



Ground Gas Monitoring Results

Project:	Phoenix Wharf	Gas analyser:	GFM 436	Preceding Weather Conditions		On-site weather conditions	General Site Conditions / Ground Conditions / On-site Activities
Project Number:	2111006.003	Condition:	Good	Atmospheric trend:	1000 - 1013hPa (Falling)	Overcast	
Location:	Port Talbot	Well Diameter:	50mm	Temperature range:	11 - 13°C		
Test Date:	24/05/2022	Wellhead Condition:	Good	Rainfall:	0 - 2.54mm		

GAS MONITORING TO BE UNDERTAKEN IN ACCORDANCE WITH TEC METHOD STATEMENT

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: BH01	0	0.4	2	0.0	0.0	21.1	0.0	0	0	2.22	18.59	0	0.0004	
	15	0	0	0.0	0.0	20.7	0.0	0	0					
	30	0.1	0	0.0	0.1	20.6	0.0	0	0					
Time: 11:00	45	0.1	0	0.0	0.1	20.6	0.0	0	0					
Atmospheric pressure (mb) before:	60	0	0	0.0	0.0	20.6	0.0	0	0					
1012	120	0	0	0.0	0.0	20.6	0.0	0	0					
	180	0	0	0.0	0.0	20.6	0.0	0	0					
Atmospheric pressure (mb) after:														
1012														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: BH02	0	0	0	0.0	0.0	20.4	0.0	0	0	4.82	24.235	0	0	
	15	0	0	64.0	5.9	3.5	>>>>	0	230					
	30	0	0	71.1	6.0	3.1	>>>>	0	420					
Time: 12:59	45	0	0	65.8	5.0	5.1	>>>>	0	600					
Atmospheric pressure (mb) before:	60	0	0	60.2	4.7	6.4	>>>>	0	690					
1005	120	0	0	49.3	4.1	8.3	>>>>	0	800					
	180	0	0	39.4	3.4	10.9	>>>>	0	730					
Atmospheric pressure (mb) after:														
1005														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: BH03A	0	0	0	0.0	0.0	20.5	0.0	0	0	4.4	20.01	0	0	
	15	0	0	0.0	0.7	20.8	0.0	0	0					
	30	0	0	0.0	0.9	20.5	4.5	0	0					
Time: 12:00	45	0	0	0.2	0.9	20.5	10.9	0	0					
Atmospheric pressure (mb) before:	60	0	0	0.6	1.0	20.4	16.7	0	0					
1007	120	0	0	0.1	1.2	20.5	12.4	0	0					
	180	0	0	0.0	1.4	20.6	0.0	0	0					
Atmospheric pressure (mb) after:														
1007														
Well Condition: Good														
Well Diameter: 50mm														



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				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: BH04	0	0	0	0.0	0.1	20.4	0.0	0	0	5.4	19.37	0	0	
	15	0	0	12.2	2.1	4.6	>>>>	0	0					
	30	0	0	71.9	2.5	3.9	>>>>	0	0					
Time: 12:41	45	0	0	71.3	2.4	4.4	>>>>	0	0					
Atmospheric pressure (mb) before:	60	0	0	69.0	2.4	4.9	>>>>	0	0					
1007	120	0	0	58.7	2.1	7.3	>>>>	0	0					
	180	0	0	49.0	1.8	9.4	>>>>	0	0					
Atmospheric preassure (mb) after:														
1006														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS01	0	0	0	0.0	0.1	20.1	0.0	0	0	2	2.62	0	0	
	15	0	0	0.0	0.0	21.1	0.0	0	70					
	30	0	0	0.0	0.0	21.0	0.0	0	50					
Time: 12:50	45	0	0	0.0	0.0	20.9	0.0	0	40					
Atmospheric pressure (mb) before:	60	0	0	0.0	0.0	20.9	0.0	0	40					
1006	120	0	0	0.0	0.0	20.9	0.0	0	25					
	180	0	0	0.0	0.0	20.9	0.0	0	0					
Atmospheric preassure (mb) after:														
1003														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS03A	0	0	0	0.0	0.1	20.6	0.0	0	0	1.88	2.35	0	0	
	15	0	0	0.0	1.8	16.9	0.0	0	0					
	30	0	0	0.0	1.9	16.5	0.0	0	0					
Time: 12:22	45	0	0	0.0	1.9	16.4	0.0	0	0					
Atmospheric pressure (mb) before:	60	0	0	0.0	1.9	16.4	0.0	0	0					
1007	120	0	0	0.0	1.9	16.4	0.0	0	0					
	180	0	0	0.0	1.9	16.4	0.0	0	0					
Atmospheric preassure (mb) after:														
1005														
Well Condition: Good														
Well Diameter: 50mm														



