Limited**,** Ivy Mill Business Centre Ivy Mill, Crown Street, Manchester, England, M35 9BD

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Version Number: GESL Ref: V1 Draft.

Project: Redevelopment Of Former Builders Yard into New Housing to Provide 35 Dwellings

Planning application reference: 4/22/2466/0F1 – Cumberland Council

Client: Prima Homes Group Ltd.

Main Contact: Paul Murphy

Contact number: 07787 228 643

Installer: TBC

Verification Plan Created by: Ben Crowther B.Sc, M.Sc, PGCE, FGS, CIEH, PCA QT, SGPV

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This document has been created in accordance with British Standards 8485:2015+A1:2019 & Construction Industry Research and Information Association
CIRIA 735 – Good Practice on the testing and verification of ground gas protection systems for buildings against hazardous ground gases

Redevelopment Of Former Builders Yard into New Housing to Provide 35 Dwellings

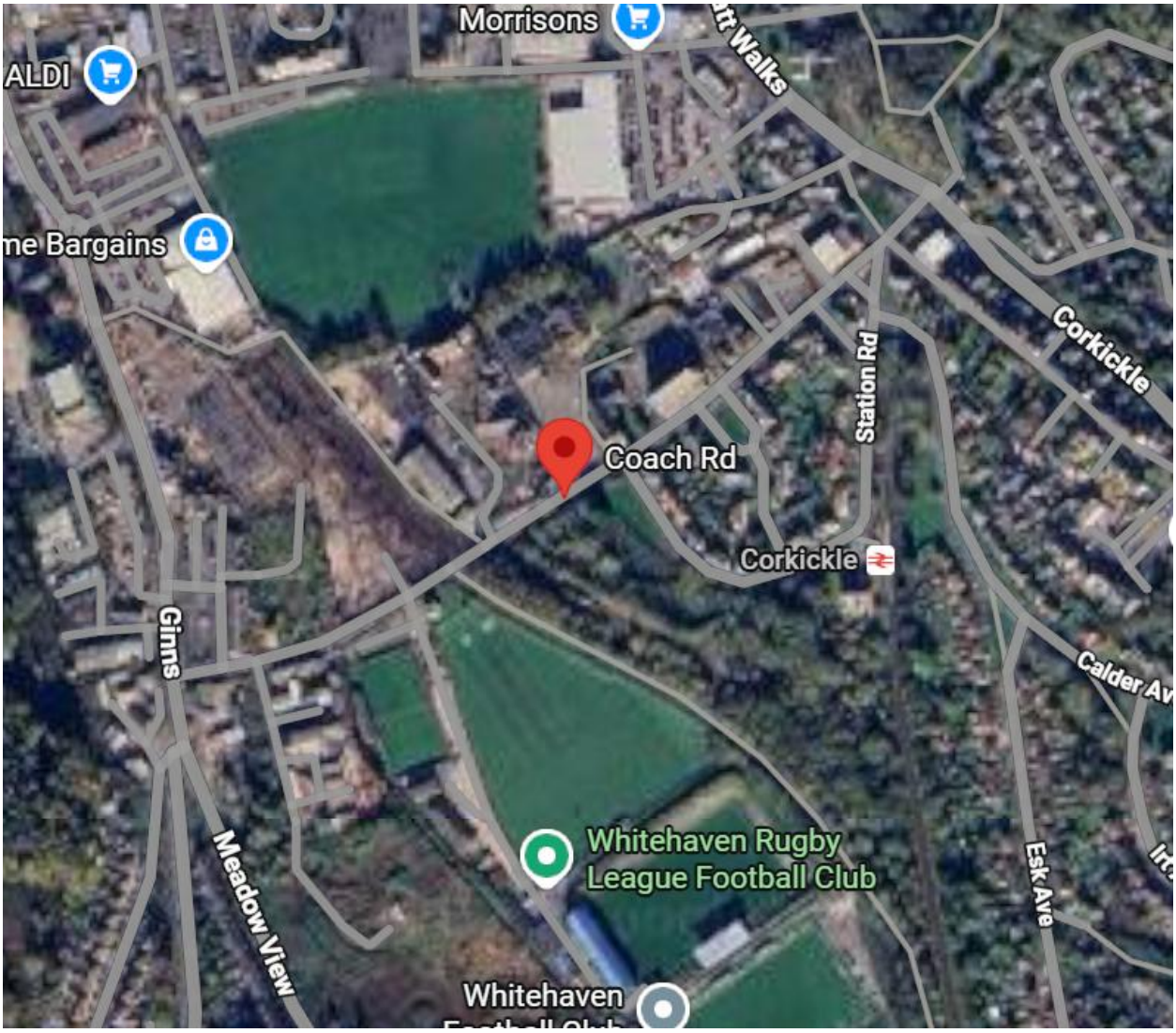

Image courtesy of Google Maps 2026

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Executive Summary

Site Address:	Land Adjacent To Border Yard, Coach Road, Whitehaven
Relevant Site Investigation Report extract:	The following reports have been completed for this site and should be read in conjunction with this verification plan: • *Phase 1 Desk Study Report, Ref.: 559-01, dated 27th February 2014, compiled by Civic Engineers* • *Geo-Environmental Site Investigation, Ref.: 45418p1r1, dated J une 2014, compiled by Resource & Environmental Consultants Limited (REC)* • *GEO Environmental Engineering Limited Coal Mining Risk Assessment (CMRA), Ref.: GEO2025 7009, dated 15th December 2025.* • *GEO Environmental Engineering Limited Phase 2 Ground Investigation Report, Ref. 2025-7009, dated 15th December 2025* The following extract has been taken from the GEO Environmental Engineering Ltd. Phase 2 Report: "*The GSV calculation is as follows.* • *CH4 GSV = (Max CH4 (%) / 100) x Max Flow (l/hr); (23 / 100) x 3.4 = 0.782l/hr* • *CO2 GSV = (Max CO2 (%) / 100) x Max Flow (l/hr); (8.9 / 100) x 3.4 = 0.3026l/hr* *Based on the results, the calculated GSV for Methane exceeds the Characteristic Situation 2 (CS2) assessment value of 0.7l/hr, and the GSV for Carbon Dioxide exceeds the Characteristic Situation 1 (CS1) assessment value of 0.07l/hr. As such the site should be classified Characteristic Situation 3 (CS3), and therefore it will be necessary for gas protection measures to be incorporated within the construction of any proposed buildings on this site. When considering the findings above, it may be possible to reduce the characteristic situation by an order of 1 if the actual true Methane concentration could be determined at the location of BH03, by way of laboratory gas analysis.* *According to the information presented in the previous desk study report, the site was not considered to be at risk from Radon gas, and therefore did not require the implementation of Radon protection measures. As it has been >10years since the production of the desk study report, an up-to-date Geo Insight report has been procured from Groundsure (a copy of which can be seen in Appendix IV). The report still confirms that the site lies within an area where between 1% & 3% of properties are affected by Radon. Therefore, the assessment concludes that Radon protection measures are not required within the construction of buildings on this proposed development / site."*
