

UPDATED REMEDIATION REPORT

AT

FORMER ROYD EDGE MILL,  
MELTHAM  
WEST YORKSHIRE

FOR

ROYD EDGE MILL DEVELOPMENTS LTD

REPORT REF: REMD 3537Rem

Engineering Geologists and Environmental Scientists



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## QUALITY MANAGEMENT FOR REPORT

Project	Royd Edge Mill Development, Thick Hollins Lane, Meltham	Updated Remediation Report for Royd Edge Mill Development	
Client	Royd Edge Mill Developments Ltd		
Date	April 2024		
Version	1		
Reference	REMD 3537Rem		
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## 1. INTRODUCTION

### 1.1 The Report

Royd Edge Mill Developments Ltd proposes to construct residential housing on land situated at Royd Edge Mills, Meltham, West Yorkshire. This report describes the remediation proposed to enable the site to be suitable for residential use. The report was commissioned by the client Brook Group Holdings Ltd in 2010 and was carried out by the Ashton Bennett Consultancy. This Report updates the Remediation Statement taking into account up to date government guidance in 2024.

A Phase I and a Phase II Intrusive Ground Investigation were undertaken on the site by this Consultancy the Ashton Bennett Consultancy and reported to Brook Group Holdings Ltd as Report No BGH 2575. The Remediation Statement presented as BGH 2754 in 2010 describes further investigative work undertaken to delineate potential contamination and describes the remediation required on the site to render the site suitable for its proposed residential use.

The Remediation Strategy aims to satisfy the local Environmental Protection Department that the remediated site will be environmentally fit for purpose; it aims to satisfy the requirements of the Local Building Control and Building Insurance and aims to ensure that construction workers are not detrimentally affected by the remediation and redevelopment, and that future occupants will not be detrimentally affected by compounds on the site.

This report describes the Remediation Strategy for the site work and will be followed by a Validation Report on completion of remediation.

Borehole Location Plans are presented in Appendix A. Borehole Logs are presented in Appendix B and Environmental Test Results are presented in Appendix C.

## 1.2 The Author

This report was prepared by Frances A Bennett an engineering geologist who has a degree in Geology, a postgraduate qualification in Soil Mechanics and is a Chartered Geologist CGeol, Chartered Environmentalist CEnv and Chartered Water and Environmental Manager C.WEM and FIMMM with 45 years of experience in the fields of geology, geotechnical engineering, hydrogeology, contamination, mining, slope stability and waste disposal.

## 1.3 Sources of Information

The following data have been referenced in relation to compiling this Report:

1. Geological mapping from British Geological Survey 1:50,000,
2. Geological mapping from British Geological Survey 1:10,000
3. Karl Terzaghi, Ralph B Peck and Gholamreza Mesri, Soil Mechanics in Engineering Practice, John Wiley and Sons Inc., Third Edition (1996).
4. BS 5930:2015, Code of Practice for Ground Investigations, British Standards Institute
5. NHBC Part 4 Foundations, Chapter 4.4 Strip and Trench Fill Foundations, ( 2010 and 2020).
6. Assessing Risks posed by hazardous ground gas to buildings, CIRIA C665, 2007.
7. Protecting Development from methane, CIRIA Report 149, CB Card, 1995.
8. Verification Requirements for Gas Protection Systems, YALPAG, Dec 2016.
9. BS8485 :2015+2019, Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
10. Verification Requirements for Cover Systems, YALPAC, October 2014.
11. The LQM / CIEH S4ULs for Human Health Risk Assessment, Land Quality Press, Nottingham, 2015.
12. Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, Report Ref. No. 10/MM/03/21.UKWIR. 2010.

The information for this report is also from sources recommended by the Institute of Civil Engineers (ICE), the Association of Geotechnical and Geoenvironmental Specialists (AGS), Construction Industry Research and Information Association (CIRIA) and the Department of the Environment Transport and the Regions (DETR). The report has been compiled in accordance with the latest ICE, DETR, Department of Environment, Food and Rural Affairs (DEFRA), British Standard Draft Documents and British Standards, CIRIA, CLR 11 & other CLEA Reports and Eurocode 7.

## 2. THE SITE

### 2.1 Site Location

The site comprised a former textile dyeworks and associated buildings situated on an area of land lying at the end of a lane leading to the west off Thick Hollins Road to the south of Meltham town centre in West Yorkshire. At the time of the ground investigations, the site comprised empty single and two storey buildings of the former mill which ceased working around twenty years ago, open ground and areas where buildings have been demolished.

The site is bounded to the north by open land and Hebble Lane at a higher ground level. To the east the site is bounded by open land a housing area known as Calmlands, Thick Hollins Clough and Thick Hollins Lane. To the west the site is bounded by open land and woodland within the Royd Edge Clough valley. To the south the site is bounded by Royd Edge Clough with open land, houses and Royd Road beyond. The site is accessed from the lane leading off Thick Hollins Road and the centre of the site lies around National Grid Reference 410100E 409900N at a height of around 180m aOD.

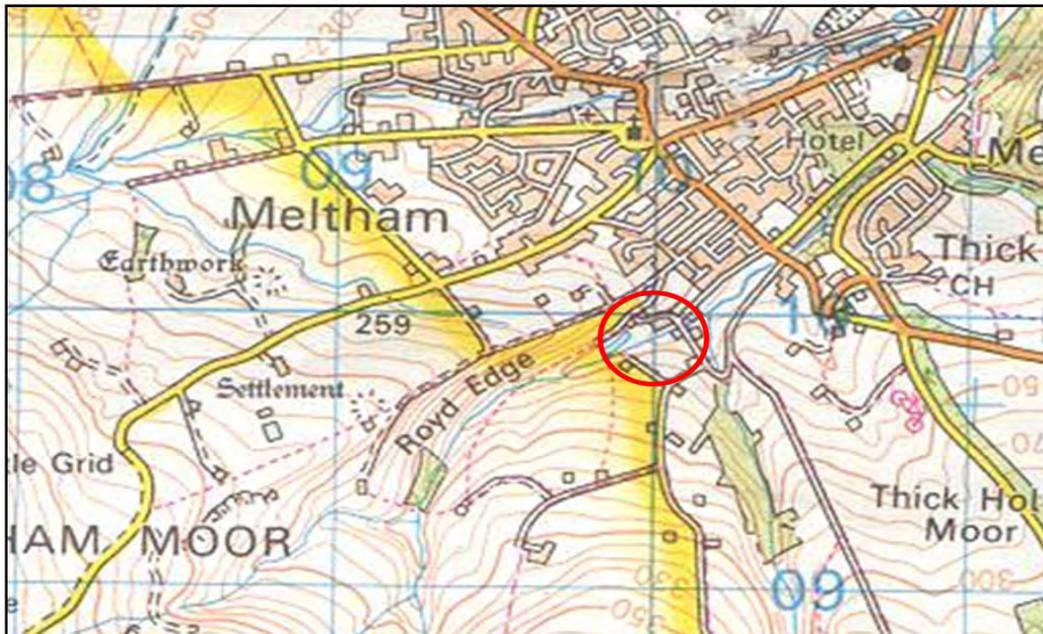


Figure 1 Site Location Plan

## 2.2 Site Description

The site is divided into three areas by the access road leading off Thick Hollins Road. The access road extends in a south west direction through the site with former warehouses to the north west and with a concrete pad from demolished buildings and a treatment plant to the south east. In the centre of the mill complex the access path turns south east to local residential housing and a footpath leads to the west following the valley of Royd Edge Clough. To the west of the access road and footpath were the older buildings of the site, now demolished, and the existing mill pond.

