7293/011A/RJH/rjh

18th November 2024

Mr D Richards
McLaren Property Limited
McLaren House
6090 Knights Court
Birmingham Business Park
Birmingham
B37 7WY

Doc Ref: MAUBS-CLB-XX-XX-RP-OT-000002
Doc Title: Hazardous Gas Risk Assessment
Rev: P01
Status: S2 For Information

Dear David

Upper Brook Street, Manchester M13 9QD - Hazardous Gas Risk Assessment

Further to our Geoenvironmental Appraisal Report (No. 7293/1, dated June 2024), gas monitoring at the above site has now been completed and we are able to issue this supplementary letter report together with copies of the monitoring results. This letter, which should be read in conjunction with Report No 7293/1, reviews soil-gas conditions, assesses risks and details any mitigation measures required to render the site suitable for the proposed development.

Background

The site is located approximately 1.5km south-east of Manchester City Centre and comprises a former Citroen car dealership, MOT testing and servicing centre. A single storey brick and steel clad apparently steel framed building lies in the central area of the site.

The western section of the building comprises the former showroom with first floor offices whilst the eastern section housed workshops used for servicing and vehicle testing. The building has a concrete floor, and vehicles were accessed via hydraulic lifts rather than pits.

External areas are all tarmac surfaced. In the north lies a small lean-too building formerly used for car cleaning and valeting.

Consideration of the conceptual site model and potential linkages has enabled a preliminary qualitative assessment of risks associated with gas:

Source	Receptors	Hazard	Pathway	Initial Risk
On-site and possible off-site made ground	Human Health	Asphyxiation & explosion.	Vertical migration, ingress & accumulation	**Very Low**: made ground essentially inert, with little degradable matter.

Given the above, gas monitoring wells have been installed in four shallow boreholes across the site. Details of the individual installations are provided in Report No 7293/1.

Consideration is being given to redevelopment of the site with two blocks of student accommodation of twenty-two and eleven storeys with a single storey podium linking them together. A proposed site layout has been provided by McLaren and is copied as Drawing 7293/2 in Report No 7293/1.

The structures will be founded on or in the Chester Formation sandstone at depth either on deep pad or short piled foundations.

Scope of Works

The generation potential of the gas source was initially considered to be Low and this has been confirmed by the monitoring results obtained. Consequently, in accordance with CIRIA Report C665, given the proposed residential end use, six visits have been completed over a six month period, between May and October 2024.

A standard procedure was followed in accordance with CIRIA guidance; this procedure involved measurement, in the following order of:

- Atmospheric temperature, pressure and ambient oxygen concentration on site immediately prior to and on completion of monitoring;
- methane, oxygen and carbon dioxide concentrations and flow rates using a Geotechnical Instruments GA5000 infra-red gas analyser; and,
- standing water level using a dipmeter.

Gas Monitoring Results

The monitoring results are enclosed and summarised below:

Monitoring Well	Response Zone	Range of Methane Concentrations (% v/v)	Range of Carbon Dioxide Concentrations (% v/v)	Range of Steady Flow Rates (litre/hour)
BH101	1.0m to 3.7m (Glacial Deposits)	0.0 to 0.1	0.0 to 1.1	0.1 to 0.4
BH103	1.0m to 3.0m (Glacial Deposits)	0.0	0.0 to 2.1	0.1 to 0.5
BH104	1.0m to 3.0m (Glacial Deposits)	0.0	0.4 to 8.7	0.1 to 0.5
BH106	1.0m to 3.0m (Glacial Deposits)	0.0 to 1.1	2.6 to 13.5	0.1 to 0.4

Note: Atmospheric pressures varied between 990mb and 1066mb.

In accordance with the DETR approach, a default value of 0.1 litres/hour has been used in the absence of any recorded flows; i.e. the limit of detection of the flow rate equipment.

During four of the six monitoring visits, atmospheric pressure was falling, including one where the pressure was below 1000mb. Plots of atmospheric pressure versus time, with the monitoring visits indicated, are appended to this letter report.

Current Gas Regime

The proposed student residential redevelopment comprises two blocks of twenty-two and eleven storeys. Consequently, the gas regime has been characterised in accordance with the Situation A (Wilson & Card) methodology outlined in CIRIA Report C665.

