

## Stage 2 Advanced Works, Stockport Interchange - Ground Gas Risk Assessment

### 1.0 INTRODUCTION

Transport for Greater Manchester (TfGM) has commissioned WSP UK Limited (WSP) to undertake a ground gas risk assessment as part of a wider Stage 2 Contaminated Land Assessment at the Stockport Bus Interchange site located on Swaine Street, Stockport, SK3 0EH. A site location plan is presented as Figure 1 attached.

### 2.0 BACKGROUND

WSP is currently providing multidisciplinary design services for the re-development of Stockport Bus Interchange. A Pre-Stage 2 Contaminated Land Report<sup>1</sup> was issued by WSP in December 2017 which summarised potential site constraints associated with contaminated land based on the review of previous ground investigation works (AECOM, 2016<sup>2</sup>). The 2016 investigation included exploratory locations to assess potential soil and groundwater contamination and to provide geotechnical information to support preliminary design. The WSP summary review identified a number of contamination constraints which included the ground gas risk assessment. AECOM's assessment classified the site as Characteristic Situation 2 (CIRIA C665<sup>3</sup>) and indicated ground gas protection measures would be required in the new development.

### 3.0 OBJECTIVE

This letter report presents our review of the 2016 ground gas risk assessment and supplementary ground gas monitoring completed by WSP to update advice on the suitable ground gas classification and exercise professional judgement, if appropriate. A borehole location plan (AECOM, 2016) is attached.

### 4.0 DEVELOPMENT PROPOSAL

The site forms part of a wider development and includes the re-design and construction of a bus interchange at ground level with a multi-storey residential building and external landscaped public space above the interchange.

### 5.0 SOURCES OF GROUND GAS ON SITE

Based on the findings of the previous ground investigation report (AECOM, 2016) and publicly available information, the potential sources of ground gas at the site are considered to include the following.

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<sup>1</sup> Advanced Works to Stage 2 Preliminary Contaminated Land report, Stockport Interchange, WSP, December 2017 (ref: 70031899-10952).

<sup>2</sup> Stockport Interchange - Ground Investigation Report, AECOM, April 2016, (ref: 60340298/GEO/02).

<sup>3</sup> CIRIA C665, Assessing risks posed by hazardous ground gases to buildings, 2007.

**Table 1 - Potential Sources of Ground Gas on Site**

Potential Source of Ground Gas	Comment	Ground Gas Generation Potential
<b>Anthropogenic</b>		
Made Ground	<p>A review of historical maps indicates the site was occupied by residential and industrial land use from 1872 before becoming a bus station in 1985. The previous and current site history indicate the likely presence of Made Ground of various composition and depth at the site.</p> <p>The 2016 investigation identified Made Ground comprising sandy gravelly clay or black sandy gravel of brick and concrete to a maximum depth of 2.6m below ground level (bgl). In general, degradable material such as wood, rags, paper and vegetation was generally absent from the logs with the following exceptions:</p> <ul style="list-style-type: none"> <li>■ WS224, some wood was noted in Made Ground between ground level and 1.2m bgl</li> <li>■ Organic matter was observed locally within Made Ground in the northeast (WS211 and WS212) and west (WS220) to between 1.20m and 1.80m bgl.</li> </ul>	Low
Organic Matter Content	<p>The soil organic matter (SOM) content within the Made Ground was below 10% in the majority of the samples analysed. A total of 9 out of 36 locations reported Made Ground SOM contents greater than 10%. The highest SOM content reported was 56.6% which was from an organic Made Ground layer located northeast of the bus station (WS212), consistent with the field observations. The average SOM content in the Made Ground was 10.2%.</p> <p>WSP note the general absence of organic material recorded on the logs.</p>	Moderate
Landfill sites	There are no known landfills within 500m of the site. The closest is located approximately 600m north which is not considered to be a potential source of ground gas at the site.	Very Low
<b>Natural</b>		
Geology	<p>Published geological mapping<sup>4</sup> indicates the south of the site is underlain by Till whilst in the north, Glaciofluvial sheet deposits are present associated with The River Mersey. Bedrock is indicated to comprise the Sherwood Sandstone. No peat or volcanic rocks are indicated to be present.</p> <p>The geological profile described above was generally encountered within the 2016 investigation: glacial sand and gravels were recorded in all positions encountered from 0.50m and 3.20m bgl; Till (clay) was encountered locally within the northwest (WS208, WS211, WS212) and south (BH101 and WS201); and deposits considered to represent alluvium were encountered in two positions in the south (BH112 and WS223). Sherwood Sandstone was encountered from 0.85m and 5.0m bgl.</p>	Very Low

<sup>4</sup> British Geological Society (BGS) 1:50,000 series Geological Map Sheet 98 Stockport (Solid and Drift editions).