The older buildings included the original dye mill buildings constructed of stone on either side of the Royd Edge Clough and which were added to and extended over the years to spread across the lower area of the valley. The majority of the buildings were of stone with some brick and with a brick chimney. In the north of this area was a stone constructed narrow water wheel building and adjacent water tower. Some of the floors of the mill were stone but the majority were concreted. Tanks to the south of the buildings held oil to supplement the coal fuel for the boilers. Tanks to the immediate east of the buildings held coal dust for the boilers.

Royd Edge Clough flows to the south west corner of the former older mill buildings and is culverted beneath the former buildings and exiting to the east of the access road. The mill dam lies to the north west of the former older buildings at a generally higher elevation and extends westwards to Hebble Road. The mill pond is fed from a mill race where the water from Royd Edge Clough is diverted into the mill race some distance higher up the Royd Edge Clough valley where they lie at a similar elevation. Evidence of an old sluice gate is present.



## 4. RESULTS OF PHASE II GROUND INVESTIGATION

### 4.1 General

A ground investigation was undertaken in August and September 2006 and comprised the drilling of 41 boreholes to depths of up to 6.10m and included geotechnical and environmental testing. Monitoring for toxic gases was undertaken in 5 boreholes. Sixty seven soil samples were tested for a screen for contamination including heavy metals, speciated PAH, TPH, asbestos, pesticides, VOC, SVOC, and PCBs. In addition, five groundwater samples were tested for a screen for contamination and for speciated PAH, pesticides and VOC and SVOC. Three surface water samples from Royd Edge Clough were tested for a screen for contamination and speciated PAHs.

### 4.2 Ground Conditions

The results from the forty one window sampler boreholes were used to interpret the strata sequence. The ground investigation broadly confirmed the ground conditions to consist of the generalised sequence as detailed in Table 1. The general ground conditions were found to comprise variable Made Ground to depths of between 0.15m and 5.10m below ground level (bgl), but generally 1.00m to 2.00m. The made ground rested on silty sandy clay or clayey sand encountered to 2.00m to 3.00m bgl. Bedrock was encountered at depths of between 0.30m(WS22 and WS24) to 5.45m(WS41) bgl and proven to 6.10m bgl (WS11).

**TABLE 1**  
**Ground Conditions Encountered in Phase II Ground Investigation**

WS No	Made Ground in m bgl	Sand In mbgl	Clay in m bgl	Sandstone in m bgl	Mudstone/ Shale in m bgl
1	GL-0.15	0.15-0.85	0.15-2.10		2.10-3.225
2	GL-2.10		2.10-2.875		
3	GL-1.10	1.10-2.10			2.10-2.55
4	GL-0.85				0.85-3.55
5	GL-2.10	2.10-3.55			
6	GL-0.55	0.55-2.10	2.10-2.85	2.85-3.25	
7	GL-2.10		2.10-3.10	4.70-5.50	3.10-4.70 5.50-5.70
8	GL-1.30				
9	GL-1.10				
10	GL-2.85				2.85-5.10
11	GL-5.05			5.05-6.10	
12	GL-2.10		2.10-3.10	3.10-3.55	
13	GL-2.10			2.10-2.75	2.75-3.55
14	GL-1.10				
15	GL-1.85				
16	GL-3.00				3.00-3.55
17	GL-0.55				
18	GL-1.90				
19	GL-1.55				
20	GL-1.10		1.10-1.55	1.55-3.10	3.10-3.55
21	GL-1.75		1.75-2.55	2.55-4.33	4.33-4.80
22	GL-0.30				0.30-2.10
23	GL-0.55	0.55-0.75 Coal		0.75-1.00	1.00-2.10
24	GL-0.30				0.30-2.10

25	GL-0.25		0.25-0.80		0.80-2.55
26	GL- 0.50				0.50-1.55
27	GL-0.45				0.45-1.55
28	GL-0.25		0.25-2.00		2.00-2.55
29	GL-2.10		2.10-3.10	3.10-4.35	4.35-4.50
30	GL-0.55		0.55-1.10	1.10-2.10	2.10-4.10
31	GL-2.10			2.10-4.20	4.20-4.60
32	GL-1.30		1.30-3.20	3.20-4.40	
33	GL-0.30	0.30-3.70		3.70-4.10	
34	GL-1.20		1.20-4.70		4.70-5.00
35	GL-2.10	2.10-3.20		3.20-3.55	
36	GL-5.10				
37	GL-0.75	0.75-1.85			1.85-3.55
38	GL-5.00				5.00-5.55
39	GL-5.10				
40	GL-5.10				
41	GL-3.55		3.55-5.45	5.45-5.55	

The made ground comprised a loose brown grey silty sandy topsoil or concrete core underlain by loose black ash and clinker with coal, brick and sandstone fragments in a sand or clay matrix. Putrescible waste was not encountered. The made ground was generally less than 1.0m in thickness beneath the older mill buildings. Beneath the southern two thirds of the former more modern buildings a cellar was present and boreholes were sunk through the floor and beneath the cellar floor. Made ground beneath the cellars was less than 1.00m below cellar floor level.

In the area of the now demolished warehouse the ground has been levelled in the past to support the warehouse and made ground in this area extended up to 5.00mbgl and comprised brick and stone and in places could not be penetrated by the drill (WS39 and WS40). The made ground was everywhere underlain by completely weathered sandstone and mudstone represented by sandy and clayey residual soil respectively.

The made ground was underlain by the sand and clay weathered derivatives of sandstone and mudstone and extended to depths of 0.75m (WS23) to 5.45m (WS41) bgl.

Bedrock was encountered at depths varying between 0.30m in WS21 and WS24 and 5.45m in WS 41 and was not encountered at depths of 5.10m in WS39 and WS40. Bedrock was proven to a maximum depth of 6.10mbgl in WS11. Bedrock comprised grey silty mudstones, yellow brown coarse grained sandstones and dark grey thinly laminated shale.

In summary the site is generally underlain by made ground to depths of less than 1.00m to in excess of 5.00m where the ground has been levelled by placement of made ground for development of a warehouse in the past. The made ground is underlain by the weathered product of the Carboniferous strata. This includes sandstone, mudstone with thin coal and a dark grey thinly laminated shale. The bedrock reflects the geology of the site with mudstone and shale encountered along the northern boundary of the site, and sandstone beneath the mudstone encountered along the southern boundary of the site.