Based on worst-case gas concentrations and flows, Gas Screening Values (GSVs) for Methane and Carbon Dioxide are 0.01 and 0.07 respectively. These GSVs equate to CHARACTERISTIC SITUATION 1 (CS1).

However, giving consideration to additional factors, most notably elevated concentrations of carbon dioxide (up to 13.5%), suggests the site's classification should be raised to CHARACTERISTIC SITUATION 2 (CS2).

Protection Measures

Based on the site characterisation discussed above, the proposed foundation solution, and with reference to the gas protection "scoring" system outlined in BS 8485:2015 + A1:2019 for Building Type Building Type C[1], Calabrian consider that the following protective measures should be incorporated in all new structures:

Characteristic Situation (Wilson & Card, 1999)	Gas "score" req'd by BS 8485	Protective Measures		
		Floor Slab (BS8485 "score")	Sub-floor ventilation (BS8485 "score")	Membrane Type (BS8485 "score")
2	2.5 (Type C)	'Beam and Block' segmental suspended subfloor – **(0)**. Reinforced ground bearing slab – **(0.5)**. Reinforced, cast in-situ suspended slab (well reinforced with minimal service penetrations & water bars around all slab penetrations & at joints) – **(1.5)**. Basement floor and walls conforming to BS8102:2009, Grade 2 waterproofing – **(2.0)**. Basement floor and walls conforming to BS8102:2009, Grade 3 waterproofing – **(2.5)**.	Layer of low permeability and/or is not terminated in a venting trench (or similar). **(0)** Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building) - **(0.5)**. For smaller commercial units, passive sub-floor ventilation; venting layer could be: i. A min. 200mm clear void **(2.5)**, or ii. A proprietary void former (expanded polystyrene shuttering) providing an equivalent clear void depth of 60mm **(2.5)**, or iii. Min. 300mm thick blanket of 20mm single size gravel, not MOT Type 1 **(0.5)**. Min. ventilation = 2,500 mm^2/m run of external wall (via air bricks on each of 2 opposite sides), with 100mm pipes at 2m centres or honeycombing of any sub-floor sleeper walls.	Gas resistant membrane meeting criteria of Table 7 BS8485:2019 with verification in accordance with CIRIA C735 [N1]. **(2.0)** ***Vented CS2 this will comprise independent visual inspection. ***Unvented this will comprise independent visual inspection and air lance integrity testing.

[1] ***Type C building***: *commercial building with central building management control of any alterations to the building or its uses and central building management control of the maintenance of the building, including the gas protection measures. Single occupancy of ground floor and basement areas. Small to large size rooms with active ventilation or good passive ventilation of all rooms and other internal spaces throughout ground floor and basement areas. Probably civil engineering construction. Examples include offices, some retail premises, and parts of some public buildings (such as schools, hospitals, leisure centres and parts of hotels).*

Should you require any further information, please contact the undersigned.

[redacted]

Richard Hey - Managing Director
for and on behalf of
CALABRIAN LIMITED

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Hazardous Gas Monitoring Results
Plot of Atmospheric Pressure Trend
Gas Monitor Calibration Certification

Calabrian Limited
9 Millwood | Ingleton | LA6 3HY | Tel: 07957 335307
email: info@calabrian.co.uk

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	20/05/2024
Start/Finish Time	09:10 - 09:45
Operator	RJH

Weather	
Raining/Dry	Dry
Cloud Cover (%)	10
Temperature (°C)	16
Pressure (mb)	1008
Weather Station Trend	Falling

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.0	0.1	0.0	0.1	21.0	0.4	0.4		
BH103		Dry	0.0	2.1	0.0	2.1	19.0	0.5	0.5		
BH104		Dry	0.0	0.4	0.0	0.4	20.5	0.5	0.5		
BH106		Dry	0.0	2.6	0.0	2.6	16.6	0.4	0.4		

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	14/06/2024
Start/Finish Time	1110 - 1125
Operator	RJH

Weather	
Raining/Dry	Damp
Cloud Cover (%)	80
Temperature (°C)	16
Pressure (mb)	990
Weather Station Trend	Falling

