Our Ref C2113/21/E/GM
12th September 2022

North Park (Shelley) Ltd,
West House,
Kings Cross Rd,
Halifax
HX1 1EB

For the attention of Ben Marsden,

Dear Ben,

Ref: Gas monitoring at Site A & Site B, Yew Tree Road, Birchencliffe

Further to our reports on the geo-environmental investigations at the above mentioned sites (C2113/21/E/3266 & C2113/21/E/3374) which were presented in July 2022, we have now completed the gas monitoring and present our findings.

Gas Monitoring

Gas monitoring standpipes were installed within WS01, WS03, WS05, WS08 and WS10, the locations of which are provided on the site plans presented as Appendix 1 in the geo-environmental reports. Visits were made to site from the 14th April to the 13th of July 2022, when the gas standpipes were monitored. The results of this work are tabulated below.

Table 1: Gas Monitoring

Location	Date	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow	Barometric Pressure (mb)	Water Level (m)	Standpipe Depth (m)
WS01	14.04.22	0.1	1.3	20.4	0.2	1001↑	0.97	3.1
	22.04.22	0.1	1.4	20.5	0.4	992↓	0.95	
	29.04.22	0.1	1.4	20.7	0.0	1012↓	1.13	
	06.05.22	0.1	1.7	20.1	0.1	1002↓	1.26	
	21.06.22	0.1	6.9	15.3	0.0	994↔	1.98	
	13.07.22	0.1	4.1	19.8	0.0	1002↔	2.35	
WS03	14.04.22	0.1	0.9	19.3	2.1	1001↑	0.95	2.1
	22.04.22	0.1	0.6	21.2	1.2	993↓	0.20	
	29.04.22	0.1	4.0	21.2	0.0	1013↓	0.31	
	06.05.22	0.1	0.9	20.5	0.0	1003↓	0.49	
	21.06.22	0.0	1.2	19.8	0.4	994↔	1.00	
	13.07.22	0.1	1.5	20.4	0.0	1003↔	1.54	
WS05	14.04.22	0.1	0.4	20.8	0.2	1001↑	0.65	3.0
	22.04.22	0.1	0.2	20.8	0.2	993↓	0.63	
	29.04.22	0.1	0.6	20.9	0.1	1013↓	0.77	
	06.05.22	0.1	0.6	20.5	0.2	1003↓	1.11	
	21.06.22	0.0	2.8	17.3	0.0	995↔	1.68	
	13.07.22	0.1	1.6	20.5	0.0	1003↔	2.91	

WS08	14.04.22	0.1	1.2	19.1	0.0	1002↑	_	1.5
	22.04.22	0.1	3.1	18.8	0.0	993↓	1.38	
	29.04.22	0.1	4.0	18.3	0.0	1013↓	_	
	06.05.22	0.1	4.2	17.9	0.1	1004↓	_	
	21.06.22	0.0	3.4	18.0	0.0	995↔	_	
	13.07.22	0.1	2.7	19.4	0.0	1004↔	_	
WS10	14.04.22	0.1	0.9	19.2	0.0	1002↑	3.38	3.9
	22.04.22	0.1	1.2	18.8	0.0	993↓	3.30	
	29.04.22	0.1	1.6	18.3	0.0	1013↓	3.46	
	06.05.22	0.1	2.2	16.5	0.1	1003↓	3.46	
	21.06.22	0.0	2.1	7.3	0.0	995↔	_	
	13.07.22	0.1	1.0	20.2	0.0	1004↔	_	

↑ - rising pressure ↓ - falling pressure ↔ -steady pressure

To conclude, these results do not materially alter the remedial recommendations provided in the geo-environmental report and subsequent remediation statement (C2113/21/E/4366). Therefore, the site can be fully characterised as Characteristic Situation Level 2 and gas protection measures should be installed.

Verification Report

In order to demonstrate that the provision of a gas barrier has been sufficiently carried out, it will be necessary to produce a verification report for submission to any statutory authorities. It should be appreciated that the inspection should be undertaken by an independent third party; this should not be the gas membrane installation contractor. This report should be produced by a suitably qualified engineer and may require inspections, along with a photographic record, to take place during the installation process.

References

- British Standards Institution (2013), BS 8576 Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds.
- British Standards Institution (2015 +A1:2019) BS8485: *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings,* B.S.I., London.
- CIRIA Report C665, *Assessing risks posed by ground gasses to building.*
- CIRIA Report C735 *Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.*

We trust that this information is of interest and should you have any other requirements do not hesitate to contact us.

For Rogers Geotechnical Services Ltd,
Yours Faithfully

Rob Palmer
Senior Geo-environmental Engineer MSc FGS ACIEH

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