### 4.3 Groundwater Conditions

Groundwater was encountered as dampness in several of the boreholes and the majority were dry. Monitoring of groundwater over a period of six weeks gave levels of 1.85m to 4.67m bgl.

Levels were generally 2.00m to 3.00m bgl and it is possible that higher groundwater levels may be encountered after heavy rainfall.

#### 4.4 Gas Conditions

Monitoring for toxic gases was undertaken in five boreholes on 6 occasions over 2 months as recommended by CIRIA C665 for a situation of very low gas generation potential and a future use of low to moderate risk for residential housing.

The results gave oxygen levels of 14.20% to 20.60%, carbon dioxide levels of nil to 4.70% and methane levels of nil. No gas flows have been recorded.

The following figures 3, 4, 5 and 6 are taken for BS8485:2016 and are used to calculate the characteristic gas situation or CS, the type of development and the gas protection score for the gas situation on the site.

The borehole  $Q_{hg}$  (in L/h) should be calculated for each monitoring location and each monitoring event using the following (for each hazardous gas):

$$Q_{hg} = q \left( \frac{C_{hg}}{100} \right) \quad (1)$$

where:

- $q$  is the measured flow rate (in litres per hour) of combined gases from the monitoring standpipe.
- $C_{hg}$  is the measured hazardous gas concentration (in percentage volume/volume).

**Figure 3 Calculation of CS**

For this site the methane recorded was nil and the highest carbon dioxide was 4.7%, and therefore the carbon dioxide figure was used for calculation of the CS.

Although no flow was recorded, an assumption of 1l/hr was used for calculations. Thus, the  $CS = 1 \times 4.7 / 100 = 0.047$ . Based of Figure 4 reproduced from BS8485, the site falls within a CS1 of very low, which equates to a methane level of <1% and a carbon dioxide level of <5%. This is a true representation of gas conditions encountered on the site.

Table 2 CS by site characteristic GSV

CS	Hazard potential	Site characteristic GSV <sup>A1</sup> L/h	Additional factors
CS1	Very low	<0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	0.07 to <0.7	Typical measured flow rate <70 L/h (otherwise consider an increase to CS3)
CS3	Moderate	0.7 to <3.5	–
CS4	Moderate to high	3.5 to <15	–
CS5	High	15 to <70	–
CS6	Very high	>70	–

<sup>A1</sup> The figures used in this column are empirical.

**NOTE** The CS is equivalent to the characteristic GSV in CIRIA C665 [6].

**NOTE 2** The results from the models can be used to determine the scope of gas protection measures needed for a building and to design any necessary underfloor ventilation.

**NOTE 3** This approach is of particular use where gas migrates through the ground from a source adjacent to the site (e.g. where landfill gas migration occurs).

**NOTE 4** Further information on detailed quantitative risk assessment is provided in the Ground Gas Handbook [4].

**Figure 4 CS by Gas Characteristics**

Based on Figure 5, the proposed construction of residential private houses falls within Type A building type.

Type A is a high risk building type. Figure 6 indicates that for a building type A and characteristics situation of CS1, there are no precautions required for construction. Thus, no methane protective membrane is required for the houses.

A Radon barrier is required based on BRE data.

No VOCs or SVOCs were detected on the site.

	Type A	Type B	Type C	Type D
<b>Ownership</b>	Private	Private or commercial/public, possible multiple	Commercial/public	Commercial/industrial
<b>Control (change of use, structural alterations, ventilation)</b>	None	Some but not all	Full	Full
<b>Room sizes</b>	Small	Small/medium	Small to large	Large industrial/retail park style

- **Type A building:** private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.
- **Type B building:** private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.

**Figure 5 Building Types**

CS	Minimum gas protection score (points)			
	High risk	Medium risk		Low risk
	Type A building	Type B building	Type C building	Type D building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 <sup>A)</sup>	5.5 <sup>A)</sup>	4.5	3.5
5	— <sup>B)</sup>	6.5 <sup>A)</sup>	5.5	4.5
6	— <sup>B)</sup>	— <sup>B)</sup>	7.5	6.5

<sup>A)</sup> Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

<sup>B)</sup> The gas hazard is too high for this empirical method to be used to define the gas protection measures.

**Figure 6 Gas Protection score by CS and Type of Building**

#### 4.5 Contamination Conditions

The soil samples tested for contamination were assessed against standards and guidelines available in 2006 and detected elevated levels of boron, copper, nickel, zinc, arsenic, cadmium, chromium, lead, sulphide and sulphate in various boreholes. The results indicated that remediation was required in several areas of the site for residential use and a Phase III Intrusive Ground Investigation and environmental testing was designed to determine exact depths and extent of contamination for design of remediation. As the government published new guidelines for assessment in 2009 the environmental test results of the 2006 investigation were reassessed during the 2009 Phase III investigation.

All groundwater and surface water samples were free from contamination.

Of the soil samples tested those where contamination was detected are recorded in Table 2 as amended according to the ATRISK 2009 guidelines for contamination levels for residential use based on the CLEA framework. The boreholes with the highest levels of contamination were detected in the oldest part of the dye house and in the made ground in the southern part of the site.

**TABLE 2**  
**Contamination Detected in Phase II Ground Investigation**

No of BHs	Borehole Nos	Contaminant	Level in mg/kg	SSV in mg/kg ATRISK 2009
8	4, 5, 7, 11, 11, 12, 39, 40	Arsenic	38 to 574	32
1	36	Cadmium	15.50	8.59
3	12, 12, 31	Chromium	4885 (0.20m) 371.3 (2.00m)	14.70
5	7, 12, 16, 36, 40	Lead	170 to 585 (0.20m)	168
2	1, 3	Sulphide	602 to 1901	250
6	1, 10, 11, 12, 19, 40	Sulphate	2517 to 7760	>2400
6	1, 3, 5, 7, 11, 36	PAHs total	40 to 6468	<40

Phytotoxic compounds of copper, boron, nickel and zinc were detected above guidelines in several boreholes, but these are unlikely to cause a risk to the site but may restrict plant growth. Soil testing during the Phase II Ground Investigation proved the soil, where tested, to be uncontaminated by mercury, selenium, cyanide, thiocyanate, sulphur, phenol, TPHs, asbestos fibres, pesticides, PCBs, volatile and semi volatile organics.

Testing of groundwater and surface water samples upstream and downstream of the site indicated the waters to be uncontaminated by heavy metals, sulphide, sulphur, sulphate, speciated PAHs, pesticides, volatile and semi volatile organics.

Of 41 boreholes sunk, 34 samples were tested from 29 boreholes, of which 14 boreholes had contaminating levels of at least one compound and 15 boreholes were uncontaminated at the depths tested. Boreholes which were contaminated by several compounds included WS11, 12, 36 and 40. These were located in the oldest part of the dye house and in the made ground in the southern part of the site.