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.0	0.1	0.0	0.1	21.0	0.1	0.1		
BH103											No access within the building.
BH104		Dry	0.0	3.6	0.0	3.6	18.6	0.2	0.2		
BH106		Dry	0.0	4.6	0.0	4.6	17.9	0.1	0.1		

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	27/07/2024
Start/Finish Time	1435 - 1455
Operator	RJH

Weather	**Start**
Raining/Dry	Dry
Cloud Cover (%)	10
Temperature (°C)	18
Pressure (mb)	1006
Weather Station Trend	Rising

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.0	0.3	0.0	0.3	20.1	0.1	0.1		
BH103											No access within the building.
BH104		Dry	0.0	**5.2**	0.0	**5.2**	17.2	0.1	0.1		
BH106		Dry	0.0	**10.1**	0.0	**10.1**	**8.2**	0.1	0.1		

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	24/08/2024
Start/Finish Time	1050 - 1115
Operator	RJH

Weather	**Start**
Raining/Dry	Rain
Cloud Cover (%)	100
Temperature (°C)	15
Pressure (mb)	996
Weather Station Trend	Rising

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.0	1.1	0.0	1.1	17.3		0.0		
BH103											No access within the building.
BH104		Dry	0.0	**8.8**	0.0	**8.7**	10.3		0.2		
BH106		Dry	**1.1**	**13.5**	**1.1**	**13.5**	**2.2**		0.0		

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	20/09/2024
Start/Finish Time	1500 - 1520
Operator	RJH

Weather	**Start**
Raining/Dry	Dry
Cloud Cover (%)	0
Temperature (°C)	15
Pressure (mb)	1015
Weather Station Trend	Falling

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.0	0.9	0.0	0.9	19.2		0.0		
BH103											No access within the building.
BH104		Dry	0.0	**6.1**	0.0	**6.1**	10.3		0.2		
BH106		Dry	0.0	**9.2**	0.0	**9.2**	**6.4**		0.0		

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

GAS & GROUNDWATER MONITORING

Project Name	Upper Brook Street, Manchester M13 9QD
Project Number	7293
Client	Mclaren Property
Date	24/10/2024
Start/Finish Time	1350 - 1410
Operator	RJH

Weather	**Start**
Raining/Dry	Dry
Cloud Cover (%)	10
Temperature (°C)	14
Pressure (mb)	1066
Weather Station Trend	Falling

Key	
ND	None Detected
NR	Not Recorded
1.0	Recorded value does not breach trigger levels
5.0	Recorded value breaches trigger level 1
10.0	Recorded value breaches trigger level 2

Monitoring Point	Base of well	Groundwater level	Concentrations					Gas Flow Rates			Remarks
			Initial / Highest		Steady		Lowest	Initial / Maximum	Steady	Time to fall from highest to steady	
			CH_4	CO_2	CH_4	CO_2	O_2				
	m	(m) bgl	% v/v	(%)	% v/v	(%)	(%)	litre/hr	litre/hr	secs	
BH101		Dry	0.1	0.3	0.1	0.3	20.2				
BH103											No access within the building.
BH104		Dry	0.0	**6.9**	0.0	**6.9**	10.3				
BH106		Dry	0.1	**11.5**	0.0	**11.5**	**4.7**				

Equipment:
Gas Data GFM430 Infrared Gas Analyser
Geotechnical Instruments Dipmeter

