

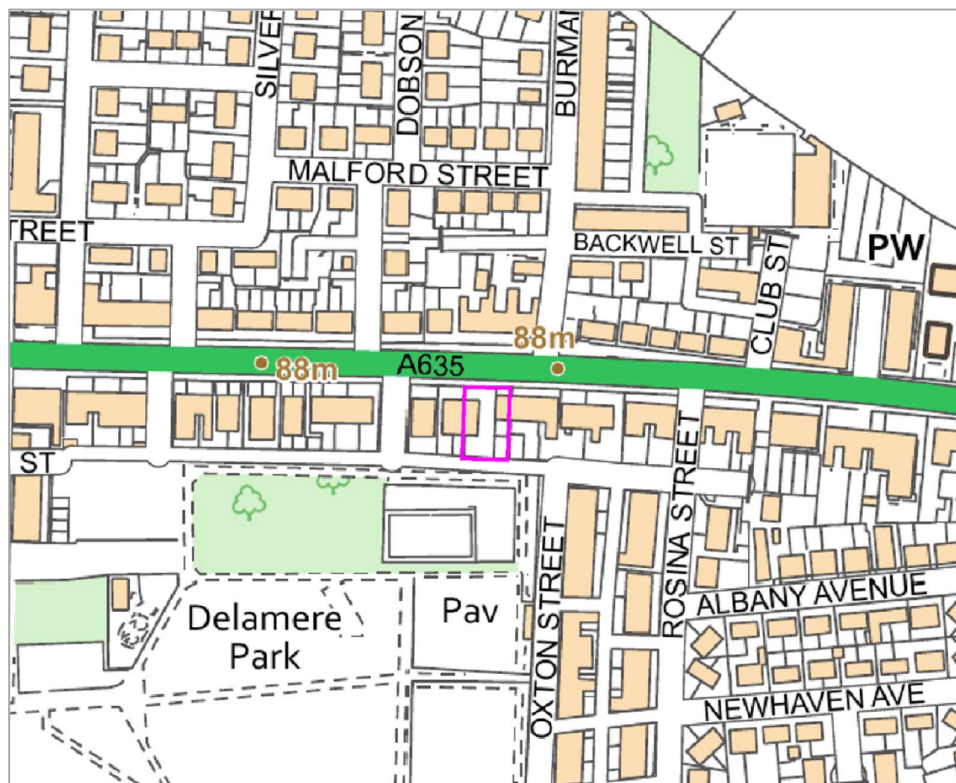
Carley Daines and Partners Limited

Consulting Civil and Structural Engineers

1468 ASHTON OLD ROAD

OPENSHAW

MANCHESTER M11 1HH



SUPPLEMENTARY REPORT ON GAS MONITORING

UNDERTAKEN FOR

MSV HOUSING

Ref:23-B-13881

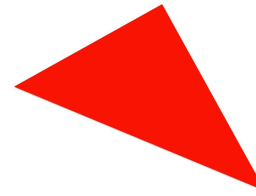
Revision 'B' 5th March 2025

Principal: **D.J. Middleton BEng(Hons) CEng MStructE**

Company Number: **11006567**

Address **11 Bridgewater Road, Walkden, Worsley, Manchester M28 3JE**

VAT Number: **285 0439 91**



SUPPLEMENTARY REPORT ON GROUND GAS MONITORING, PROPOSED DEVELOPMENT AT 1468 ASHTON OLD ROAD, MANCHESTER M11 1HH

INTRODUCTION AND OBJECTIVES

Reference should be made to the Geo-Environmental Report dated 16th October 2023.

This supplementary report deals strictly with ground gas monitoring issues, together with recommendations for the mitigation thereof, in respect of the proposed development.

A full set of ground gas monitoring results were not available at the time of writing the previous report.

GROUND GAS MONITORING

Ground gas measurements were undertaken on 6 occasions (in line with CIRIA 665) between 26th September 2023 and 6th December 2023. A full set of results are included in Appendix A.

The assessment of potential ground gas generation was based on the observation of trends and changes in gas evolution by the direct measurement of ground gases from gas wells. The works included measurement of methane, carbon dioxide, oxygen, hydrogensulphide, carbon monoxide, gas flows and barometric pressure.

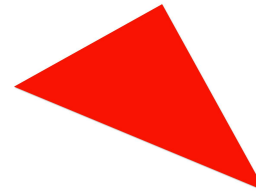
The potential pathways into the building are:

- Horizontal and vertical migration through the ground into the building via cracks in the floor slab or around services.
- lateral migration could occur from the adjacent infilled sites through the shallow made ground deposits and drainage annulus within service trenches.

A summary of the soil gas monitoring results is presented below.