## 5. PHASE III GROUND INVESTIGATION

### 5.1 General

As a result of the Phase II Ground Investigation there were several areas on the site where contamination was identified. A Phase III Ground Investigation was therefore undertaken to determine the extent and depth of the contamination in order to enable design of a suitable Remediation Strategy. The Phase III investigation was undertaken in March 2009 and October 2009 and comprised the drilling in March 2009 of 25 window sampler boreholes referenced WSA to WSW and collection of soil samples for testing for environmental nature to establish requirements for remediation. In October 2009 a further 17 window sampler boreholes referenced WS1A to WS17A and 2 shell and auger boreholes referenced BH1 and BH2 were drilled for geotechnical design and some additional further environmental testing.

Borehole Location Plans are presented in Appendix A. The borehole logs are presented in Appendix B, Environmental Test Results are presented in Appendix C.

### 5.2 Ground Conditions

The ground conditions encountered were similar across the site of made ground underlain by clay and overlying bedrock comprising sandstone and mudstone. The boreholes drilled around the mill pond area in the north west of the site encountered soft clays overlying the bedrock.

The made ground extended from depths of around 1.00m bgl to 3.00m bgl in the western area of the site and deepening up to a maximum of 8.30m bgl in the southern part of the site immediately north of Royd Edge Clough. The made ground was usually underlain by firm clay representing weathered mudstone overlying weak mudstone encountered from depths as shallow as 0.135m bgl to 8.30m bgl. The made ground mostly comprised loose ash and clinker with gravel of sandstone and sand and reworked clay. The underlying clay was brown to grey and generally of firm consistency becoming stiff with depth and represented weathered mudstone. In the southern part of the site between the access road and Royd Edge Clough the made ground and/or clay was underlain by weak sandstone.

Boreholes drilled in the northwest of the site around the mill pond encountered 200mm of top soil underlain by loosely compacted sand and a thick layer of very soft to soft wet clay that extended to depths of up to 7.10mbgl and underlain by mudstone.

Boreholes drilled in the south west encountered bedrock at shallow depth, boreholes between the mill pond and Royd Edge Clough encountered bedrock at generally 1.00m to 3.00m bgl and boreholes drilled in the south of the site between the access road and Royd Edge Clough encountered bedrock at depths of 3.00m to over 8.00m bgl.

**TABLE 3**  
**Ground Conditions in Phase III Ground Investigation**

WS No	MADE GROUND Depth in mbgl	CLAY Depth in mbgl	MUDSTONE Depth In mbgl	WEATHERED SANDSTONE Depth in mbgl
WSA	GL-1.00		1.00-2.00	
WSB	GL-1.00		1.00-2.00	
WSC	GL-0.135		0.135-1.10	
WSD	GL-1.90		1.90-2.00	



WSE	GL-0.85	0.85-2.10	2.10-3.10	
WSF	GL-0.85	0.85-2.10	2.10-3.10	
WSG	GL-0.80	0.80-1.60	1.60-2.10	
WSH	GL-0.50	0.50-2.80	2.80-3.10	
WSI	GL-1.10	1.10-2.10	2.10-2.80	
WSJJ	GL-3.30		3.30-3.60	
WSJ	GL-0.35+			
WSK	GL-3.00		3.00-3.30	
WSL	GL-2.80		2.80-3.10	
WSM	GL-2.80		2.80-3.10	
WSN	GL-3.10		3.10-4.00	4.00-4.60
WSNN	GL-3.10		3.10-4.00	4.00-4.60
WSO	GL-5.00			5.00-5.10
WSP	GL-2.50			2.50-5.10
WSQ	GL-2.00			2.00-3.10
WSR	GL-3.00+			
WSS	GL-1.60			1.60-3.10
WST	GL-3.10			3.10-4.90
WSU	GL-3.10	3.10-5.10		
WSV	GL-1.60	1.60-2.10		
WSW	GL-0.60	0.60-2.10		
WS1A	GL-3.10	3.10-7.10	7.10-7.55	
WS2A	GL-3.10	3.10-7.10	7.10-7.55	
WS3A	GL-1.10	1.10-6.90	6.90-7.10	
WS4A	GL-1.10	1.10-6.00	6.00-7.175	
WS5A	GL-0.20	0.20-5.90	5.90-6.20	
WS6A	abandoned			
WS7A	GL-5.80			5.80-7.50
WS8A	GL-4.80		4.80-6.55	
WS9A	GL-1.80		1.80-2.55	
WS10A	GL-0.30		0.30-1.16	
WS11A	GL-1.20	1.20-3.00	3.00-3.55	
WS12A	GL-2.50	2.50-3.00	3.00-3.475	
WS13A	GL-2.70	2.70-3.10	3.10-3.55	
WS14A	GL-1.20	1.20-2.20	2.20-2.55	
WS15A	abandoned			
WS16A	GL-0.40	0.40-2.10	2.10-2.55	
WS17A	GL-3.55+			
BH1	GL-2.40	2.40-8.30	8.30-8.60	
BH2	GL-7.80		7.80-8.30	

Note Boreholes WS1A to 17A and BH1 and BH2 were drilled for geotechnical design and are reported in full in Report No BGH 2805.

### 5.3 Groundwater Conditions

Wet ground conditions were encountered during drilling in WS1A, WS2A, WS3A, WS11A at 2.40mbgl and in WS12A at 2.50mbgl. It is expected that groundwater may be encountered during construction especially during and after heavy rainfall at the base of the made ground where it overlies impermeable strata and in the soft clay encountered in WS1A to WS3A.

## 5.4 Contamination Conditions

### 5.4.1 Standards

There are no definitive legal standards for contaminated land in the United Kingdom, although the Government Department of the Environment in the late 1970's published guidance on a restricted number of contaminants. Further guidance was published in March 2002 as the Contaminated Land Exposure Assessment (CLEA) by the Department of Environment, Food and Rural Affairs (DEFRA). These were withdrawn in August 2008 and new guidelines are becoming available in 2009/10. The UK Risk Assessment Framework is based on a tiered approach, Tier 1 being a risk screening or qualitative risk assessment, Tier 2 is a generic quantitative risk assessment and Tier 3 is a detailed quantitative risk assessment. Where the Tier 2 identifies a potentially unacceptable risk to human health either a Tier 3 Detailed Quantitative Risk Assessment (DQRA) is undertaken, or risk management action recommended to remove the pathway and the risk.

For this site both a Tier 1 and Tier 2 assessment have been undertaken using generic assessment criteria and site specific assessment criteria based on CLEA 2009 and ATRISK 2009 which are based on the new CLEA guidance 2008 and 2009 (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report), SC050021/SR4, CLEA Software version 1.04 (2009) and toxicological reports and SGV technical notes (2009)). The site will be used for residential housing with gardens, landscaped ground and hard cover. The risk assessment has used a scenario of residential use with plant uptake as the model for assessment in order to be conservative. In deriving the SSVs a child has been chosen as the critical receptor with exposure over a lifetime being the most appropriate and conservative scenario.