	CH_4	CO_2	O_2
Trigger level 1	1	5	16
Trigger level 2	5	10	10

SUMMARY OF HAZARDOUS GAS MONITORING RESULTS

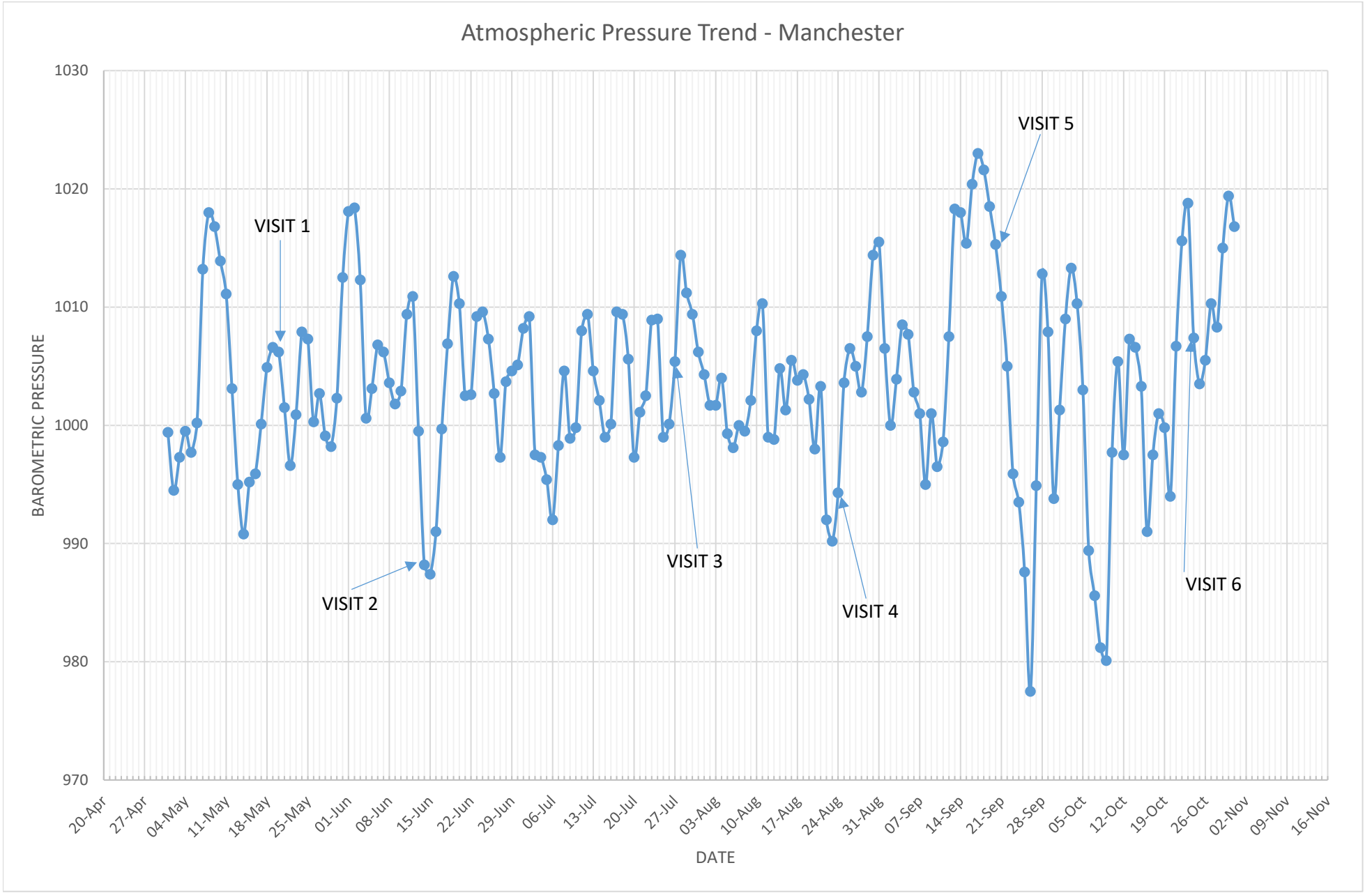
Max. recorded steady concentration of methane (any borehole)	1.1	%
Max. recorded steady concentration of carbon dioxide (any borehole)	13.5	%
Max. recorded peak concentration of methane (any borehole)	1.1	%
Max. recorded peak concentration of carbon dioxide (any borehole)	13.5	%
Max. recorded peak gas flow (any borehole)	0.5	l/hr (default 0.1)
Max. recorded steady gas flow (any borehole)	0.5	l/hr (default 0.1)
Site GSV for methane (based on peak flows & peak concentrations)	0.01	litre/hr
Site GSV for carbon dioxide (based on peak flows & peak concentrations)	0.0675	litre/hr
Site GSV for methane (based on steady flows & peak concentrations)	0.0055	litre/hr
Site GSV for carbon dioxide (based on steady flows & peak concentrations)	0.0675	litre/hr
Max. recorded GSV for methane in any one borehole	0.0044	litre/hr
Max. recorded GSV for carbon dioxide in any one borehole	0.0540	litre/hr