Potential Source of Ground Gas	Comment	Ground Gas Generation Potential
Coal measures strata	The Coal Authority website <sup>5</sup> indicates the site is not within a Coal Mining Reporting Area.	Very Low
Organic rich sediments	<p>The 2016 investigation identified alluvial clay with organic material locally in the south (BH112 and WS223). The thickness of the organic rich sediment is considered to be limited (between 0.4m and 0.6m thick).</p> <p>One sample of the alluvial clay was tested for SOM, which was reported to be 21.7% whilst for glacial sands and gravels, 6 samples were tested and the average SOM content was 1.6%</p>	Low

Based on the above, the overall ground gas generation potential on site is considered to be Low.

## 6.0 POTENTIAL POLLUTANT LINKAGES

A conceptual site model for the site is presented within the Pre-Stage 2 Contaminated Land Report (WSP, 2017). With respect to ground gas, the following contaminant linkages are potentially viable at the site.

- Inhalation of ground gases by commercial workers at interchange level and construction and maintenance workers; and,
- Accumulation of ground gases and generation of explosive atmospheres.

Given the multi-storey residential building is located at an elevation above the bus interchange (i.e. over-site level), future residential occupants are not considered to be viable receptors.

Other potential pollutant linkages identified in the Pre-Stage 2 Contaminated Land Report (WSP, 2017) are not discussed in the report presented herein.

## 7.0 THIRD PARTY GROUND GAS RISK ASSESSMENT REVIEW

The 2016 investigation included 24 ground gas wells which were monitored three times over a 4-week period in 2016. The ground gas monitoring results were used to generate a worst-case gas screening value (GSV) for the site based on CIRIA C665. The GSV is the maximum volume of methane or carbon dioxide gas that could be produced each hour and is calculated as follows:

- $GSV = \text{Maximum steady concentration (\%)} \text{ of carbon dioxide (CO}_2\text{) or methane (CH}_4\text{) / 100 x maximum steady flow rate (or limit of detection if no flow rate detected) (l/hr)}$ .

The 2016 assessment classified the site as Characteristic Situation 2 (CS2) with gas protection measures required to be implemented, based on peak carbon dioxide concentrations identified in four wells during one out of the three rounds undertaken, as summarised in Table 2 below.

**Table 2 - Summary of CS2 Ground Gas Results**

Location	Monitoring Date	Barometric Pressure (mb)	Flow Rate (l/hr)	Peak CO <sub>2</sub> (%v/v)	GSV (l/hr)	Response Zone (m bgl)	Strata Targeted
BH101	09/02/2016	969	-2.1	3.8	0.0798	5.0 – 7.0	Sandstone
WS201	09/02/2016	969	0.1	6.1	0.0061	3.5 – 4.0	Sandstone

<sup>5</sup> The Coal Authority Interactive Map Viewer available online.

Location	Monitoring Date	Barometric Pressure (mb)	Flow Rate (l/hr)	Peak CO <sub>2</sub> (%v/v)	GSV (l/hr)	Response Zone (m bgl)	Strata Targeted
WS204	11/01/2016	969	0.1	7.1	0.0071	1.5 – 2.45	Made Ground (0.05m) / Sandstone
WS217	25/01/2016	1001	0.1	19.4	0.0194	1.50 – 2.50	Sand and Gravel

Based on the ground gas information provided within the 2016 report, WSP makes the following observations.