Assessment of groundwater and leachate was against drinking water standards or EQS where available and acceptable leachate for landfill.

The assessment of the risks to users on the site has been undertaken within the framework set out in guidance published by DEFRA and the Environment Agency for the assessment of risks to human health associated with chronic long term exposure to contaminated soils. The guidance set out in this documentation has been used to establish a conceptual model of the risks on the site following redevelopment.

The Contaminated Land Exposure Assessment (CLEA) model provides a means of establishing concentrations of contamination in soils at a site. Assessment was undertaken using ATRISK 2009 guidelines. If results exceed these concentrations, then further assessment or intervention by mitigation or remediation may be required to reduce risks to human health.

### 5.4.2 Environmental Tests on Soils

Forty five soil samples were collected from GL-3.00m depth below ground level and all forty five were selected for testing for the presence of various potentially contaminating compounds according to guidelines of the CLR documentation. Eighteen soil samples were tested for a range of metals, twenty soil samples were tested for speciated PAH, six were tested for TPH and eight for gasoline range organics (BTEX and aromatic/aliphatic carbon ranges), two for asbestos, two for chromium VI, nine for sulphate and three for sulphide. Results are presented in Appendix C. One groundwater sample was tested and the results are presented in Appendix C. Four samples from the deep made ground south of the access road were tested for leachability and results are presented in Appendix C.



**TABLE 4**  
**Results of Environmental Tests on Soils**

Compound	No of samples tested	Min value mg/kg	Max value mg/kg	SSV guideline residential with plant uptake mg/kg	Samples exceeding 2009 guidelines
<b>Phytotoxic</b>					
Copper	18	<3.2	256.5	4020	None
Nickel	18	<2.7	56.40	130	None
Zinc	18	<19.70	341.70	17200	None
<b>Metals</b>					
Arsenic	18	2.00	117.20	32.0	WSB, P, R, S, T, U
Cadmium	18	<0.10	0.93	8.59	None
Chromium	18	<3.20	73.30	14.7	WSB, C, H, J, K, N, P, R, S, T, U, BH1, BH2
Chromium vi	2	<0.10	<0.10	14.7	None
Lead	18	<3.80	1570	168	WSS, T, U, BH2
Mercury	18	<0.10	0.13	1	None
Selenium	18	<0.50	4.90	350	None
<b>Organics</b>					
PAH speciated	16	See Table 5	See Table 5	See Table 5	WSE, WSG, WSL, WSM, WST
Phenol	2	<0.60	<0.70	1930	None
TPH speciated	8	See text	See text	See text	None
TPH total	2	338	371	500	None
PCB	2	<0.005	<0.0052	1	None
<b>Others</b>					
Sulphate	9	39	1300	2400*	None
Sulphide	3	<0.50	15.70	250**	None
pH	8	5.7	10.9	5-11	None
Asbestos	2	NBFO	NBFO	NBFO	None

\*BRE Special Digest 2007

NBFO=No Bulk Fibres Observed

The site where tested was found to be free of phytotoxic compounds. The site was found to be contaminated by arsenic, chromium, and lead. Arsenic exceeded guideline levels in WSP at 0.80m, WSR at 1.5m, WSS at 0.5m, WST at 0.50m and WSU at 0.50m which are all situated in the eastern area of the site around the concrete pad where a building was demolished, arsenic guideline levels were also exceeded in WSB at 0.50m in the south west part of the site. Chromium exceeded guideline levels in WSB at 0.50m, WSC at 0.20m and WSK at 0.50m in the south west of the site area, WSH at 0.80m and WSJ at 0.50m immediately north of the Clough, WSN at 0.80m and 1.80m in the north of the site, and WSP at 0.80m, WSR at 1.50m, WSS at 0.50m, WST at 0.50m and WSU at 0.50m, to the east of the site and in BH1 and BH2 in the south of the site. Lead exceeds guideline values in WSS at 0.50m, WST at 0.50m and WSU at 0.50m in the east of the site.

The soil samples tested were found to be uncontaminated by cadmium, copper, mercury, nickel, selenium, zinc, and sulphide. No asbestos fibres were encountered in the soil samples tested.

The test results confirmed the extent of remediation required. The results confirmed that the contamination by arsenic, chromium and lead is widespread in the western and southern areas of the site at depths from ground level to >1.50m bgl. The levels of PAHs confirmed they are widespread in the proposed landscaped area between plots 29 and 30 and plots 25, 26, 27 and 28, probably due to the former presence of fuel tanks and possibly the area where waste from the mill chimney was deposited in the past. The levels of hydrocarbons were only exceeded in the sample collected from waste collected within the fuel tank bunding which has since been removed from site. Details will be presented in the Validation Report.

**TABLE 5**  
**Test Results for Polyaromatic Hydrocarbons**

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg										2009 Guideline Residential with plant uptake mg/kg
	WS1 A	WS3 A	WSB	WSE	WSF	WSG	WSJ	WSK	WSL	WSM	
Naphthalene	<0.09	<0.12	<0.10	0.51	0.22	56.45	<0.10	<0.10	<4.00	1.63	8.71
Acenaphthene	<0.09	<0.12	0.11	8.40	0.12	118.4	<0.10	<0.10	52.16	20.97	937
Acenaphthylene	<0.09	<0.12	<0.10	<0.50	0.12	4.71	<0.10	<0.10	<4.00	1.00	20.90
Fluorene	<0.09	<0.12	<0.10	10.54	0.10	152.1	<0.10	<0.10	67.52	24.71	746
Phenanthrene	0.22	0.43	1.25	74.29	1.54	877.7	0.80	<0.10	590.4	193.6	-
Anthracene	<0.09	0.10	0.27	27.38	0.70	336.6	0.24	<0.10	222.1	82.94	20.90
Fluoranthene	0.38	0.97	1.30	86.07	3.97	920.4	0.93	<0.10	507	204.9	113
Pyrene	0.30	0.70	0.97	63.82	3.21	668.9	0.80	<0.10	369.8	148.2	13.20
Benzo(a)anthracene	0.21	0.53	0.42	27.90	1.78	283.8	0.42	<0.10	152	63.10	8.54
Chrysene	0.24	0.52	0.40	24.67	1.82	256.3	0.44	<0.10	134.8	55.02	2.64
Benzo(b)fluoranthene	0.20	0.53	0.45	26.67	2.47	260.1	0.41	<0.10	138.8	57.71	7.29
Benzo(k)fluoranthene	0.09	0.18	0.17	9.83	0.78	95.75	0.14	<0.10	53.7	21.70	4.12
Benzo(a)pyrene	0.15	0.37	0.34	22.48	1.66	220.6	0.32	<0.10	121	50.14	0.998
Indeno (1,2,3,cd)pyrene	<0.09	0.24	0.24	13.97	1.00	134.1	0.19	<0.10	73.30	31.26	0.368
Dibenzo(ah)anthracene	<0.09	<0.12	<0.10	2.94	0.28	27.53	<0.10	<0.10	14.90	6.10	0.0236
Benzo(ghi)perylene	<0.09	0.21	0.21	11.22	1.08	105.1	0.16	<0.10	58.97	25.30	0.112
<b>TOTAL PAH</b>	<b>&lt;2.56</b>	<b>&lt;5.44</b>	<b>&lt;6.53</b>	<b>&lt;411</b>	<b>21.16</b>	<b>4469</b>	<b>&lt;5.28</b>	<b>&lt;1.55</b>	<b>2565</b>	<b>988.4</b>	

