

Our Ref: KB/60275

Your Ref:

30 April 2020

Tendring District Council
Town Hall
Station Road
Clacton on Sea
Essex
CO15 1SE

Dear Sir/Madam

Re: Starlings, Dovercourt - Gas Monitoring

As you are aware ground gas monitoring has been on-going at the Starlings site, Milton Road, Dovercourt, Harwich, Essex, CO12 3EQ. Provisional results of the monitoring were provided in our ground investigation report, reference 60275, dated January 2020.

The proposed scheme is understood to comprise redevelopment of the subject site to provide surface car parking together with the construction of a public toilet and small areas set to soft landscaping.

This letter report presents the results of the gas monitoring completed on 16 April 2020.

Gas Monitoring

Semi-permanent gas monitoring standpipes were installed in 3no. small diameter windowless sampler (WLS) boreholes (WS03, WS04 & WS05), for use in the monitoring of potentially hazardous ground gases. Monitoring wells were installed in accordance with the methodologies detailed in BS 8576: 2013, 'Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)'. Drawing no. 60275-G-Fig 02, enclosed, indicates the location of the monitoring standpipes with respect to the existing site layout.

The wells were monitored on six occasions over a period of three months, at a range of atmospheric and weather conditions in line with current guidelines as given in CIRIA document 665, 'Assessing risk posed by hazardous ground gases to buildings', (2007).

The standpipes have been monitored for the presence of methane, carbon-dioxide and oxygen using an infra-red portable gas analyser, the calibration certificate for which is included with this letter. Ground gas flow, atmospheric pressure, standing water levels (SWL) and measurements to the base of the well installations were also recorded during each visit.

Cont'd.../



also at: London [redacted] Cambridge [redacted] Bristol [redacted] and
Norwich [redacted]
Richard Jackson is a trading name of Richard Jackson Ltd. Registration No. 2744316 England.
Registered Office 847 The Crescent, Colchester, CO4 9YQ.

847 The Crescent,
Colchester, Essex CO4 9YQ

Telephone: [redacted]

A photo-ionisation detector (PID) was also used during each of the 6no. monitoring visits, to monitor potential volatile organic compound (VOC) concentrations at the site. The calibration certificate for the PID is also enclosed.

Table 1, provides a summary of the gas monitoring results. The full results of the gas monitoring programme are enclosed.

Table 1: Summary of Gas Monitoring Results

Borehole No.	Range of Peak CO₂ conc. (%v/v)	Range of Peak CH₄ conc. (%v/v)	Range of O₂ conc. (% v/v)	Range of VOC conc. (ppm)	Range of Steady Flow Rates (l/hr)
WS03	1.7 – 2.3	0.0 – 6.6*	10.2 – 19.8	0.0	0.0
WS04	1.9 – 3.1	0.0	16.2 – 17.9	0.0	0.0
WS05	0.4 - 1.2	0.0 – 1.2*	19.6 – 20.5	0.0	0.0

Bold denotes worst case reading
 *Peak CH₄ concentrations only recorded momentarily; concentrations generally recorded at 0.0%v/v for duration of monitoring.

Flow rates were briefly recorded in WS03; these have been attributed to fluctuations in groundwater level and have been discounted.

Gas Protection Measures

Gas monitoring results has recorded carbon-dioxide concentrations of up to 3.1%v/v, methane concentrations momentarily peaking at 6.6%v/v, and depleted oxygen concentrations as low as 10.2%v/v. No VOC concentrations or steady flow rates were detected.

Carbon-dioxide is a heavier gas than air, which affects the respiratory and central nervous systems. It can cause unconsciousness at concentrations of 5% by volume and death at concentrations of 10% to 15% by volume. Methane is a flammable asphyxiant gas, which is within explosive limits of 5% to 10% by volume in air.

Table 8.5 of CIRIA Report 665 (2007) provides information on current UK practice with respect to gas control measures based upon a Gas Screening Value (GSV). It should be noted that this document only provides guidance with respect to bulk ground gases carbon-dioxide and methane), it does not include guidance relevant to VOC.

A GSV is calculated by multiplying the maximum concentration of gas by the maximum flow rate recorded at the site. As no steady gas flow rates have been detected at the site minimum detection limit for the analyser of 0.1l/hr has been adopted.

The following GSV have been calculated on the basis of the results recorded:

- Carbon dioxide GSV = 0.0031l/hr
- Methane GSV = 0.0066l/hr

For the purposes of characterising the site the more conservative GSV for methane of 0.0066 has been adopted.

The calculated GSV typically corresponds to a characteristic situation 1 (CS-1). Typically, where carbon dioxide concentrations exceed 5%v/v or where methane concentrations exceed 1%v/v, consideration is given to the adoption of a CS-2, which is recommended for adoption at the site.

A CS-2 classification requires the adoption of protective measures to mitigate the risks posed by ground gases. Reference should be made to British Standard 8485:2015+A1:2019, 'Code of Practice for the Design of Protective Measures for Methane and Carbon-dioxide ground gases for New Buildings', to determine which protective measures are appropriate for adoption in the proposed scheme.

Typically protective measures for a CS-2 will include:

- The installation of a gas resistant membrane, the type is dependent on the proposed building construction;
- All joints and penetrations to be sealed;
- The provision of underfloor venting.

It is recommended that CIRIA Report No. C735 (2014), 'Good Practice on the Testing and Verification of Protective Systems for Buildings Against Hazardous Ground Gases' is consulted for guidance on the testing and verification of gas protection measures which are to be installed.

It should be noted that depleted oxygen concentrations as low as 10.2% were also recorded at the site. Excavations should therefore be monitored for the presence of anoxic/explosive gases prior to entry by operative during the development works, to ensure that safe working conditions are maintained throughout.

General

We trust that the above is clear and acceptable, however, should you have any further questions or queries please do not hesitate to contact us.

Yours sincerely



Katherine Brightwell
on behalf of Richard Jackson Limited

Enc. Figure 1 – Site Location Plan
Figure 2 – Exploratory Hole Location Plan
Gas Monitoring Results
Calibration Certificates