- The GSV for three out of the four locations of concern was <0.07 l/hr (CS1), however the risk classification was increased to CS2 based on the CO<sub>2</sub> concentration, which was recorded higher than 5% on one occasion only.
  - The highest carbon dioxide concentration (19.4%v/v) was recorded in WS217; with the other two monitoring events recording carbon dioxide concentrations <5%v/v.
  - WS217 is located in the bus station where traffic is considered to be dense and therefore the high reading might be associated with an anomaly.
  - Elevated carbon dioxide readings above 5%v/v were recorded in WS201 and WS204.
- A negative flow rate (-2.1 l/hr) was used to derive the GSV for BH101, which is considered to be overly conservative. The limit of detection is considered to be more appropriate, which would result in a GSV of 0.0038 l/hr (CS1).
- The response zones in the four wells above are screened predominantly in natural strata (medium dense sand or weathered sandstone).
- No methane concentrations were reported above the limit of detection in any of the wells.
- Generally, the flow rate of boreholes serviceable for ground gas monitoring (without fully or significantly flooded response zones) was consistently <0.1l/h.
- The monitoring was undertaken over a range of atmospheric and climatic conditions.

Based on the above, WSP considers that the ground model for the site and the monitoring dataset indicates that significant ground gas sources are not present at the site and that it is appropriate to undertake further professional appraisal (as recommended in CIRIA C665) to avoid overly conservative recommendations with respect to ground gas protection measures.

## 8.0 SUPPLEMENTARY GAS MONITORING DATA

### 6.1 FIELDWORK

WSP has undertaken two further ground gas monitoring visits at the site, in April 2018 and September 2018. This improves the overall dataset to 5 occasions to comply with the frequency in CIRIA C665 specified for sites likely to have very low gas generation potential and a low sensitivity development (commercial). It is noted that whilst the site development includes a residential tower, this is located above the bus interchange and future residential occupants are not considered to be receptors of potential ground gas sources on site.

Groundwater depths were gauged and ground gas concentrations and flow rates were measured using an infra-red gas analyser (GFM435). Initial and steady concentrations of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>) and trace gases (including carbon monoxide and hydrogen sulphide) were recorded along with initial and steady gas flow rates.

### 8.2 RESULTS

Atmospheric pressure was recorded to be 1002mb and rising during the first monitoring visit (April 2018) and 1009mb and falling (September 2018) during the second visit. During the monitoring five wells were not serviceable on one or more occasions due to them being either located within a construction site compound or covered with standing water or stockpiles. The headworks of WS201 are now partially covered in tarmac.

In addition, four wells during the first monitoring visit and 4 wells during the second visit had fully flooded response zones during the monitoring although this is not considered to be detrimental to the ground gas assessment.

A summary of the ground gas monitoring results is presented in Table 3; the ground gas monitoring record sheets are attached.

**Table 3 – Summary of Additional Ground Gas Results**

Parameter	Initial Reading		Steady Reading	
	Min	Max	Min	Max
Methane (% v/v)	0.0	0.0	0.0	0.0
Carbon Dioxide (% v/v)	0.0	1.4	0.0	4.8
Oxygen (% v/v)	16.4	20.7	12.4	20.7
Flow (l/hr)	<0.1	<0.1	<0.1	<0.1

The maximum steady carbon dioxide concentration recorded was 4.8%v/v (WS209). An initial peak carbon dioxide concentration of 1.4%v/v was recorded in WS214 during visit 2 which increased to 4.5%v/v for a steady reading. No initial or steady readings of methane above 0.1%v/v has been recorded. Flow rates during the monitoring were all <0.1l/hr. Within WS204 and WS217 which previously recorded elevated carbon dioxide readings, recorded carbon dioxide concentrations were below 5%v/v.

### 8.3 GROUND GAS RISK ASSESSMENT

Using the highest gas concentration recorded during the additional two ground gas monitoring events and a maximum flow rate recorded in boreholes, the GSV is as follows:

- Carbon dioxide –  $(4.8/100 \times 0.1) = 0.0048\text{l/h}$

Based on the two ground gas monitoring rounds conducted by WSP, the GSV indicates the site is characterised as CS1 (very low risk), with no ground gas protection measures required.

### 9.0 CONCLUSIONS

Based on our review of the extended ground gas monitoring dataset and the ground model, it is recommended that an appropriate classification of risk for the development with respect to ground gas is Characteristic Situation 1 i.e. no special ground gas precautions are required.

The observations to support this professional judgement are:

- The proposed development is considered to be of low sensitivity (parts of the development are not directly on the ground);
- Ground gas generation potential of the site is low (sources are restricted to natural soils and Made Ground);
- Concentrations of carbon dioxide in the ground that exceed the 5% threshold are sporadic and in installations within natural, non-organic soil/rock.