Polyaromatic Hydrocarbon Compounds In mg/kg	Levels of Polyaromatic Hydrocarbons In mg/kg										2009 Guideline Residential with plant uptake mg/kg
	WSQ	WSR	WSS	WST	WSV	BH1	BH2	TAN K	S1	S2	
Naphthalene	0.15	0.22	0.32	2.59	<0.11	<0.09	<0.12	<0.15	0.26	<0.10	8.71
Acenaphthene	<0.1	<0.11	<0.11	1.05	<0.11	<0.09	<0.12	1.89	1.77	0.25	937
Acenaphthylene	0	<0.11	<0.11	<0.50	<0.11	<0.09	<0.12	<0.15	0.14	<0.10	20.90
Fluorene	<0.1	<0.11	<0.11	0.58	<0.11	<0.09	<0.12	4.04	2.85	0.35	746
Phenanthrene	0.62	0.58	0.45	14.66	0.12	0.22	0.43	13.73	23.41	3.12	-
Anthracene	0.14	<0.11	<0.11	4.54	<0.11	<0.09	0.10	1.62	8.09	1.23	20.90
Fluoranthene	0.91	0.79	0.80	65.53	0.25	0.38	0.97	5.38	18.23	3.72	113 16



Pyrene	0.80	0.67	0.64	55.18	0.20	0.30	0.70	6.29	13.20	2.78	13.20
Benzo(a)anthracene	0.52	0.42	0.33	28.31	0.12	0.21	0.53	0.98	5.40	1.10	8.54
Chrysene	0.57	0.51	0.41	27.76	0.15	0.24	0.52	2.65	5.22	1.22	2.64
Benzo(b)fluoranthene	0.65	0.59	0.55	39.52	0.21	0.20	0.53	3.30	5.38	1.31	7.29
Benzo(k)fluoranthene	0.30	0.23	0.19	13.48	<0.11	0.09	0.18	1.05	2.00	0.47	4.12
Benzo(a)pyrene	0.48	0.36	0.36	32.05	0.10	0.15	0.37	1.98	4.04	0.94	0.998
Indeno (1,2,3,cd)pyrene	0.33	0.42	0.31	24.39	0.12	<0.09	0.24	2.00	2.02	0.54	0.368
Dibenzo(ah)anthracene	<0.1	<0.11	<0.11	4.29	<0.11	<0.09	<0.12	0.38	0.50	0.11	0.0236
Benzo(ghi)perylene	0.29	0.49	0.29	21.43	0.11	<0.09	0.21	1.60	1.46	0.46	0.112
<b>TOTAL PAH</b>	<b>&lt;6.1</b>	<b>&lt;5.84</b>	<b>&lt;5.18</b>	<b>&lt;336</b>	<b>&lt;2.14</b>	<b>&lt;2.56</b>	<b>&lt;5.44</b>	<b>&lt;46.9</b>	<b>94.00</b>	<b>&lt;17.8</b>	

NOTES to TABLES - SSV are Atkins Soil Risk ATRISK site specific values for soil screening for which the risk assessment methodology can be provided.

The site was found to be uncontaminated by the polyaromatic hydrocarbons tested in half of the 20 samples tested with elevated levels of more than 9 compounds in 5 samples and elevated levels of benzo(a)pyrene in 8 samples and elevated dibenzo(a)anthracene in 14 samples and elevated benzo(ghi)perylene in 15 samples. The PAHs were encountered in WSE, WSG, WSL, WSM and WST where a number of PAH compounds tested exceeded guideline values.

The samples tested were found to be uncontaminated by gasoline range organics (BTEX and aromatic/aliphatic carbon ranges). The samples tested were found to be uncontaminated by total petroleum hydrocarbons with the exception of the sample from the bunding of the fuel tank.

**TABLE 6**  
**Test Results for Total Petroleum Hydrocarbons (TPH) Fractions**

TPH Fraction	Total Petroleum Hydrocarbons In mg/kg								2009 Guideline Residential with plant uptake mg/kg
	WSA	WSB	WSJ	BH1	BH3	TANK	S1	S2	
<b>Aliphatics</b>									
C5-C6	<0.2	<0.2	<0.2	<0.2	<0.3	<0.9			1
>C6-C8	<0.2	<0.2	<0.2	<0.2	<0.3	<0.9			1
>C8-C10	<5	<5	<5.40	<5	<6	47			14.5
>C10-C12	<5	<5	<5.40	<5	<6	624			87.7
>C12-C16	<5	<5	<5.40	<5	<6	15800			126
>C16-C35	<5	<5	44	<13.7	23.3	27500			88200
>C35-C40	<10.87	<10.88	240	<5	<6	6580			88200
<b>Aromatics</b>									
C5-C7	<0.2	<0.2	<0.2	<0.01	<0.01	<0.5			1
>C7-C8	<0.2	<0.2	<0.2	<0.01	<0.01	<0.5			1
>C8-C10	<5	<5	<5	<5	<6	39.1			23.7
>C10-C12	<5	<5	<5	<5	<6	115.5			132
>C12-C16	<5	19.30	<5	<5	<6	6290			452
>C16-C21	<5	41.50	29.30	9.98	<6	14500			804
>C21-C35	45.5	30.70	221	51.6	27.1	6400			1220
>C35-C40	-	-	-	4.66	<6	-			1220
<b>Organics</b>									
Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.045	<0.013	<0.012	0.033

Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.045	<0.013	<0.012	610
Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.045	<0.013	<0.012	350
Xylene	<0.01	<0.01	<0.01	<0.01	<0.02	<0.225 to 0.045	<0.025	<0.024	230-250

### 5.4.3 Environmental Leachate Tests on Soils

Leachate tests were undertaken on two soil samples (S1 and S3) of made ground from BH1 and BH2 and two soil samples from WST and WSV all from the south side of the access road, to assess the levels of potentially contaminating compounds that could leach into Royd Clough. Results from S1 and S2 indicated slightly elevated conductivity results which were at 2770 to 3430 against 2500uS/cm at 25degrees C for drinking water. However, the results fell in line with groundwater range of 7 to 9550uS/cm at 25degrees C. The samples had slightly elevated nickel against drinking water which is not of concern and slightly elevated organic carbon which can be due to contamination by organic compounds or it can be due to natural decaying materials. All other compounds tested in S1 and S2 and WST and WSV fell within drinking water standards or within Environment Agency EQS.