Site description and context:	The site, occupying an area of c.0.85ha, is located off Coach Road, opposite Whitehaven Bowling Club and Whitehaven Football Club, in the Cumbrian town of Whitehaven, as

	indicated on the site location plan. Access to the site is gained from Coach Road, which bounds the site's southern boundary. • National Grid Reference: 297380, 517470 • Post Code: CA28 9DF The site is currently undeveloped, comprising unsurfaced / areas of bare ground along the northeastern / eastern portions of the site, and a mixture of concrete (building floor slabs) and tarmacadam surfacing across the southwestern portion of the site. Based on historical aerial photography, it would appear that the previous buildings occupying the site were demolished sometime between 2016 and 2018, and the area of dense vegetation which occupied the northeastern / eastern portions of the site were cleared sometime between 2020 and 2023. Several stockpiles of soils are located along the northeastern / eastern portions of the site. Generally, there was no evidence of any surface contamination sources (significant bulk fuel/oil or chemical storage) noted on the site during the walkover, however, it is understood that a former fuel pump island and underground storage tanks (UST's) are present below the central portion of the site. During site investigations undertaken during 2014, USTs were encountered at shallow depth (circa 0.30m). In addition, potential Asbestos Containing Materials (ACMs) may have clad some of the previous historical buildings which have occupied the site. The site area is generally flat, although ground levels slightly fall from south to north. The southwestern portion of the site is c.0.5m higher than the northeastern portion of the site, with ground levels ranging between 7.3m and 7.5m AOD across the southwestern portion of the site, and between 6.9m and 7.3m AOD across the northeastern portion of the site.
Planning Permission:	4/22/2466/0F1 – Cumberland Council
Geology and Aquifer Designations:	Made ground deposits were recorded across the whole site area, ranging in thickness between 0.30m up to 1.50m. Below the previously un-investigated area of the site (NE), targeted by TP's 01 to 04, the made ground comprised gravelly sand with gravels of slag (TP01), very sandy gravel of ash, cinder, clinker, tarmacadam and coal (TP02 to TP04), and mixed gravelly sand and sandy gravelly clay (TP03). An initial layer of gravelly sandy soil with the presence of ash, cinder, clinker and tarmacadam (0.20m) was recorded at the location of TP04. The surfacing across the southwestern portion of the site generally comprises reinforced concrete and tarmacadam underlain by reddish-brown sandy gravel sub-base. Below the surfacing and sub base, the made ground generally comprises ash, cinder, clinker, brick rubble and gravelly sand. A large fragment of potential asbestos-