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Kinchington, Jess  
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Jessica Kinchington  
Environmental Consultant

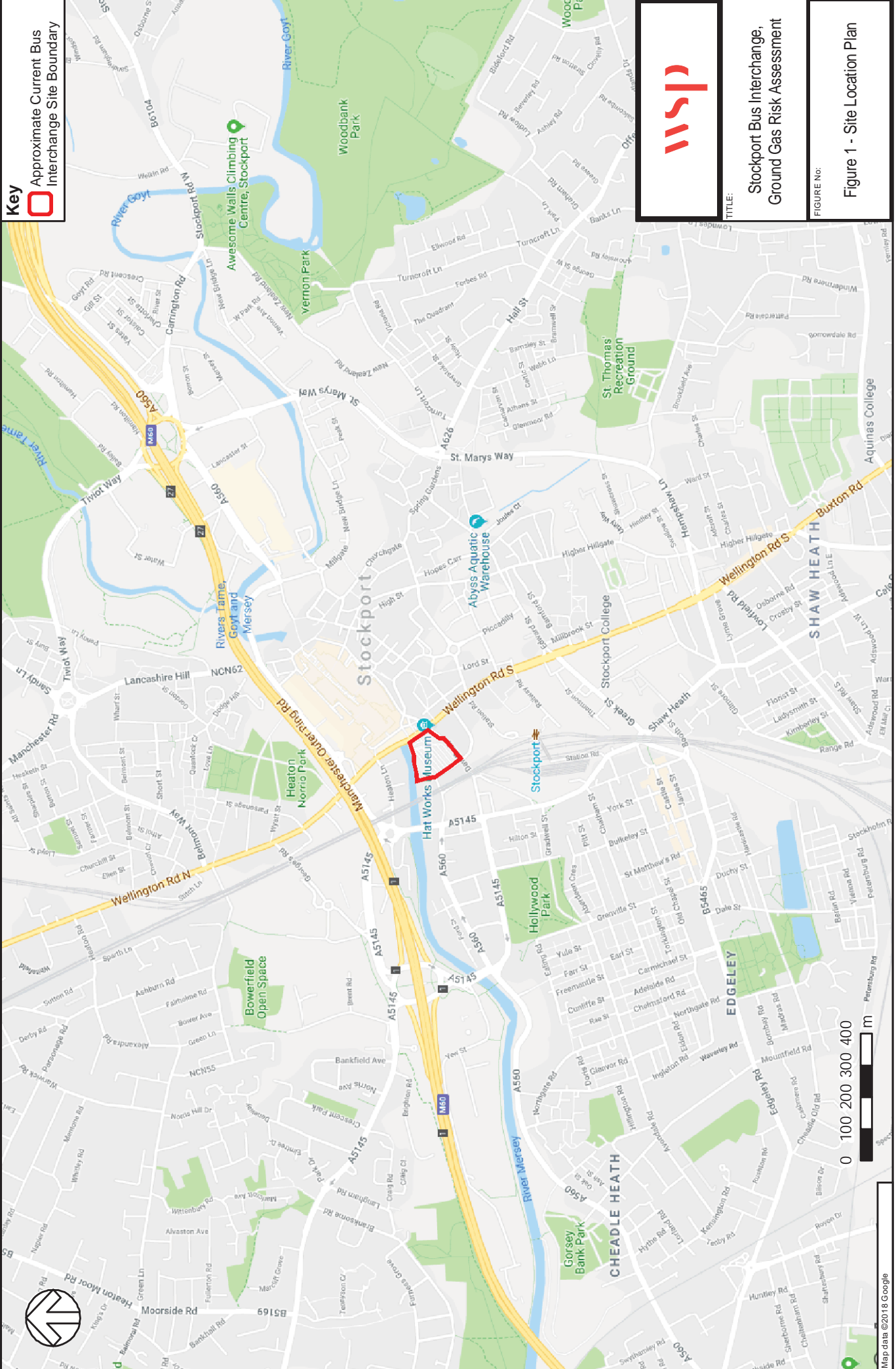
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Paloma Montes  
Principal Risk Assessor

Attachments :

Figure 1 – Site location plan  
Borehole Location Plan (AECOM, 2016)  
WSP Ground Gas Monitoring Field Sheets – April and September 2018