Date	BH	CH4%	CO2%	O2%	Press	Flow l/h	Weather/Temp
26/09/2023	1	0.5	5.3	18.0	1003	0.4	12°C Clear
12/10/2023	1	0.5	4.9	17.3	1003	0.4	12°C Sunny/Clear
25/10/2023	1	0.1	5.1	18.7	989	0.7	8°C Clear
07/11/2023	1	0.0	4.6	17.6	1003	0.6	10°C Overcast/Raining
23/11/2023	1	0.0	4.2	17.9	1012	0.5	12°C Overcast/Windy
06/12/2023	1	0.0	4.8	17.4	1008	0.6	0°C Clear / Frosty

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Gas screening values should be calculated on a borehole basis in the first instance. Consideration of worst case i.e. highest flow and highest concentrations should only be considered if the CSM warrants it. In line with CIRIA 665 Guidance on Methane and Carbon Dioxide, the site is to be developed for residential end use and the ground gas investigation has identified a maximum methane value of 0.5%. Combining this with a maximum flow of 0.7 litres/hr gives a GSV of 0.004, falling within the “Green” category.

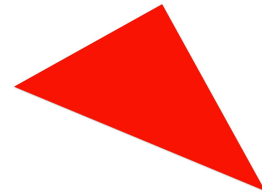
Gas monitoring for carbon dioxide indicated a maximum concentration of 5.3% and when combined with a maximum recorded flow of 0.7 litres/hr gives a GSV of 0.04. Using the NHBC Classification table (refer to Appendix B) This is considered to fall into the "Amber 1" category as the concentration of 5.3% exceeds the 5% upper limit of the “Green” category.

The Phase 1 PRA indicated the site as being in an area unaffected by Radon.

Measurements were undertaken in a variety of atmospheric pressure conditions varying between 989 and 1012 bars. For clarity the monitoring only provides a momentary snapshot of the atmospheric pressure at any particular time, not how pressure is trending. Rising or falling atmospheric pressure has no bearing on the gas protection proposed and it is clearly demonstrated that monitoring occurred in a wide range of pressure situations.

Given the above gas protection measures are recommended for all buildings on site, however the scope of protection measures for each section will be assessed based on the building type and Characteristic Situation. This has been assessed using the matrix presented in BS8485:2015 and is presented in the table below.

Gas protection measures should be installed in accordance with BS8485: 2015. Based on a Type A development and CS2 classification a gas protection score of 3.5 to will need to be achieved.



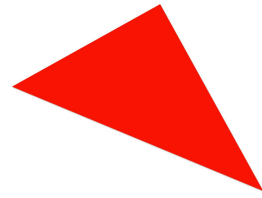
Building Type	Floor Slab Type	Ventilation	Membrane	Required Points Score	Points Achieved
Conventional residential house (Building Type A)	Block and beam suspended floor (0 Points)	Suspended beam and block flooring with suspended ventilated void (2.5 points)	Full gas membrane installed to S8485:2015 and validated to CIRIA 735 (2 points)	3.5	4.5 points

CONCLUSIONS

On the basis of the results, certification of ground gas measures are classified as Situation 2 (Amber 1) conditions. We therefore propose to install the Proctor GM Super Gas Barrier which is suitable for the most high-risk sites as defined by CIRIA, BS8485 & NHBC assessment criteria. The data sheet is attached in Appendix 4.

This solution entails use of a Low Permeability membrane and ventilated sub-floor void which creates a permeability contrast to limit the ingress of gas into buildings. Service entries should be sealed with appropriate Visqueen or similar specialist proprietary equipment.

Gas protection measures should be installed as prescribed in BRE 414 with the ventilation of the sub-floor void designed to provide a minimum of one complete volume change per 24 hours.



APPENDIX A

GAS MONITORING RESULTS

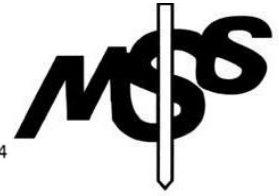
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MINI • SOIL • SURVEYS

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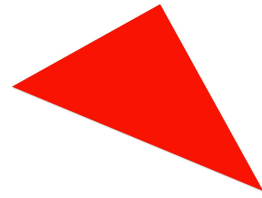
Tel: 0161 980 0044



Gas Monitoring – 1468 Ashton Old Road

Date	BH	CH4%	CO2%	O2%	Press	Flow l/h	Weather/Temp
26/09/2023	1	0.5	5.3	18.0	1003	0.4	12°C Clear
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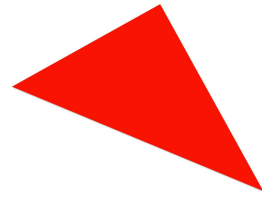