	containing sheet was recovered from TP09. In addition, small fragments of potential asbestos-containing sheet were noted at the surface near to the location of BH01. The natural drift deposits generally comprise soft, firm and stiff clay, with the occasional presence of peat, remains of vegetation, roots and rootlets, recorded to depths of between 1.35m and 2.60m bgl, before giving way to silty sand, gravelly sand and very sandy gravel proven to depths of at least 4.00m. These deposits are felt to be representative of alluvial derived deposits. The full depth of the superficial deposits was not proven as part of these investigation works. Slight seepages of water were recorded to emanate from the base of the made ground deposits between depths of 0.40m and 1.00m (TPs 01, 12 & 13). Hydrocarbon contamination was noted to be present at the locations of TPs 12 & 13. Ingresses of groundwater / groundwater strikes were recorded within the natural deposits ranging between the depths of 1.10m and 2.45m. The water level was noted to rise to 1.00m within BH02. Where some groundwater ingresses were observed at the base of the completed excavations in the sand deposits, the creation of 'running sand' was noted. TPs 05, 08 & 09 were noted to remain dry during excavation and on completion prior to backfilling. Hydrocarbon contamination was noted to be present within the groundwater at the locations of BHs 03 and 05. Samples of the shallow groundwater have been recovered from the monitoring wells sunk across the site area (BHs 01 to 05) for chemical laboratory contamination screening to determine the risks posed to Controlled Waters. Groundwater monitoring of the installations, placed in boreholes BH01 to BH05 to depths of between 3.00m and 4.00m bgl, has been carried out on two occasions in October and November 2025 to date. Standing water levels have been recorded ranging between 0.80m and 1.62m bgl. Following purging for groundwater sampling on the second visit, standing water levels were recorded between 0.96m and 1.96m. Given the ground conditions and the groundwater observations noted during the investigation works, it is likely that the groundwater ingresses recorded within the trial pits and the standing water levels recorded at the borehole / monitoring well locations is representative of a shallow continuous groundwater surface within the natural deposits. As such, it would be considered prudent to allow for the introduction of temporary groundwater control techniques (i.e. sump pumping and the like) during the construction phase of works to ensure excavations remain dry and stable, and to take care of any ingresses of groundwater which may occur, especially during the wetter periods of the year. It should also be noted that instability within such excavations could occur because of water inflow. Where water is present, granular deposits have the potential to flow in excavations (e.g., running sands). Based on the ground conditions, and the water ingresses and standing water levels observed to date, the use of soakaways to discharge positively drained surface water direct to the ground may be unsuitable, however if

	necessary, confirmatory testing may be required to confirm the infiltration characteristics with more certainty.
Ground Gas and Summary of Gas Risk Assessment	The GSV calculation is as follows. • CH4 GSV = (Max CH4 (%) / 100) x Max Flow (l/hr); (23 / 100) x 3.4 = 0.782l/hr • CO2 GSV = (Max CO2 (%) / 100) x Max Flow (l/hr); (8.9 / 100) x 3.4 = 0.3026l/hr Based on the results, the calculated GSV for Methane exceeds the Characteristic Situation 2 (CS2) assessment value of 0.7l/hr, and the GSV for Carbon Dioxide exceeds the Characteristic Situation 1 (CS1) assessment value of 0.07l/hr. As such the site should be classified Characteristic Situation 3 (CS3), and therefore it will be necessary for gas protection measures to be incorporated within the construction of any proposed buildings on this site. When considering the findings above, it may be possible to reduce the characteristic situation by an order of 1 if the actual true Methane concentration could be determined at the location of BH03, by way of laboratory gas analysis. The results of the ground gas monitoring have recorded elevated concentrations of Methane. However, the presence of volatile vapours (Hexane – max. concentration of 0.513%) can artificially increase the Methane reading as volatile vapours have a similar infra-red range to that of Methane. Therefore, the concentration recorded may not actually be a true representation of the actual concentration. This can only be confirmed by carrying out laboratory gas analysis. Elevated Carbon Dioxide (>5%) has been recorded, along with depleted levels of Oxygen. Some high positive flow rates have been noted; however, this is suspected to be attributable to fluctuating water levels pressuring the column of air / gases in the solid section of the monitoring well (piston effect). Typically, negligible and low positive flow rates have been recorded, ranging between <0.1l/hr up to 3.4l/hr. Nonetheless, at this stage the calculated GSVs for the site, have determined that the site should be placed within a CS3 classification, and therefore gas protection measures are considered necessary. When considering the presence of significant levels of Petroleum Hydrocarbon and the generation / creation of volatile vapours, the proposed gas barrier membrane should be upgraded to be volatile vapour resistant to negate the risks associated with inhalation of vapours. The site will therefore require a Ground Gas Verification Plan, detailing the proposed remediation measures and validation requirements. Based on an up-to-date Radon risk report procured for the site, Radon protection measures are not currently required for this proposed development / site.

Remediation Strategy and Gas Protection Measures Required	Gas screening values (GSV) have been calculated using maximum methane and carbon dioxide concentrations with maximum flow rates recorded at the site. The GSV have been compared with the generic Traffic Lights, as presented within the NHBC ground gases guide (Boyle and Witherington, 2007) and the aforementioned CIRIA report C665, owing to the development. In addition, the gas regime is considered within the context of a conceptual model as required by aforementioned guidance documents. This site will require gas protection measures in compliance with BS 8485:2015+A1:2019, for this CS3 site, this Type B building will require 4 points.

CS	Minimum gas protection score (points)			
	High risk		Medium risk	Low risk
	Type A building	Type B building	Type C building	Type D building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 A)	5.5 A)	4.5	3.5
5	— B)	[A1⟩ 6 ⟨A1] A)	5.5	4.5
6	— B)	— B)	[A1⟩ — B) ⟨A1]	[A1⟩ 6 ⟨A1]

Contents

Purpose of the Verification Plan

This report has been prepared in general accordance with UK guidance and good practice documents, including (but not limited to):

- BS8485: 2015 + A1: 2019 - Code of Practice for the Design of Protective Measures for Methane & Carbon Dioxide Ground Gases for New Buildings (BSI, 2019).
- CIRIA 665 Assessing risks posed by hazardous ground gases to buildings.
- CIRIA Report C735 - Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gases (CIRIA, 2014).
- Land Contamination: Risk Management (https://www.gov.uk/government/publications/land contamination-risk-management-lcrm) (Environment Agency, October 2020); and
- BS EN ISO 21365 - Soil quality – Conceptual Site Models for Potentially Contaminated Sites (BSI, 2020).
- Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects) 2023 edition.