**Key**

- Approximate Current Bus Interchange Site Boundary

**wsp**

TITLE:  
 Stockport Bus Interchange,  
 Ground Gas Risk Assessment

FIGURE NO:  
 Figure 1 - Site Location Plan

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF THE DESIGNING ORGANISATION.
2. ALL DIMENSIONS TO BE CHECKED BEFORE COMMENCEMENT OF WORK ON SITE.
3. ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
4. THE DETAILED DESIGN IS SUBJECT TO APPROVAL BY THE METROPOLITAN BOROUGH COUNCIL.
5. DRAWING BASED ON TOPOGRAPHICAL SURVEY PAS 192 2004 & T SITE SURVEY PROVIDED BY SUBCON.
6. EXPLORATORY HOLE LOCATIONS TAKEN FROM DRAFT FACTUAL REPORT PREPARED BY GEOTECHNICS LTD ON STOCKPORT BUS STATION, REF PN 1526, DATED FEBRUARY 2016.

KEY

- BH104 BOREHOLE
- WS220 WINDOW SAMPLE
- TP09 TRIAL PIT
- HP02 HAND DUG PIT
- DP08 DYNAMIC PROBE
- EXTENTS OF PROPOSED BUILDING
- EXTENTS OF PROPOSED ROOF
- AA GEOLOGICAL SECTIONLINE

ISSUE/REVISION	NO	DATE	DESCRIPTION
	PO1	MAR 2016	FIRST ISSUE
	IR		

PROJECT NUMBER  
60340298

SHEET TITLE  
EXPLORATORY HOLE LOCATION PLAN

SHEET NUMBER  
60340298-ACM-00-00-DR-0001 P01



**EXPLORATORY HOLE PLAN**  
Scale: 1:500 @ A1

## PRE-REPORT DATA CHECK



All Response Zone depths are complete.



All visit dates match in the Monitoring Results and Monitoring Visit tables.



All visit dates match in the Dip and Monitoring Visit tables.



All event names match in the Monitoring Point and Dips tables



# Stockport Interchange



## Key:

### Depth to water



Response zone *fully* flooded during sampling

Response zone *significantly* flooded during sampling

Datum or response zone information missing. Response zone flooding cannot be calculated

**Methane**  
> 1% v/v



**Carbon Dioxide**  
> 5% v/v

**Gas Flow**  
> 70 l/hr

## Visit 1, Event: Visit 1, Date: 16/04/2018

## Sheet 1 of 2

Engineer	J Kinchington
Start/End Time	08:30 - 16:00
Pressure Start/End (mB)	1000 - 1002
Temperature (Deg C)	15.00
Weather Conditions	Cloudy

<b>Equipment</b>	<b>SerialNo</b>	<b>Calibrated</b>
GFM 11942	WSP 000239	Yes
Dip Meter	WSP 000163	Yes

**Comments and Ground Conditions:** WS214 - unable to obtain representative ground gas data due to broken gas tap. WS205 unable to obtain gas data due to bentonite within gas tap. WS211 not servicable due to tarmac partially over cover.

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure Pa	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water m	Depth to Base m	Thickness of product mm	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	PID	H2S	CO				
BH101	5.00	7.00	0.00	0.00		0.00	0.00	0.00	0.00	20.10	20.20	1.00	0.00	0.00	7.20	N/A	No	
BH102	8.00	10.00	0.00	0.00		0.00	0.00	0.00	0.00	19.80	20.70	1.00	0.00	0.00	10.05	N/A	No	
BH103	11.00	14.00	0.00	0.00		0.00	0.00	0.00	0.00	20.40	20.30	1.00	0.00	0.00	7.22	N/A	No	
BH104	1.00	3.50	0.00	0.00		0.00	0.00	0.00	0.00	20.20	20.70	1.00	0.00	0.00	2.71	N/A	No	
BH105	9.50	12.00	0.00	0.00		0.00	0.00	0.00	0.00	20.20	20.50	1.00	0.00	0.00	12.20	N/A	No	
BH106	5.00	7.00	0.00	0.00		0.00	0.00	0.00	0.00	20.10	20.20	1.00	0.00	0.00	7.31	N/A	No	
BH112	12.80	14.80	0.00	0.00		0.00	0.10	0.00	0.00	20.10	20.20	1.00	0.00	0.00	14.81	N/A	No	
WS203	2.00	3.00	0.00	0.00		0.00	0.00	0.00	0.00	20.20	20.50	1.00	0.00	2.68	2.76	N/A	No	
WS204	1.50	2.45	0.00	0.00		0.00	0.00	0.00	0.00	20.60	20.50	1.00	0.00	0.00	2.43	N/A	No	
WS205	1.50	2.00												5.20	1.95	N/A	No	
WS206	1.00	2.00	0.00	0.00		0.00	0.00	0.00	0.00	20.10	20.60	1.00	0.00	0.00	1.85	N/A	No	
WS208	1.70	2.80	0.00	0.00		0.00	0.00	0.00	0.00	20.70	20.60	1.00	0.00	0.00	2.76	N/A	No	
WS209	1.00	3.00	0.00	0.00		0.00	0.00	0.00	0.00	20.40	20.60	1.00	0.00	0.00	1.95	N/A	No	
WS211	1.00	2.00	0.00	0.00		0.00	0.00	0.00	0.00	19.90	20.50	1.00	0.00	0.00	N/A	N/A	No	