CLASSICATION	
C665 Traffic Light	
AMBER1	
AMBER2	
AMBER1	
AMBER2	
	Wilson & Card
GREEN	CS1
GREEN	CS1
GREEN	CS1
GREEN	CS1
GREEN	CS1
GREEN	CS1

Barometric Pressure		
Visit	Average	Trend
Visit 1	1008	Falling
Visit 2	990	Falling
Visit 3	1006	Rising
Visit 4	996	Rising
Visit 5	1015	Falling
Visit 6	1066	Falling

Visit	Exp Hole	GWL	Concentrations					Gas Flow Rates			Gas Screening Value (GSV)		Surface Gas Emission Rate	
			Initial\Highest		Steady		Lowest O_2	Initial	Steady	Time to fall from highest to steady	CO_2	CH_4%V/V	CO_2	CH_4%V/V
			CH_4 (% v/v)	CO_2 (%)	CH_4 (% v/v)	CO_2 (%)	(%)	(litre/hr)	(litre/hr)	(secs)	(litre/hr)	(litre/hr)	($m^3/m^2/hr$)	($m^3/m^2/hr$)
											Diameter of monitoring well (mm)			50
Visit 1	BH101	Dry	0.0	0.0	0.0	0.0	21.0	0.4	0.4	0.0				
Visit 2	BH101	Dry	0.0	0.1	0.0	0.1	21.0	0.1	0.1	0.0				
Visit 3	BH101	Dry	0.0	0.3	0.0	0.3	20.1	0.1	0.1	0.0				
Visit 4	BH101	Dry	0.0	1.1	0.0	1.1	17.3	0.1	0.1	0.0				
Visit 5	BH101	Dry	0.0	0.9	0.0	0.9	19.2	0.1	0.1	0.0				
Visit 6	BH101	Dry	0.1	0.3	0.1	0.3	20.2	0.1	0.1	0.0				
											Diameter of monitoring well (mm)			50
Visit 1	BH103	Dry	0.0	2.1	0.0	2.1	19.0	0.5	0.5	0.0				
Visit 2	BH103	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
Visit 3	BH103	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
Visit 4	BH103	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
Visit 5	BH103	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
Visit 6	BH103	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0				
	Max	0.0	0.0	2.1	0.0	2.1	19.0	0.5	0.5		0.0105	0.0000	1.05E-06	0.00E+00

Visit	Exp Hole	GWL	Concentrations					Gas Flow Rates			Gas Screening Value (GSV)		Surface Gas Emission Rate	
			Initial\Highest		Steady		Lowest O_2	Initial	Steady	Time to fall from highest to steady	CO_2	CH_4%V/V	CO_2	CH_4%V/V
			CH_4 (% v/v)	CO_2 (%)	CH_4 (% v/v)	CO_2 (%)	(%)	(litre/hr)	(litre/hr)	(secs)	(litre/hr)	(litre/hr)	($m^3/m^2/hr$)	($m^3/m^2/hr$)
											Diameter of monitoring well (mm)			50
Visit 1	BH104	Dry	0.0	0.4	0.0	0.4	20.5	0.5	0.5	0.0				
Visit 2	BH104	Dry	0.0	3.6	0.0	3.6	18.6	0.2	0.2	0.0				
Visit 3	BH104	Dry	0.0	5.2	0.0	5.2	17.2	0.1	0.1	0.0				
Visit 4	BH104	Dry	0.0	8.8	0.0	8.7	10.3	0.1	0.2	0.0				
Visit 5	BH104	Dry	0.0	6.1	0.0	6.1	10.3	0.1	0.2	0.0				
Visit 6	BH104	Dry	0.0	6.9	0.0	6.9	10.3	0.1	0.1	0.0				
	Max		0.0	0.0	8.8	0.0	8.7	20.5	0.5	0.5	0.0440	0.0000	4.40E-06	0.00E+00
											Diameter of monitoring well (mm)			50
Visit 1	BH106	Dry	0.0	2.6	0.0	2.6	16.6	0.4	0.4	0.0				
Visit 2	BH106	Dry	0.0	4.6	0.0	4.6	17.9	0.1	0.1	0.0				
Visit 3	BH106	Dry	0.0	10.1	0.0	10.1	8.2	0.1	0.1	0.0				
Visit 4	BH106	Dry	1.1	13.5	1.1	13.5	2.2	0.1	0.1	0.0				
Visit 5	BH106	Dry	0.0	9.2	0.0	9.2	6.4	0.1	0.1	0.0				
Visit 6	BH106	Dry	0.1	11.5	0.0	11.5	4.7	0.1	0.1	0.0				
	Max		0.0	1.1	13.5	1.1	13.5	17.9	0.4	0.4	0.0540	0.0044	5.40E-06	4.40E-07