A copy of this report should be submitted to relevant Regulators / stakeholders for their review, comment and approval.

Limitations of the Verification Plan

This report is based on the information that has been made available to GeoEnginSeer Ltd by the client, contractor and architect regarding the site. The conclusions drawn in the report are considered correct although any subsequent additional information or actions may allow for refinement of the conclusions. It should be noted that: The report has been prepared under the express instruction and is solely for the use of the Client.

The findings of this report represent the professional opinion of experienced Ground Gas System Surveyors. GeoEnginSeer Ltd. does not provide legal advice. The advice of lawyers may also be required.

All work carried out in the preparation of this report has utilised, and is based upon understanding of current relevant UK standards and codes, technology, and legislation. (BS8485:2015+A1:2019 & CIRIA 735).

Changes in the aforementioned legislation and guidance may occur at any time and could render conclusions null.

This report is limited to the boundaries identified by the client on this site and confirmed within this document.

A retrospective fit may be required if additional services are introduced, or if service conduits are not sealed, or if service conduits have services provided through them at a later date and are not sealed to the conduit and or gas protection system. If a site is left open for prolonged periods following verification or works are conducted that may damage the integrity of the installation by follow-on trades, repairs may be needed, the standards observed in a positive verification report may be compromised. Intellectual rights to this document may be rescinded.

The report is limited to the boundaries identified by GeoEnginSeer Ltd on this site and confirmed within this document.

Principals of Coach Road Verification Plan

GeoEnginSeer Ltd, an independent specialist, has been appointed by the client to create this Verification Plan, conduct Verification visits and to produce a Verification Report for the installation of gas protection measures at Coach Road.

Verifier Experience

GeoEnginSeer Ltd staff collectively have a 47-year history in the industry dealing with gas barriers and containment. Ben Crowther – Director details appended below.

GeoEnginSeer Ltd has been a verification specialist company for 5 years and has experience with gas and water protective systems ranging from multistory apartment blocks, residential housing, commercial developments and industrial heavy machinery floors as well as HS2 tunnels and shafts.

Verification Testing

A non-destructive testing regime is used to verify installed gas protective measures. GeoEnginSeer Ltd can and will conduct the following methods for testing the integrity of the installed materials.

Visual examination, pick testing, Air Lance testing and air flow testing to sub floor void.

Examination of startup test welds by destructive testing shall also occur if heated hand welding is conducted.

Some of these tests adhere to ASTM D4437, 2008 Edition, April 1, 2008, others are novel and are described in the CIRIA C735 code of practice documentation and BS 8485+2015+A1:2019.

Professionally Designed System:

A Structural Engineer designed system has be produced, in conjunction with the Architects plans with close attentive reference to standard installation principals from manufacturers.

These plans are reproduced in this document but refer to latest editions for scaling or build program.

The wording on the plans details the buildup of layers and placement of the Passive Ventilation Layer and Gas Resistant membrane and other components of this gas protection plan.

Much of the wording is drawn from manufacturers recommendations, which can be found on their websites, under installation details. Links provided in the Appendix.

Assured Professionalism

Guidance and professional bodies such as member of the British Verification Council (Ben Crowther was a founding member) and quality assurance peer review organisations such as CL:AIRE with their TGVP/SGVP system all suggest several key elements are required for the action of verification which are all included in this plan.

Professional Installers:

As the installation must be conducted by professional staff qualified with the NVQL2 diploma in substructure occupations (installation of Gas Membranes) a professionally qualified person is not necessary in this case, with approval from the membrane manufacturer, the materials manufacturer and so experienced ground workers can create an excellent installation as long as manufacturers guidelines are followed.

Frequency of Inspection:

Verification is required for all installation events, prior to any covering of the gas barrier on the new build properties.

The plan for Coach Road will be 100% inspection of membrane and evidential reporting on Covering of the membrane, and inspection during installation of insulation for protection of the installed membrane. This is especially the case if experienced ground workers conduct the installation.

Immediately post installation is the Key time that damage can occur and must be dealt with appropriately.

Subgrade

Subgrade quality is key to a successful install, subgrade inspection forms shall be submitted by site management or acceptance forms from professional installers to GeoEnginSeer Ltd.

With Coach Road the subfloor build-up of floor will involve piled foundation; 150mm subfloor Void, reinforced monolithic slab, Professionally (Qualified NVQL2 Installers) installed Volatile Hydrocarbon Barrier Material with required independent verification, which is required, insulation and floor screed will then be protected with the rapid installation of insulation or screeding.

Additional Important Considerations:

Follow on trades taking care and avoiding damage to the installed material is crucial all levels of Management must pay heed to this to prevent damage as detailed above.

Tool Box talks detailing the above and the importance of reporting damage so it can be repaired is critical.

