

# **HERTS & ESSEX SITE INVESTIGATIONS**

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**GEOTECHNICAL ASSESSMENTS – ENVIRONMENTAL ASSESSMENTS - DESKTOP STUDY – CONTAMINATED LAND**

30<sup>th</sup> June 2020

Our Ref : CSG/14798

LPS Construction  
7th Floor  
90 York Way  
London  
N1 9AG

**For the attention of S.Hare Esq.,**

Dear Sir,

**Re : Site at 73 Maygrove Road, West Hampstead, London NW6 2EG : GAS INVESTIGATION REPORT**

Further to our site investigation works, we have visited the above site to assess the extent of land gas risk.

The purpose of this visit was to establish whether reasonable assessments and investigative works could be undertaken within the proposed site works to confirm the extent and nature of gas risk and any mitigation measures could or would need to be implemented. This was based on infilled land which included an infilled pond area through the centre of the site.

Gas monitoring installations were then installed within the site within a single borehole.

Gas testing results were recorded over six monitoring rounds initially with an additional six monitoring rounds to confirm the extent of ground gas and limit the potential for spikes in ground gas regime at the site. These have been presented within the table below.

Considering the results of the gas testing and taking into account the worst case readings from the gas testing undertaken, it remains the case that no flow rates were recorded within the site and as such, the site and surrounding area is not degrading at a fast rate.

With this in mind, we can confirm the following calculations can be made :-

$$Q_{hg} = q \left( \frac{Chg}{100} \right)$$

$q$  = is the measured flow rate, (in litres per hour) of combined gases from the monitoring standpipe

$Chg$  = is the measured hazardous gas concentration, (in percentage volume / volume)

Therefore :-

$$Q_{hg} = 0.0 \left( \frac{4.5}{100} \right) = 0.0$$

As such, the Hazardous Gas Flow Rate has been calculated as 0.00 and we would therefore suggest gas generation within the site area is minimal, although, slightly elevated Carbon Dioxide values were recorded up to 5.9% and as such, risk cannot be ruled out with differing atmospheric pressures. As such, and in line with comments within BS8485:2015 we would suggest that a Characteristic Situation of 1 could be given to the site based on the ground gases measured.

We have considered a number of factors in the assessment and decision making in relation to ground gases which are detailed below which has broadly been derived from RB17, (An Pragmatic Approach to Ground Gas Risk Assessment – November 2012): -

- Conceptual Site Model.
- Soil Type, (made ground, clay, gravel, organic, peat, chalk) in relation to permeability.
- CO<sup>2</sup> and CH<sub>4</sub> concentration.
- O<sub>2</sub> concentration in conjunction with CO<sup>2</sup> and CH<sub>4</sub>, (i.e. any other vapours present – hydrocarbons etc which reduce O<sub>2</sub> levels and see no CO<sup>2</sup> gases or methane, therefore what's utilizing the O<sub>2</sub>).
- Source of ground gas.
- Distance from site.
- Atmospheric Pressure.
- Total Organic Carbon, (where available).
- Groundwater presence / absence.
- Response Zones.
- Variable Stratum.
- Proposed construction.

Based on the above, the following criteria should be considered: -

1. The soil types in place have been identified as Made Ground which overlies London Clay. The made ground forms the only source of ground gases on the site and as such, initial risks are considered low.
2. The O<sub>2</sub> and CO<sup>2</sup> levels correlate relatively well in respect to a slight drop in the normal level of O<sub>2</sub> and a slight increase in CO<sup>2</sup>.
3. The London Clay will restrict any off site sources of ground gas from migrating onto the site.
4. A visual assessment of the made ground confirms that this is considered a reworked clay FILL for the majority of the site which would promote a low risk of ground gases being produced. The underlying geology is identified as a Mottled dark grey, black CLAY and as such, is likely the source of the low levels of CO<sub>2</sub> produced in the records and as such, is unlikely to increase to a level where risk is in place
5. The samples record relatively low organic matter within nearly all samples tested.
6. The response zones would promote an accurate depiction of the ground gas regime at the site as this is an entirely permeable stratum and would allow for ground gas movement if being generated.

Based on this information, we can confirm that the classification for ground gas regime is low and classified as CS1.

I hope the foregoing is sufficient for your requirements, although please do not hesitate to contact us should require any further information regarding the above.

Yours Faithfully



**C.S.Gray M.Sc**  
Contract Engineer

**Table 1                      Gas Monitoring Data Sheet 1**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG						Weather				Cloudy				Operatives				RAC/CSG				
Date	Time	BH ID	Flow Rate				Concentration, (CH4)				Concentration, (CO2)				Concentration, (O2)				Qhg, CH4	Qhg, CO <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15	30	45		15	30	45		15	30	45		15	30	45					
				secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs					
				L/h	L/h	L/h		L/h	%			%				%							
10/01/2020	10.05am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.1	4.2	4.3	18.5	18.5	17.2	16.5	0.0	0.0	MADE GROUND	Yes	1001	

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 2                      Gas Monitoring Data Sheet 2**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG																Weather				Cloudy				Operatives		RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH4)				Concentration, (CO2)				Concentration, (O2)				Qhg, CH4	Qhg, C0 <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure					
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady												
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs														
L/h	L/h	L/h	L/h	%	%	%	(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB																		
13/01/2020	10.05am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	1.8	3.8	4.5	18.4	18.4	17.1	16.5	0.0	0.0	MADE GROUND	Yes	1003						

