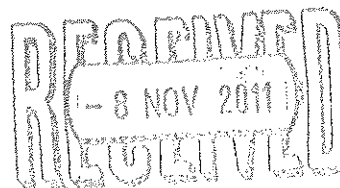


Our ref: NPT/JL/SH10753/Let-003

7 November 2011

Your ref:



Mark Bray
Bellway Homes Ltd (Yorkshire Division)
2 Deighton Close
Wetherby
West Yorkshire
LS22 7GZ

Email and Post

Dear Mark

**END OFF DODWORTH ROAD, BARNSELY
REVISED GROUND GAS ASSESSMENT**

We have completed the three final rounds of ground gas monitoring at the above site following the submission of our Phase II Site Investigation report in September 2011 and our updated ground gas assessment is presented below.

Gas Monitoring Wells

One gas monitoring well was installed at the site during site investigation works by Wardell Armstrong in August 2011. A preliminary ground gas assessment was presented in our Phase II Site Investigation Report SH10753-RPT-002 dated September 2011. Data has now been collated for six rounds of ground gas monitoring at the site from over a period of three months and this is summarised below in Table I and the data is attached as Annex I.

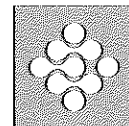
Revised Ground Gas Assessment

The ground gas assessment has been undertaken using both the NHBC Traffic light assessment for low rise housing (constructed with a ventilated underfloor void (CIRIA 665 Situation B)).

The NHBC 'Traffic Lights' ground gas assessment is a risk-based approach that is designed to allow quick and easy design of gas protection for a low-rise housing development by comparing the measured gas emission rates to generic Traffic Lights. The Traffic Lights include 'Typical Maximum Concentrations' and risk-based Gas Screening Values (GSVs) that can be compared with measured data and calculated GSVs.

Table I						
Bore-hole	Response Zone/Strata	No. Tests	CO ₂ (%)	CH ₄ (%)	Flow (l/hr)	Atmospheric Pressure
BH01	MG	6	0-4.8	0.0 – 0.1	-0.1 to 0.1	977-1016





Only a very minor methane concentration was detected at 0.1% during one visit. Carbon dioxide was detected to a maximum concentration of 4.8%. Flow rates for the borehole ranged between -0.1 and 0.1 l/hr. Barometric pressures ranged from 977mb to 1016mb and 4 visits were carried out at a low or falling atmospheric pressure.

Using the NHBC 'Traffic Lights' classification system (CIRIA 665 Situation B) and based on the current monitoring results, a GSV of 0.0048 l/hr has been calculated. This corresponds to Green.

Ground Gas Protection Measures

Based on the gas monitoring data undertaken at the site, the ground conditions are classified as Green and therefore, no special precautions would be required. However, more extensive ground gas monitoring has been undertaken on the adjacent land to the north west which has a shared past historical use and it is considered appropriate to consider the ground gas conditions of this land which were characterised as Amber 1 based on elevated carbon dioxide concentrations.

Therefore it is considered prudent to characterise the site as Amber 1 based on the adjacent land ground gas conditions and the general scope of gas protection measures required is likely to include:

- Reinforced concrete cast in situ floor slab (suspended, nonsuspended or raft) with at least 1200g DPM and underfloor venting;
- Beam and block or pre-cast concrete and 2000g DPM reinforced gas membrane and underfloor venting; and
- All joints and penetrations sealed.

For the Amber 1 classification, the NHBC guidance (Table 14.2) states, "Low-level ground gas protection measures are required, using a membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours".

We trust that the above is suitable for your requirements. Please contact us if you have any queries or wish to discuss the assessment further.

Yours sincerely

for Wardell Armstrong LLP

N P TOVEY

Director

ntovey@wardell-armstrong.com

enc. Annex 1 – Gas Monitoring data – Wardell Armstrong, 2011

RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 5/8/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.0	0.0	19.6	0.0	Acc.	997	-0.02	DRY @ 8.5m

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: n/a

Sample Type: As indicated

Weather: Warm and sunny

Operator: M Kelly

Notes:	
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RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 9/9/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.0	1.9	18.5	-0.1	Acc.	991	+2.32	7.43

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: Falling

Sample Type: As indicated

Weather: Warm and sunny

Operator: J A Shaw

Notes:	
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RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 12/9/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.0	2.4	18.4	+0.1	Acc.	977	-0.1	7.39

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: n/a

Sample Type: As indicated

Weather: Windy

Operator: J A Shaw

Notes:	
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RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 14/10/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.1	4.8	15.8	-0.1	Acc.	1016	-0.13	7.34

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: n/a

Sample Type: As indicated

Weather: Dry and cool and cloudy

Operator: J Lymer

Notes:	
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RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 17/10/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.0	1.1	19.0	+0.1	Acc.	988	-0.36	7.35

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: n/a

Sample Type: As indicated

Weather: Raining, cold and windy

Operator: J Lymer

Notes:	
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RECORD OF MEASUREMENTS FOR GAS MONITORING BOREHOLES

Client Name: Bellway Homes

Date of Sampling: 21/10/2011

Site Name: Polar Ford Extension Site

Job Number: SH10753

Borehole Ref.	CH ₄ % by Volume	CO ₂ % by Volume	O ₂ % by Volume	Flow Rate l/hr	Sample Type	Barometric Pressure (mb)	Relative Pressure (mb)	Depth to Water (m bgl)
BH1	0.0	4.2	16.5	+0.1	Acc.	1005	-0.36	7.32

Atmospheric Pressure: As indicated

Instrument Used: Infrared GA 2000

Pressure Trend: n/a

Sample Type: As indicated

Weather: Raining, cold and windy

Operator: J Lymer

Notes:	
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