Individual or Daily Verification Event Recording

Each verification event will photographically document any repairs. These records may include subgrade sign off forms and each report will evidence all non-destructive testing conducted. A report of the event detailing any issues, concerns and all testing will be produced each time verification is required. This will usually be close to the end of each stage of installation, so that repairs can be affected. Air flow testing will occur to any installed ventilation duct work.

Confirmation of appropriate products used over 100% of the installed system will be conducted on each and every verification event.

Communication

Communication is crucial to a successful project. Appropriately timed verification event coordination will occur just before the completion of each section of gas protection measure installation, especially of the gas resistant barrier membrane.

British Standard 8485:2015+A1:2019 Calculated Points System

The Architect and Manufacturer of gas protection designed solutions for this development provides a system that achieves the points that are required to ensure protection of this property and the occupants. 4 points are required for this Type B building, with the precautionary adoption of Characteristic Situation 3, Moderate Risk is in effect at this site. The installation of an appropriate gas barrier membrane (example link in appendices), and subsequent independent verification testing provides 2.0 points. A lightly reinforced suspended slab will provide 0.5 points in the system.

In addition, a subfloor void of minimum 150mm, scores an additional 1.5 points depending on Number of air bricks in the surround of the building which should be roughly 1 per 1.5 m and sleeper wall gaps on an equivalent ratio. This gives a total score of 4,0 points in the British Standard ref; above.

Conclusive Reporting

A final Gas Protection Verification Report for the project will be supplied to the client which will summarise and document all the above testing, materials deployed and as built effectiveness of the passive ventilation system. Any damage, repairs and variations necessary, if any, to this plan will be documented.

Conclusion - Statement

This system provides the minimum of two elements required by the British Standard guidance for the 4 points required for the protection of this privately owned residential Type B building.

The gas protection measures above constitute a satisfactory solution for this system, given the level of risk and allows for structural stability of the development.

Ben Crowther SGPV 004

24.01.2026

Product Specification

The following pages detail the range of required gas resistant materials available for the Coach Road site, appropriately fitted to the manufacturers standards.

The materials have been chosen to protect different areas of the designed build. The design of protective layers has included a two-tier system to protect this development by placing a lightly reinforced concrete slab to prevent movement and a sealed CS3 rated Gas and Vapour barrier from out leaf to outer leaf of the building.

The following specification is specific to this development – to encompass a minimum standard material to meet the BS8485:2015+A1:2019 characteristic situation 3 – Gas Barrier requirement.

Verification of the installed gas protection scheme is a strict requirement.

Seals between the outer service pipes placed through conduits and the internal face, and possible external face of such conduits also needs careful addressing. In the UK area an accepted suggested material to fit this purpose is Filo Seal, or Stop Aq, Last accessed January 2026).

It is a requirement of GeoEnginSeer Ltd that, with this installation, welded seams should be implemented in place of taped seams. There is a tendency of taped and self-adhesive seems to perform to a lesser standard than that of welded seams when installed in adverse weather conditions. Welded seams have been found to be more withstanding of previously conducted destructive testing.

Product	Description	Installation & Testing
Visqueen NF 600 Gas and VOC Vapour Barrier	NF 600 is a multi-layer low density polyethylene (LDPE) gas barrier with a Blue Tint. The membrane is designed for use in concrete ground floors, above and below slab not subject to hydrostatic pressure. Other protects buildings against Moisture, Radon, Carbon Dioxide, VOC and Methane from the ground. Complies with latest codes of practice as published by BRE, BSI & CIRIA.	Installation as per manufacturers guidance & BBA Cert Annex C - Testing in accordance with CIRIA 735 & BS8485:2015+A12019
Gas Resistant Self-Adhesive Membrane	Gas Resistant (GR) Self Adhesive Membrane (SAM) is a material designed to prevent the transmission of carbon dioxide, radon and methane gases in tanking applications or where hydrostatic pressure is present. Resistance to gas is achieved by an integral aluminum film. Substrates should be primed with a Tanking Primer prior to application.	Installation as per manufacturers guidance & BBA Cert Annex C - Testing in accordance with CIRIA 735 & BS8485:2015+A12019
Preformed Corners or Top hats	Manufacturers can produce formed shapes to fit round difficult corners or pipe joins. These need to be sized correctly for pipe or service entry fittings used in welded/GR-SAM fitted situations	These elements also need to be in line with manufacturers guidance & BBA Cert Annex C - Testing in accordance with CIRIA 735 & BS8485:2015+A12019
Seal between inner of conduits for serves and outer of conduit	Filo seal, or similar or better performance material: https://www.filoform.co.uk/filoseal-hd-re-enterable-duct-sealing	No BBA exists so an appropriate gas resistant self-adhesive should be used to ensure gas resistance is achieved.
Liquid Membrane and close sealed foam (e.g. Filoseal or StopAq)	Sealing the gap between service conduits internal face and external surface of the service	Physical and visual checks of the integrity of the seals

Verification Process

Verification is accordance with the Construction Industry Research and Information Association (CIRIA 735) & British Standards 8485:2015+A1:2019.

The following tests will be conducted during the Verification process.