**Key:**

**Depth to water**



Response zone *fully* flooded during sampling

Response zone *significantly* flooded during sampling

Datum or response zone information missing. Response zone flooding cannot be calculated



**Methane**  
> 1% v/v

**Carbon Dioxide**  
> 5% v/v

**Gas Flow**  
> 70 l/hr

**Visit 1, Event: Visit 1, Date: 16/04/2018**

Engineer	J Kinchington
Start/End Time	08:30 - 16:00
Pressure Start/End (mB)	1000 - 1002
Temperature (Deg C)	15.00
Weather Conditions	Cloudy

<b>Equipment</b>	<b>SerialNo</b>	<b>Calibrated</b>
GFM 11942	WSP 000239	Yes
Dip Meter	WSP 000163	Yes

**Comments and Ground Conditions:** WS214 - unable to obtain representative ground gas data due to broken gas tap. WS205 unable to obtain gas data due to bentonite within gas tap. WS211 not servicable due to tarmac partially over cover.

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure Pa	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water m	Depth to Base m	Thickness of product mm	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	PID	H2S	CO				
WS212	2.50	3.50	0.00	0.00		0.00	0.00	0.00	0.00	20.00	20.50	1.00	0.00	0.00	3.52	N/A	No	
WS214	0.50	1.00													0.95	N/A	No	
WS217	1.50	2.50	0.00	0.00		0.00	0.00	0.00	0.00	20.70	20.70	1.00	0.00	0.00	2.23	N/A	No	
WS218	1.00	2.50	0.00	0.00		0.00	0.00	0.00	0.00	20.10	20.20	1.00	0.00	0.00	2.39	N/A	No	
WS220	1.20	1.70	0.00	0.00		0.00	0.00	0.00	0.00	20.30	20.50	1.00	0.00	0.00	1.70	N/A	No	
WS223	0.50	1.40	0.00	0.00		0.00	0.00	0.00	0.00	20.20	20.70	1.00	0.00	0.00	1.62	N/A	No	

# Stockport Interchange



## Key:

### Depth to water



- Response zone *fully* flooded during sampling
- Response zone *significantly* flooded during sampling
- Datum or response zone information missing. Response zone flooding cannot be calculated



- Methane** > 1% v/v
- Carbon Dioxide** > 5% v/v
- Gas Flow** > 70 l/hr

## Visit 2, Event: September 2018, Date: 07/09/2018

## Sheet 1 of 2

Engineer	Jess Kinchington
Start/End Time	09:23 - 16:30
Pressure Start/End (mB)	1009 - 1007
Temperature (Deg C)	12.00
Weather Conditions	Overcast

<b>Equipment</b>	<b>SerialNo</b>	<b>Calibrated</b>
Gas Analyser	11941	Yes
Interface Probe	WPS000116	Yes

**Comments and Ground Conditions:** BH112- Bentonite in gas tap, gas reading taken after gas tap cleared. WS220 inaccessible due to stockpile. WS204 lost in thirty party compound. BH104 underneath puddle in carriage way.