Atmospheric Pressure Trend - Manchester
BAROMETRIC PRESSURE
1030
1020
1010
1000
990
980
970
VISIT 1
VISIT 2
VISIT 3
VISIT 4
VISIT 5
VISIT 6
20-Apr
27-Apr
04-May
11-May
18-May
25-May
01-Jun
08-Jun
15-Jun
22-Jun
29-Jun
06-Jul
13-Jul
20-Jul
27-Jul
03-Aug
10-Aug
17-Aug
24-Aug
31-Aug
07-Sep
14-Sep
21-Sep
28-Sep
05-Oct
12-Oct
19-Oct
26-Oct
02-Nov
09-Nov
16-Nov
DATE

CERTIFICATION OF CALIBRATION

PJLA Calibration No. 66916

QED

Date Of Calibration: 15-Mar-2024

Certificate Number: G500452_9/34948

Issued by: QED Environmental Systems Inc.

Customer: **CALABRIAN LIMITED**
9 MILLWOOD INGLETON, LA6 3HY GB

Description:

Model: GA5000

Serial Number: G500452

Accredited Results:

Methane (CH4)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.1	5.0	0.42
15.0	14.9	0.66
60.0	59.8	1.03

Carbon Dioxide (CO2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.0	5.0	0.43
15.2	15.1	0.71
40.0	40.1	1.19

Oxygen (O2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
20.9	21.0	0.25

Gas cylinders are traceable and details can be provided if requested.

CH4, CO2 readings recorded at: 31.6 °C/88.8 °F

O2 readings recorded at: 22.3 °C/72.2 °F

Barometric Pressure: 0981 mbar/28.96 "Hg

Method of Test : The analyzer is calibrated in a temperature controlled chamber using a series of reference gases, in compliance with procedure ISP17.

Instrument has passed calibration as the measurement result is within the specification limit. The specification limit takes into account the measurement uncertainty.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

www.qedenv.com (800) 624-2026 info@qedenv.com

QED Environmental Systems Inc. 2355 Bishop Circle West, Dexter, MI 48130

CERTIFICATION OF CALIBRATION

PJLA Calibration
No. 66916

Date Of Calibration: 15-Mar-2024

Certificate Number: G500452_9/34948

Issued by: QED Environmental Systems Inc.

Non Accredited results:

Pressure Transducers (inches of water column)					
Transducer	**Certified (Low)**	**Reading (Low)**	**Certified (High)**	**Reading (High)**	**Accuracy**
Relative	0"	0"	40"	40.35"	2.0"

Barometer (mbar)	
Reference	**Instrument Reading**
0981 mbar / 28.96 "Hg	0982 mbar / 28.99 "Hg

Additional Gas Cells		
Gas	**Certified Gas (ppm)**	**Instrument Reading (ppm)**
CO	500	491
H_2S	252	252

As received gas check readings:

Methane (CH4)	
Certified Gas (%)	**Instrument Reading (%)**
5.1	6.1
15.0	16.7
60.0	63.6

Carbon Dioxide (CO2)	
Certified Gas (%)	**Instrument Reading (%)**
5.0	5.6
15.2	16.2
40.0	42.4

Oxygen (O2)	
Certified Gas (%)	**Instrument Reading (%)**
21.5	21.6

As received Gas readings recorded at: 31.6 °C/88.8 °F

As received Barometric Pressure recorded at: 22.3 °C/72.2 °F

As received gas check readings are only recorded if the instrument is received in a v
Where the instrument is received damaged no reading can be taken.

[redacted]

Date of Issue : 20 Mar 2024 Approved By Signatory

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable through NIST to the International System of Units (SI). Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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