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 3                      Gas Monitoring Data Sheet 3**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG										Weather				Cloudy				Operatives				RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure	
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady								
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs										
L/h	L/h	L/h	L/h	%	%	%	(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB														
16/01/2020	9.55am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	2.1	3.5	4.1	17.9	17.9	17.1	16.8	0.0	0.0	MADE GROUND	Yes	1004		

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 4**                      **Gas Monitoring Data Sheet 4**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG						Weather				Cloudy				Operatives				RAC/CSG				
Date	Time	BH ID	Flow Rate				Concentration, (CH4)				Concentration, (CO2)				Concentration, (O2)				Qhg, CH4	Qhg, CO <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15	30	45		15	30	45		15	30	45		15	30	45					
				secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs					
				L/h	L/h	L/h		L/h	%			%				%							
20/01/2020	10.50am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	2.8	3.3	4.2	18.1	18.1	17.4	16.5	0.0	0.0	MADE GROUND	Yes	999	

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 5                      Gas Monitoring Data Sheet 5**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG										Weather				Cloudy				Operatives				RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure	
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady								
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		(Peak) <sup>A)</sup>	15 secs	30 Secs		45 Secs								
L/h	L/h	L/h	L/h	%	%	%	(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB														
23/01/2020	9.25am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	2.4	3.1	3.9	18.2	18.2	17.8	17.5	0.0	0.0	MADE GROUND	Yes	1001		

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 6                      Gas Monitoring Data Sheet 6**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG																			Weather				Cloudy				Operatives				RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure										
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady																	
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs																			
L/h	L/h	L/h	L/h	%	%	%	(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB																							
27/01/2020	9.15am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	2.5	3.4	4.1	18.2	17.5	16.9	16.9	0.0	0.0	MADE GROUND	Yes	1003											

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

Table 7 Gas Monitoring Data Sheet 1																							
Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG										Weather			Raining					Operatives			RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )			Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure	
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		(Peak) <sup>A)</sup>	15 secs	30 Secs		45 Secs							
L/h	L/h	L/h	L/h	%			%			%			(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB							
22/04/2020	9.30am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.8	2.2	3.4	19.1	19.1	18.7	17.9	0.0	0.0	MADE GROUND	Yes	1001	

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

Table 8		Gas Monitoring Data Sheet 2																					
Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG										Weather				Raining				Operatives				RAC/CSG
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, C0 <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15	30	45		15	30	45		15	30	45									
				secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs									
				L/h	L/h	L/h		L/h	%				%				%						
1/05/2020	9.25am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.1	1.7	2.8	19.0	19.0	18.7	18.5	0.0	0.0	MADE GROUND	Yes	1005

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

Table 9 Gas Monitoring Data Sheet 3																							
Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG										Weather				Overcast				Operatives			RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, C0 <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15	30	45		15	30	45		15	30	45		15	30	45					
				secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs					
				L/h	L/h	L/h		L/h	%			%				%							
12/05/2020	10.15am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.8	2.4	3.4	19.2	19.2	18.4	17.4	0.0	0.0	MADE GROUND	Yes	1007

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 10** **Gas Monitoring Data Sheet 4**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG																Weather		Clear Skies - Sunny								Operatives		RAC/CSG
Date	Time	BH ID	Flow Rate				Concentration, (CH4)				Concentration, (CO2)				Concentration, (O2)				Qhg, CH4	Qhg, CO <sup>2</sup>	Stratum Screened	Flooded Response Zone	Barometric Pressure						
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady													
				15	30	45		15	30	45		15	30	45		15	30	45											
				secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs		secs	Secs	Secs											
				L/h	L/h	L/h		L/h	%			%				%								(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB		
21/05/2020	10.05	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.4	2.7	3.6	19.4	19.4	18.6	18.2	0.0	0.0	MADE GROUND	Yes	1008						

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 11** **Gas Monitoring Data Sheet 5**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG						Weather				Sunny Hot								Operatives		RAC/CSG		
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady							
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		(Peak) <sup>A)</sup>	15 secs	30 Secs		45 Secs							
L/h	L/h	L/h	L/h	%	%	%	(Peak) <sup>A)</sup>	(Peak) <sup>A)</sup>	(Yes / No)	mB													
4/06/2020	9.05am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	1.6	2.4	4.1	19.1	19.1	18.4	17.2	0.0	0.0	MADE GROUND	Yes	1009	

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).

**Table 12** **Gas Monitoring Data Sheet 6**

Site	Site at 73 Maygrove Road, West Hampstead, London, NW6 2EG																Weather		Sunny Hot				Operatives		RAC/CSG	
Date	Time	BH ID	Flow Rate				Concentration, (CH <sub>4</sub> )				Concentration, (CO <sub>2</sub> )				Concentration, (O <sub>2</sub> )				Qhg, CH <sub>4</sub>	Qhg, CO <sub>2</sub>	Stratum Screened	Flooded Response Zone	Barometric Pressure			
			Peak	Steady			Peak	Steady			(Peak) <sup>A)</sup>	Steady			Peak	Steady										
				15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs		15 secs	30 Secs	45 Secs												
L/h	L/h	L/h	L/h	%	%	%																				
17/06/2020	9.45am	WS5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	1.8	3.2	4.1	19.2	19.2	18.1	17.8	0.0	0.0	MADE GROUND	Yes	1011				

Works and table completed in accordance with **BS 8485 : 2015**, (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).  
Table prepared after Table F2, (Gas Monitoring Data).