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				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS06	0	0	0	0.0	0.0	20.3	0.0	0	0	0.37	2.93	0	0	
	15	-11	0	0.0	0.3	20.5	0.0	0	0					
Time: 11:21	30	-3.7	0	0.0	0.3	20.3	0.0	0	0					
	45	-1	0	0.0	0.4	20.3	0.0	0	0					
Atmospheric pressure (mb) before: 1011	60	0	0	0.0	0.4	20.2	0.0	0	0					
	120	0	0	0.0	0.5	20.2	0.0	0	0					
Atmospheric preassure (mb) after: 1011														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS07	0	0	0	0.0	0.0	21.0	0.0	0	0	0.69	3.195	0	0	
	15	0	0	0.0	0.3	20.7	0.0	0	0					
Time: 11:12	30	0	0	0.0	0.3	20.6	0.0	0	0					
	45	0	0	0.0	0.3	20.5	0.0	0	0					
Atmospheric pressure (mb) before: 1012	60	0	0	0.0	0.3	20.5	0.0	0	0					
	120	0	0	0.0	0.3	20.5	0.0	0	0					
Atmospheric preassure (mb) after: 1011	180	0	0	0.0	0.3	20.5	0.0	0	0					
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS10	0	0	0	0.0	0.1	20.4	0.0	0	0	2.12	4.8	0	0	
	15	0	0	0.0	2.3	15.2	0.0	0	0					
Time: 12:31	30	0	0	0.0	2.4	14.5	0.0	0	0					
	45	0	0	0.0	2.4	14.2	0.0	0	0					
Atmospheric pressure (mb) before: 1006	60	0	0	0.0	2.5	14.2	0.0	0	0					
	120	0	0	0.0	2.8	13.7	0.0	0	0					
Atmospheric preassure (mb) after: 1007	180	0	0	0.0	3.2	13.0	0.0	0	0					
Well Condition: Good														
Well Diameter: 50mm														



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				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
BH ref: WS11	0	0	0	0.0	0.0	20.5	0.0	0	0	1.28	3.015	0	0	
	15	0	0	0.0	0.7	20.2	0.0	0	0					
	30	0	0	0.0	0.9	20.0	0.0	0	0					
Time: 12:14	45	0	0	0.0	0.9	19.9	0.0	0	0					
	60	0	0	0.0	1.0	19.8	0.0	0	0					
	120	0	0	0.0	1.2	19.6	0.0	0	0					
Atmospheric pressure (mb) before: 1006	180	0	0	0.0	1.4	19.4	0.0	0	0					
Atmospheric pressure (mb) after: 1006														
Well Condition: Good														
Well Diameter: 50mm														

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
												0	0	

Borehole Information	Time (s)	Borehole Flow Rate (l/hr)	DP (Pa)	Gas Concentrations						Groundwater Level	Borehole Depth	Methane - Hazardous Flow Rate CH4 Qhg (l/hr)	Carbon Dioxide – Hazardous Flow Rate CO2 Qhg (l/hr)	Comments
				CH4 (%v/v)	CO2 (%v/v)	O2 (%v/v)	LEL (%)	CO (ppm)	H2S (ppm)					
												0	0	

Appendix H

Risk Methodologies and Evaluation

Risk Evaluation

The qualitative assessment methodology presented in CIRIA publication C552 (2001) titled '*Contaminated Land Risk Assessment: A Guide to Good Practice*' has been used by TEC for the basis of evaluating potential risk.

The method requires an assessment of the:

- magnitude of the probability or likelihood of the risk occurring (Table 1); and
- magnitude of the potential consequence or severity of the risk occurring (Table 2)

Table 1. Classification of Probability

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the short-term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.

Table 2. Classification of Consequence

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. (Note: Water Resources Act contains no scope for considering significance of pollution). Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organisation forming part of such ecosystem (note: the definitions of ecological systems within the draft circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to human health ("significant harm" as defined in DETR, 2000). Pollution of sensitive water resources. (Note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem, (note: the definitions of ecological systems within draft circular on Contaminated Land, DETR, 2000).	Concentration of a contaminant from site exceeding the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the draft circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (for example foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc), easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

The combination of the two factors is determined using Table 3 and the resulting level of risk is described in Table 4. The evaluation can be applied to each of the scenarios identified in the risk model and the overall risk assessed.

Table 3. Combination of Consequence with Probability

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table 4. Description of risks and likely action required

Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the long-term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Using the risk model the pollutant linkages are identified and a preliminary estimate of risk undertaken. If there is no pollutant linkage identified, then there is no risk. If the estimate of risk for all the linkages and exposure scenarios is very low at this stage then it is likely that no further assessment will be required.