1. Pick & Probe testing on minimum of 100% of all seams
2. Non-Destructive Air Lance testing on a minimum of 100% of all seams to ASTM D4437 (2008)
3. Visual Inspections on minimum of 100% of all seams
4. Destructive Testing on selected seam test welds or field tests where appropriate
5. Verification reporting prior to each major concrete pour, or built wall section, shall be conducted and will include written records, photographic evidence and subgrade sign off records.
6. Visual inspection of Subgrades and subgrade hand over forms where available.
7. Trace gas testing on appropriate locations can be conducted post construction.
8. Air flow testing on passive ventilation to check flow potential in the subfloor voids.

In addition, where possible a quality control regime conducted by a named installer shall be recorded and added to verification reporting upon each verification reporting event.

Risk – Based Approach to Verification

A risk-based system takes account of various factors that will influence the consideration of the scope of verification activities, including integrity testing. The verification specialist will consider the following:

1. Site – specific gas regime.
2. Number of buildings/plots to be inspected and over the period this will take place.
3. Complexity of the design and installation.
4. Qualifications and or experience of the workforce.
5. Additional gas resistance protection.

Elements that have been considered in the generation of this Verification Plan

Gas Regime:

Low Risk	CS2
Intermediate Risk	CS3/4
High Risk	CS4 an above

Design complexity:

Simple	Few service entries/penetrations, gas membrane and sub floor void
Complex	Variety of gas protection measures, numerous columns/penetrations/service entries, corners and small spaces

Number of plots/buildings:

Small	<5
Medium	5-15
Large	>10

Installation workforce: To be confirmed

Non-Specialist	General builder/ground worker
Skilled	Qualified and experienced installer (NVQ 2 qualification in gas protection installation)

:

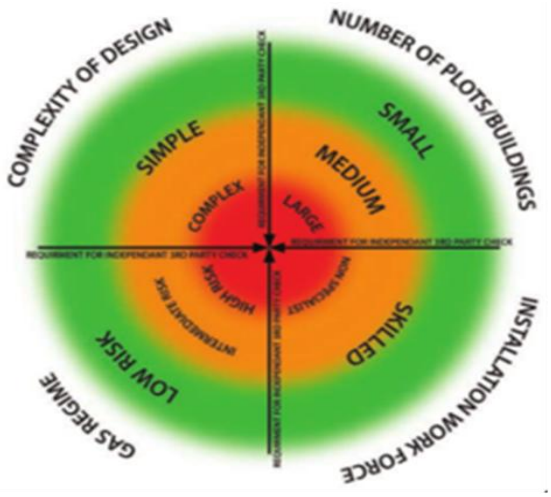

Diagram of risk from Ciria 735

Conclusion: The Gas Regime for this development is a Characteristic Situation 3 = Moderate Risk

Annex

A – Ben Crowther: GeoEnginSeer Ltd: Verification Specialist: Person Specification.

B – Building Plans, elevations, location plan and setting out of plots

C – Product Specification: Gas Membrane and associated jointing and sealing products.

Geological Services: Verification Specialist: Freelance Geologist

Ben Crowther trading as GeoEnginSeer Ltd; Independent Geological Services.

CSCS MAP: 06010225 exp 09/2022

Telephone: 07817 108921

Email: geoenginseer@gmail.com Website: www.GeoEnginSeerLtd.com

Qualifications: B.Sc, M.Sc, PGCE, FGS, CIEH, PCA QT (CSSW) SGVP (CL:AIRE)

NVQL3 Assessor of: Verification of Gas Protection Measures (NVQL4)

Confined Spaces L1, IPAF Harness Training, Cradle Safety.

PCA Qualified Technician in structural waterproofing. October 2020

Experience Summary:

15 years local authority regulation

14 years site investigation, site supervision, construction quality assurance and verification

Previous Secretary of, and founder member of the British Verification Council

Attendee of CIRIA Research Group 'Remedial Measures for Proprietary Gas Protection Measures'

Assessor for: NVQL4 Verification of Gas Protection Systems

CL:AIRE GPVS Assessor, SGVP certificate holder No.004

Climber, Fell Runner, Wild Swimmer, Ex Royal Marine Diver.

Recent CPD Summary:

GGS 2 Day A-Z of Ground Gas August 2017

CIRIA Verification Training Event October 2017

PCA Structural Waterproofing Conference 2018, 2019

CIRIA Technical Meeting for Retrospective Fitting of Gas Resistant Membranes 2019

Brownfield Summit Attendance 2018, 2019, 2020, 2021, 2022

DoWCoP CL:AIRE Training March 2021

PCA CSSW Qualified Technician Training 2021, working towards CSSW qualification.

Appeared on: Gassing On! with Neil Salvidge.