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure Pa	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water m	Depth to Base m	Thickness of product mm	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	PID	H2S	CO						
BH101	5.00	7.00	0.00	0.00		0.00	0.00	0.30	0.00	19.90	20.10	1.00	0.00	0.00	6.25	7.15	N/A	No
BH102	8.00	10.00	0.00	0.00		0.00	0.00	0.10	0.00	19.80	20.20	1.00	0.00	0.00	5.58	10.04	N/A	No
BH103	11.00	14.00	0.00	0.00		0.00	0.00	0.30	0.20	19.20	19.90	1.00	0.00	0.00	5.10	7.28	N/A	No
BH104	1.00	3.50	0.00	0.00		0.00	0.00	1.20	0.80	18.70	19.20	1.00	0.00	0.00	3.67	3.75	N/A	No
BH105	9.50	12.00	0.00	0.00		0.00	0.00	0.70	0.10	20.10	20.10	1.00	0.00	0.00	6.77	12.78	N/A	No
BH106	5.00	7.00	0.00	0.00		0.00	0.00	0.10	0.00	20.10	19.80	1.00	0.00	0.00	5.21	7.20	N/A	No
BH112	12.80	14.80	0.00	0.00		0.00	0.00	0.00	0.00	20.10	20.10	1.00	0.00	0.00	5.12	11.54	N/A	No
WS203	2.00	3.00	0.00	0.00		0.00	0.00	0.40	0.10	19.20	20.10	1.00	0.00	0.00	2.80	2.95	N/A	No
WS206	1.00	2.00	0.00	0.00		0.00	0.00	0.30	0.10	19.90	20.10	1.00	0.00	0.00	1.72	1.83	N/A	No
WS208	1.70	2.80	0.00	0.00		0.00	0.00	1.30	0.10	19.80	19.60	1.00	0.00	0.00	2.75	2.75	N/A	No
WS209	1.00	3.00	0.00	0.00		0.00	0.00	4.80	2.00	18.60	15.60	1.00	0.00	0.00	2.92	2.92	N/A	No
WS211	1.00	2.00	0.00	0.00		0.00	0.00	2.70	0.50	18.40	16.10	1.00	0.00	0.00	1.90	2.00	N/A	No
WS212	2.50	3.50	0.00	0.00		0.00	0.00	3.60	1.20	16.40	15.00	1.00	0.00	0.00	3.04	3.04	N/A	No
WS214	0.50	1.00	0.00	0.00		0.00	0.00	4.50	1.40	17.20	12.40	1.00	0.00	0.00	0.96	0.96	N/A	No

# Stockport Interchange



## Key:

### Depth to water



- Response zone *fully* flooded during sampling
- Response zone *significantly* flooded during sampling
- Datum or response zone information missing. Response zone flooding cannot be calculated



- Methane** > 1% v/v
- Carbon Dioxide** > 5% v/v
- Gas Flow** > 70 l/hr

## Visit 2, Event: September 2018, Date: 07/09/2018

## Sheet 2 of 2

Engineer	Jess Kinchington
Start/End Time	09:23 - 16:30
Pressure Start/End (mB)	1009 - 1007
Temperature (Deg C)	12.00
Weather Conditions	Overcast

<b>Equipment</b>	<b>SerialNo</b>	<b>Calibrated</b>
Gas Analyser	11941	Yes
Interface Probe	WPS000116	Yes

**Comments and Ground Conditions:** BH112- Bentonite in gas tap, gas reading taken after gas tap cleared. WS220 inaccessible due to stockpile. WS204 lost in thirty party compound. BH104 underneath puddle in carriage way.

Borehole	Response Zone (m)		Gas Flow (l/hr)		Borehole Differential Pressure Pa	Methane (% v/v)		Carbon Dioxide (% v/v)		Oxygen (% v/v)		Other Gases (ppmV)			Depth to Water m	Depth to Base m	Thickness of product mm	Sampled ?
	Top	Base	Initial	Steady		Initial	Steady	Initial	Steady	Initial	Steady	PID	H2S	CO				
WS218	1.00	2.50	0.00	0.00		0.00	0.00	0.30	2.00	19.70	16.60	1.00	0.00	0.00	2.35	N/A	No	
WS217	1.00	2.50	0.00	0.00		0.00	0.00	1.20	3.60	19.80	16.40	1.00	0.00	0.00	2.25	N/A	No	