The results for all samples were also assessed against the proposed landfill completion criteria for leachates and all fell within guideline values. There is little concern therefore that rainfall will leach contamination from the open ground areas and contaminate Royd Edge Clough. Test results are presented in Appendix C.

### 5.4.4 Environmental Tests on Groundwater/Surface Water

Environmental tests undertaken on Royd Clough upstream and downstream of the site as part of the Phase II Ground Investigation indicated levels within EQS confirming the site is not contaminating the Clough.

Environmental test results on a water sample from the mill pond were assessed against drinking water standards and Environment Agency EQS and indicated that the water is not contaminated and therefore unlikely to contaminate Royd Clough into which the mill pond discharges via an underground pipe exiting beneath the bridge in the centre of the site. Test results are presented in Appendix C. There was not sufficient groundwater in the boreholes during the Phase III investigation to collect for testing.

## 6. EVALUATION OF AREAS FOR REMEDIATION

The Phase II Ground Investigation recommended further investigation in the area of the old dye house, in the area of the former fuel tanks and the area of the former chimney, and in the area of the made ground between the roadway and the Royd Edge Clough.

The area of the former dyehouse was investigated further as elevated levels of chromium, arsenic and lead were detected at 0.20m bgl, with arsenic and lead being uncontaminated at 2.00m bgl and the chromium reduced to lower levels at 2.00m bgl. Borehole WSH sunk in this area encountered chromium at lower levels with no contamination by arsenic or lead. It is recommended that this area of landscaped ground and gardens is remediated by removal of 1.00m of material to landfill close to the river reducing to 0.50m bgl close to the rear of the proposed houses, plots 23 and 24. Where this area will be used as gardens the area should be sealed with a geotextile and covered with a minimum of 600mm of subsoil and topsoil. The

topsoil should be tested to be suitable for purpose and uncontaminated in accordance with up to date CLEA guidelines.

The area of the demolished building north of the fuel tanks where WS1, WS2 and WS3 were sunk was further investigated by boreholes WSE, WSG, WSL and WSM following removal of the fuel tanks and levels of PAHs and chromium were detected across the area. This area will be designated as landscaped ground and it is recommended that 0.50m is removed to landfill over the area, the surface rechecked for contamination and a geotextile placed with at least 600mm of suitable tested as uncontaminated subsoil/topsoil.

The area where the tanks were situated was investigated by Boreholes WSC and WSD which detected arsenic and chromium and it is recommended that this area is hard covered by the proposed houses 29 and 30 and the landscaped and garden areas are sealed with a geotextile and uncontaminated subsoil and topsoil of 600mm in thickness.

In the area of the deep made ground to the south of Royd Edge Road, it is not practical to remove all the contaminated material to 8.0m bgl. Further investigation in this area by boreholes WSO, WSP, WSQ, WSR, WSS indicated contamination in the form of arsenic and chromium is widespread due to the waste ash and clinker. Where hard cover is not present it is recommended that a geotextile is used with 600mm of soil in garden and in landscaped areas.

All landscaped areas that may be used by children should be covered in a geotextile and 600mm of subsoil/topsoil tested as uncontaminated according to government guidelines or the exposed surface can be retested for the presence of contamination once completed. It is expected that the only area that may benefit from retesting is the area beneath the building remaining on the site north of the access road which may be situated directly on bedrock.

The contamination detected could detrimentally affect sensitive receptors on or off the site if mitigating measures and remediation are not undertaken. Contamination could potentially affect future occupants of houses, workmen and visitors by ingestion, skin contact and inhalation and could potentially detrimentally affect perched groundwater in the made ground and surface water in Royd Edge Clough. It is unlikely and a very low risk that the contamination detected will detrimentally affect humans or the environment outside the site. Based on the levels of contamination detected there is a risk of harm to humans and to the watercourse and the remediation is aimed at reducing this risk by removing the hot spots of contamination and by sealing the made ground remaining from sensitive receptors by hard cover or by a geotextile and 600mm of tested as uncontaminated soil.

The groundwater within the sandstone aquifer at depth is protected by a cover of relatively impermeable mudstone. The perched groundwater is only present after heavy rainfall and will in the future drain into the constructed drainage system and discharge to sewer. The watercourse is not at present receiving contamination based on test results and will be protected during construction and in the future from run off or leachate.



**TABLE 7**  
**Contamination Detected and Remediation for House Plots**

Plot No	Boreholes in area	Contamination Detected	Remediation Proposed
1	24, 37	none	Check garden areas-clean 600mm topsoil
2	24, 37	none	Check garden areas-clean 600mm topsoil
3	25	Not tested	Requires Testing in garden areas
4	26	Not tested	Requires Testing in garden areas
5	27	Not tested	Requires Testing in garden areas
6	21, 22	arsenic	Sealing garden with geotextile and 600mm clean topsoil
7	36, T, U,	cadmium, arsenic, chromium, lead, PAH	Sealing garden with geotextile and 600mm clean topsoil
8	8, S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil
9	S	arsenic, chromium, lead	Sealing garden with geotextile and 600mm clean topsoil
10	BH1, BH2, 9	arsenic, chromium, lead	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
11	BH1, 10, R	arsenic, chromium, sulphate	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
12	11, R	arsenic, chromium, sulphate, PAH	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
13	11, 40, 41	arsenic, lead, sulphide, sulphate, PAH	No removal of material, hard cover or geotextile and 600mm clean topsoil in garden areas
14,15,16	7, 28	arsenic, lead, PAH	Remove PAH to landfill. (Area 125m <sup>2</sup> x 0.50m = 62.5m <sup>3</sup> ) and seal gardens with geotextile and 600mm topsoil
17		Not tested	Requires testing in garden area
18	17, 18, 19, S	arsenic, chromium, lead, sulphate	Check PAHs east of Plot 18. Landfill area 60m <sup>2</sup> x 0.50m =30m <sup>3</sup> . Geotextile and clean topsoil for all gardens and landscaped ground
19	20	none	Geotextile and clean topsoil in garden areas
20	15	none	Geotextile and clean topsoil in garden areas
21	15	none	Geotextile and clean topsoil in garden areas
22	14	none	Geotextile and clean topsoil in garden areas
23	12, H	Arsenic, chromium, lead, sulphate	Remove chromium to landfill, Area 90m <sup>3</sup> . and seal gardens with geotextile and clean topsoil
24	13, I, J	chromium	Remove chromium to landfill, Area 90m <sup>3</sup> . and seal gardens with geotextile and clean topsoil
25	13	none	Geotextile and clean topsoil in garden areas
26	J	chromium	Geotextile and clean topsoil in garden areas
27	J	chromium	Geotextile and clean topsoil in garden areas
28	J, 40	Arsenic, chromium, lead, sulphate	Geotextile and clean topsoil in garden areas
29	D	none	Geotextile and clean topsoil in garden areas
30	C, 4	arsenic, chromium	Geotextile and clean topsoil in garden areas
Landscaped area SW area	1, 2, 3, 15, 16, E, F, G, K, L	Arsenic, chromium, sulphide, lead, PAH	Excavate hot spots and landfill 262.5m <sup>3</sup> , lay geotextile and 300mm of uncontaminated topsoil.