HS2 Align Training for Tunnel Shaft H&S Green Tunnels and Shaft Work: C1 and C2,

2022 Cradle safety and IPAF harness use trained: Operator Licence: OP/2157339

Signature:

Annex B

Building Plans

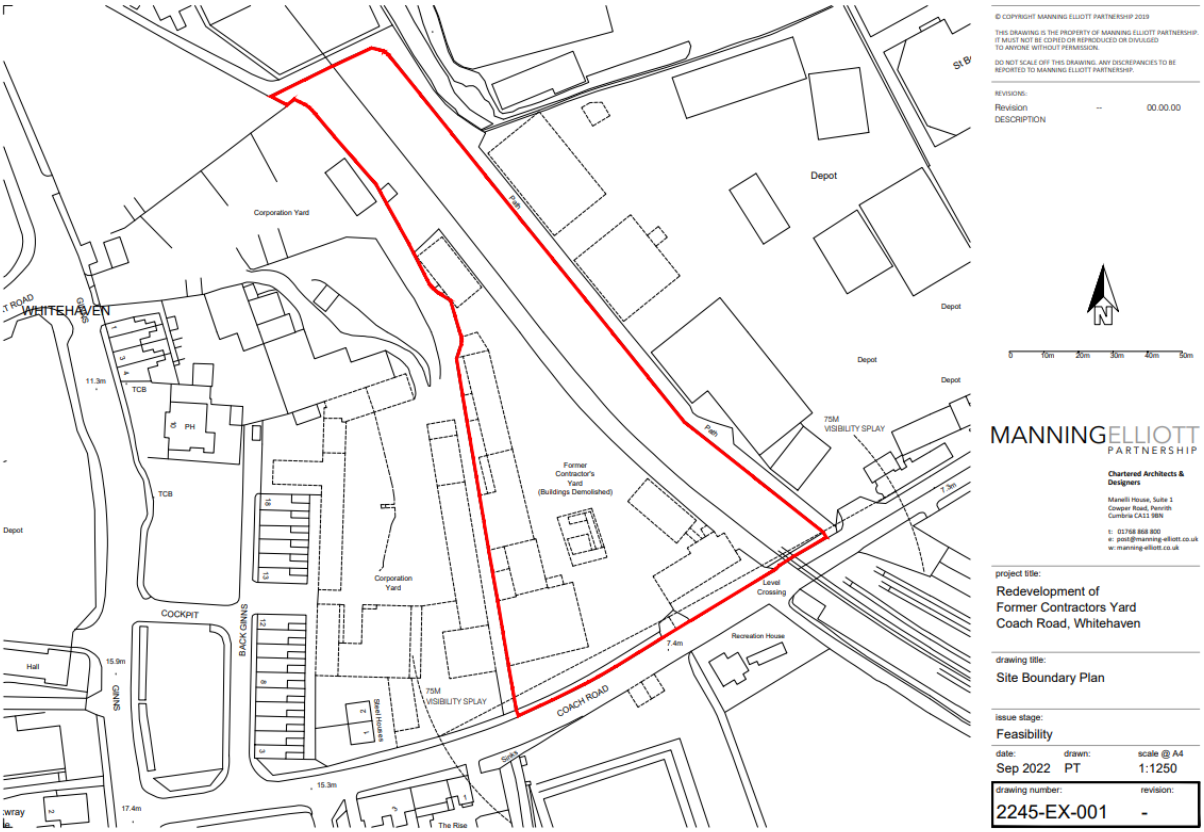

Figure 1: Location Plan

Figure 2: Proposed Site Plan

Site Investigation Location Plan

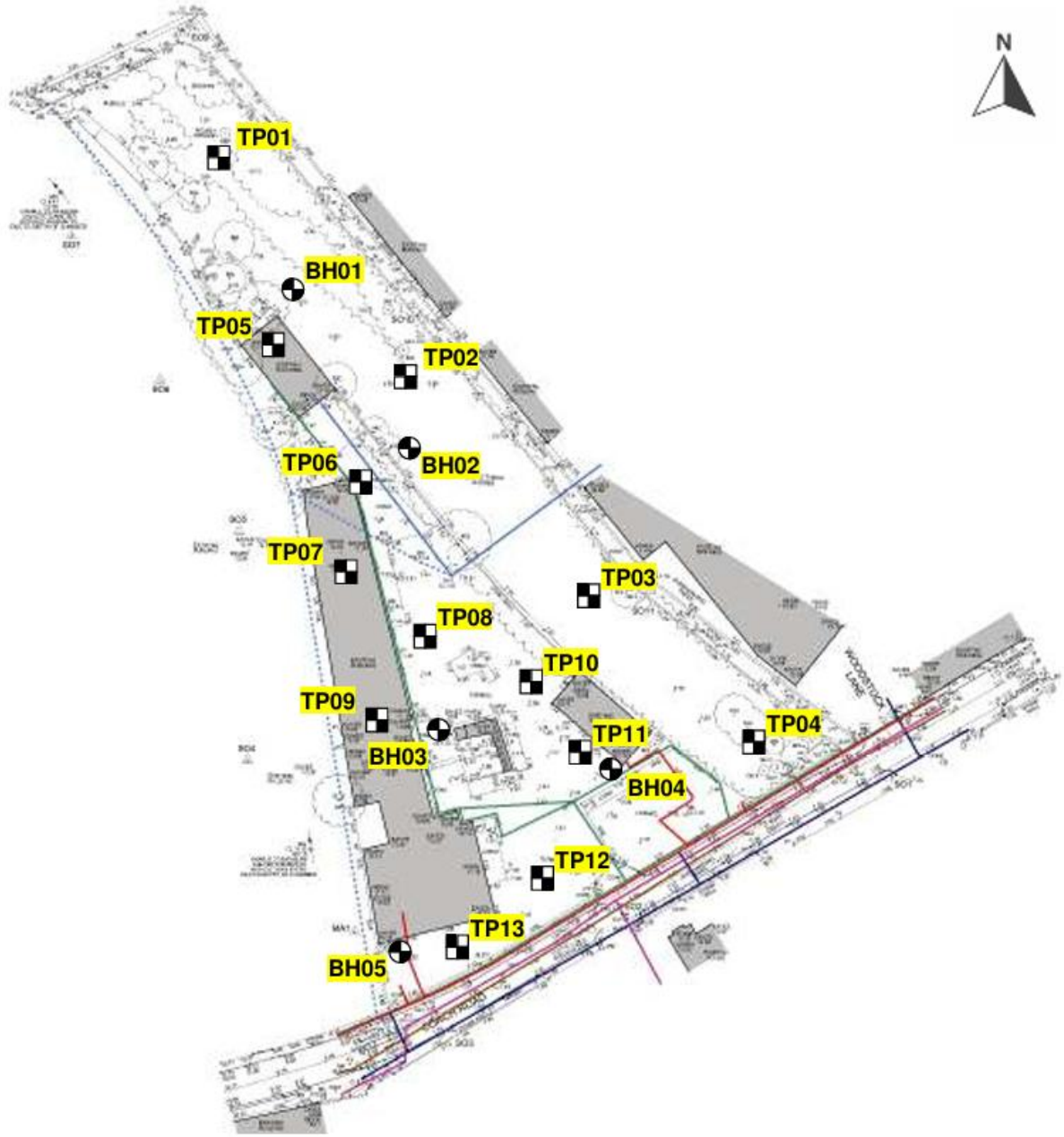

Figure 3: GEO Environmental Engineering Site Investigation Location Plan


Gas Protection Verification
exp. 31.10.2025
G
HUGO CROWTHER
SGPV0004


B
V
C

Annex C

Example materials website to use as reference for installation guides.

Links provided to save space:

Visqueen Technical Downloads | Product Specs & Guides

Last accessed January 2026

Technical Datasheet

VISQUEEN ULTIMATE GAS BARRIER NF-600

Technical support: +44 (0) 333 202 6800
Date Published: 24-Jul-2025
Version: 25205

Visqueen Ultimate Gas Barrier NF-600

Features & benefits

- Agrement certified - third party accreditation
- Complies with NHBC Foundation's NF94 guidance for use in Type A, Type B and Type C membrane locations
- Complies with CIRIA C748:2014 - industry standard for volatile organic compounds (VOC) protection
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Also provides radon and damp proof membrane protection
- Dual jointing methods - depending upon specification, lap joints can be taped or heat welded

Product description

Visqueen Ultimate Gas Barrier NF-600 is a co-extruded, multi-layer thermoplastic volatile organic compound barrier and gas barrier, 0.6mm thick (600 micron). The membrane is transparent with a blue tint and supplied 2m x 50m in a single wound roll.

Approvals and standards

- Third party accreditation (BDA Agrement Certificate BAB-24-339-P-A-UK)
- Complies with the methane gas transmission rate, mass per unit area and thickness requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Complies with NHBC Foundation NF94 guidance for use in Type A, Type B and Type C membrane locations (non foil system)
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2023
- UKCA UKNI CE to EN 13967:2012
- Visqueen certified with Quality Management System ISO 9001:2015
- Visqueen certified with Occupational Health and Safety System ISO 45001:2018
- Visqueen certified with Environmental Management System ISO 14001:2015

Usage