APPENDIX B

NHBC CLASSIFICATION TABLE

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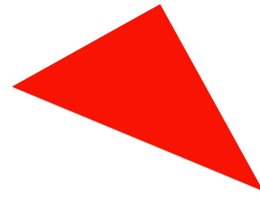
NHBC classification for low rise housing (150 mm void) (Boyle & Witherington, 2007; CIRIA, 2006)				
Traffic Light Classification	Methane		Carbon dioxide	
	Typical maximum concentration (%v/v)	Gas screening value (l/h)	Typical maximum concentration (%v/v)	Gas screening value (l/h)
Green				
	1	0.16	5	0.78
Amber 1				
	5	0.63	10	1.56
Amber 2				
	20	1.56	30	3.10
Red				



APPENDIX C

SUMMARY OF GAS MONITORING

Summary of gas monitoring					
Methane			Carbon dioxide		
Typical maximum concentration (%v/v)	Flow (l/h)	Gas screening value	Typical maximum concentration (%v/v)	Flow (l/h)	Gas screening value
0.5	0.7	0.004	5.3	0.7	0.04



APPENDIX D

PROPOSED MEMBRANE DETAILS

Principal: **D.J. Middleton BEng(Hons) CEng MStructE**
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Protech GM Super

GAS PROTECTION

• HIGH RISK CHARACTERISTIC SITES •

REGULATIONS COMPATIBILITY TABLE

	CIRIA 665 CHARACTERISTIC SITUATION 2	CIRIA 665 CHARACTERISTIC SITUATION 3-6	BS8485 CHARACTERISTIC SITUATION 2	BS8485 CHARACTERISTIC SITUATION 3-6	BRE 211 RADON	NHBC AMBER 1	NHBC AMBER 2 & RED
METHANE	✓	✓	✓	✓	N/A	✓	✓
CARBON DIOXIDE	✓	✓	✓	✓	N/A	✓	✓
RADON	N/A	N/A	N/A	N/A	✓	N/A	N/A

DESCRIPTION

Protech GM Super is a proprietary reinforced gas barrier, that incorporates a 12 micron aluminium foil layer, for maximum protection against ground-borne gases. This specifically conforms with the latest guidance documents. The membrane also provides protection from damp when placed below the slab and, therefore, there is no need to install a separate DPM.

SPECIFICATION

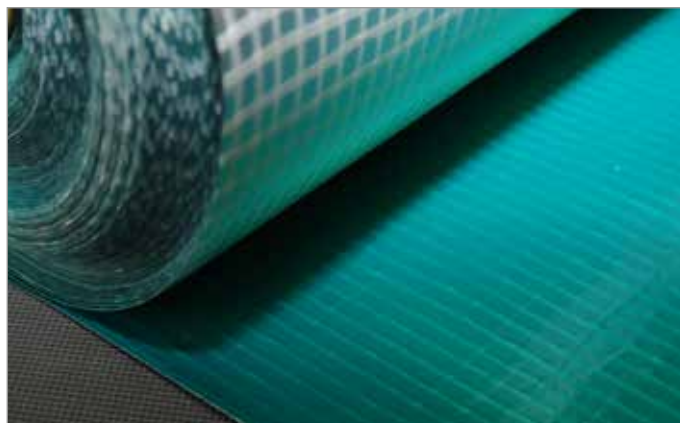
CIRIA C665, BS8485:2015 & Local Authority Ground Gas Handbook recommended that gas membranes are specified on the basis of the 'need to survive' construction, i.e. use one that is puncture and tear resistant.

Thickness should not be the main determinant of the suitability of a membrane for a particular site, although it can indirectly influence some key performance parameters.

In practise, because of the nature of construction sites, the survivability of membranes are equally important than purely permeability to gas.

Protech GM Super incorporates a reinforced grid to ensure that maximum protection is achieved when installed to manufacturers' instructions.

The need for high quality workmanship during installation should not be under-estimated. The health and safety of the occupants of the building is dependent on its satisfactory performance. If installed incorrectly or damaged during the construction process, the membrane is rendered ineffective and will fail to provide adequate protection against the ingress of ground gas or vapours.



TYPICAL PROPERTIES

Roll Length	50m
Width	2m
Weight	370g/m ²
Thickness	0.4mm
Colour	Green / Silver
Methane Permeability (ISO 15105-1)	≤ 0.1 ml/day/m ²

REQUIRED ACCESSORIES

- Protech GM Super Starter Band (1m x 50m)
- Protech GM Tape
- Protech GM Tophats
- Protech SAGM (Self Adhesive Gas Membrane)
- Protech GM Flashing Strip
- Protech GM Super Corner Units
- Protech GM Primer
- Protech GM 3mm Protection Board
- Protech GM Protection Fleece
- Protech I25

VENTING

On sites where venting is required, our Provoid Venting System should be used. We can provide design advice for both passive and active venting systems to suit individual site requirements.