Visqueen Ultimate Gas Barrier NF-600 is suitable for use in all types of buildings to prevent the ingress of harmful levels of volatile organic compounds (VOCs), methane, carbon dioxide and radon.

The barrier can be positioned above or below reinforced cast in situ concrete floor slabs e.g. ground bearing, suspended or raft, or above precast suspended segmental subfloors, e.g. beam and block floor.

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

Where protection against VOCs or hydrocarbon contamination is required, the barrier system should be applied with welded joints.

Radon, carbon dioxide, methane and VOC protection - NHBC NF94 guidance:
Visqueen Ultimate Gas Barrier NF-600 when installed with either welded or taped joints (welded when used for VOC protection) complies with NHBC Foundation NF94 publication, Hazardous ground gas - an essential guide for housebuilders, in Type A membrane locations in precast suspended segmental subfloors and reinforced cast in situ concrete floor slabs (ground bearing, suspended or raft).

In addition, Visqueen Ultimate Gas Barrier NF-600 when installed with welded joints complies with NHBC Foundation NF94 publication, Hazardous ground gas - an essential guide for housebuilders, in Type B and Type C membrane locations in reinforced cast in situ concrete floor slabs (ground bearing, suspended or raft).

For site or zone characteristic gas situations of CS4 and above, contact Visqueen Technical Services.

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

System components

- VisqueenPro Double Sided Jointing Tape, 50mm x 10m
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 1500, 1m x 2m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen NF-Detailing Strip, 300mm x 10, 500mm x 10m
- Visqueen NF-150 Lap Tape, 150mm x 10m

Storage and handling

When storing Visqueen Ultimate Gas Barrier NF-600 care should be taken to:
- store in its original packaging;
- avoid exposure to direct sunlight and high or low temperatures for prolonged periods of time;
- store in a well-ventilated covered area to protect from rain, frost, humidity and mechanical damage;
- store away from possible ignition sources;
- store rolls of the barrier horizontally on a flat surface and not stacked.

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