The drawing presented as Figure 7, Plan of Areas of Soil Remediation, dated August 10<sup>th</sup> 2009, indicates 4 areas for remediation of soil and other areas of hard standing for houses and areas of access roads which are areas requiring no remediation as they will be hard covered preventing any contamination from detrimentally affecting sensitive receptors. Any excavation work in the future to extend houses or construct garages is unlikely to cause health concerns based on the level and spread of contamination detected.

Areas annotated to be covered by any concrete sett paving should be underlain by a geotextile in areas of actual or potential contamination. In the area to the north of the access road between Plot numbers 1 to 6 inclusive and in front of Plot 17 it is unlikely that contamination will be present, and this should be checked following excavation to determine whether or not a geotextile is required.

All other garden and landscaped areas should be protected by a geotextile and 600mm of tested as uncontaminated subsoil/topsoil, tested to conform with levels of compounds acceptable by up to date standards ie LQM / CIEH 2015.(ref 11).

## **7. REMEDIATION STRATEGY**

### **7.1 Objectives**

The objective of the Remediation Strategy is to ensure, according to the 1990 Environment Act the condition of the land is unlikely to cause pollution to the environment or harm to human health. The objective of the Remediation Strategy is to ensure an environmentally safe site for the construction and future use of the proposed residential housing development. The objectives include:

- Minimal earthworks are required for the necessary ground levels for development
- sealing contamination detected beneath hard cover in areas of roads and houses
- removal to landfill of material contaminated by arsenic, chromium, lead and PAH close to the river and beneath some gardens and landscaped areas
- rendering environmentally safe all garden and landscaped areas with geotextile and 600mm of tested as uncontaminated topsoil
- Testing all materials for reuse on the site
- Importation of tested as uncontaminated topsoil for garden/landscaped areas
- Installation of a radon membrane beneath houses
- Supervision of all work by a suitably qualified Environmental Scientist
- Validation of Remediation to confirm the remediation is undertaken in accordance with the Remediation Strategy and in accordance with legislation
- Retention of river banks and protection to the river from contamination leaching into the Royd Clough

### **7.2 Strategy**

Based on the results of the ground investigation there are several areas beneath the existing building north of the access road which require further investigation once the building is demolished, although as the building is constructed into the hillside of bedrock it is unlikely that the areas will be significantly contaminated.

Remediation will comprise the removal of contamination to landfill, the sealing of less contaminated material beneath hard cover, the laying of a radon resistant membrane,

underfloor ventilation and concrete ground floor slab and the sealing of landscaped and garden areas with a geotextile and 600mm of imported tested as uncontaminated uncontaminated topsoil.

All material that needs to be taken off site for whatever purpose will be transported by a licensed carrier to a landfill licensed to accept contaminated waste as tested for waste acceptance criteria disposal. Waste Acceptance Criteria Tests will be undertaken as appropriate.

If any material is excavated by the Contractor that has an unusual odour/nature, then Ashton Bennett Consultancy will be notified by the site, samples will be collected for environmental testing and any necessary new remediation strategy reported to the Planning Services. In addition, Kirklees Council will be notified in writing immediately, should any unexpected contamination be encountered at any stage of the development process. Revision to the Remediation Statement will be submitted to and approved in writing by the Local Planning Authority and works will thereafter be carried out in accordance with the approved revised Remediation Statement.

## **8. REMEDIATION PROPOSALS**

### **8.1 General**

It is proposed to remove and/or to seal the contamination detected beneath a geotextile and soil and/or hard cover to eliminate the risk of ingestion through soil, plants or vegetables and eliminate the risk from inhalation or skin contact.

Prior to earthworks being undertaken on the site all underground services will be established and protected and marked to prevent damage during construction.

### **8.2 Demolition**

All buildings on the site have been demolished. An asbestos survey was undertaken at the buildings prior to demolition and any asbestos detected was removed according to Government Regulations. Details will be presented in the Validation Report.

### **8.3 Stockpiling Materials for Reuse**

There is very little topsoil present on site and the majority of the topsoil will be imported and will be tested every 250m<sup>3</sup> for organic content and contamination to check its suitability for use for gardens.

Made ground, if removed, to relevel the site will be stockpiled separately from topsoil and from crushed engineered fill. All made ground will be retested before reuse on the site to ensure its suitability for reuse.

### **8.4 Asbestos**

Any asbestos detected in the buildings will be removed in accordance with government guidelines to appropriate landfill before demolition of the buildings. Asbestos was not detected in the soil. Details will be presented in the Validation Report.

## 8.5 Contamination

Contamination was detected in the Phase II Ground Investigation and was further delineated in depth and extent by the Phase III Ground Investigation. Contamination generally comprised arsenic and sulphide from waste ash, chromium from dyes, polyaromatic hydrocarbons and lead from dyes and sulphate.

Remediation will be undertaken as follows:

- 1 excavating and removing to landfill the arsenic, lead and chromium contamination to 1.00m bgl in the western area of the site adjacent to the Clough and Plots 23 and 24. Area  $90\text{m}^2 \times 0.75\text{m}$  depth average =  $72.5\text{m}^3$ . Replacing with hard cover or geotextile and 600mm of uncontaminated sub/topsoil.
- 2 excavating and removing area of PAH contamination east of Plot 18 to 0.50m. Area  $75\text{m}^2 \times 0.50\text{m}$  depth =  $37.5\text{m}^3$ . Replacing with hard cover or geotextile and 600mm of uncontaminated topsoil
- 3 excavating and removing area between track and plots 14, 15 and 16. Area  $120\text{m}^2 \times 0.50\text{m}$  depth =  $60\text{m}^3$ . Replacing with hard cover or geotextile and 600mm of uncontaminated sub/topsoil
- 4 excavating the area of proposed landscaped ground immediately south of Royd Edge Clough west of access road and removing hot spots of chromium and hydrocarbon contaminated ground and sealing with geotextile and 600mm of uncontaminated topsoil.
- 5 Ensuring any other hot spots of contamination lie beneath hard cover.
- 6 Ensuring all other created landscaped areas are sealed beneath a cover of a minimum of 600mm of topsoil.
- 7 Ensuring that the majority of the site, especially where hard covered for paving is non permeable to prevent leaching to groundwater and surface water.
- 8 Ensuring all garden areas for plots are covered in a geotextile and a minimum of 600mm of tested as uncontaminated imported topsoil.
- 9 Ensuring any excavated material for foundations is tested before reuse on the site.
- 10 Ensuring radon protection as appropriate is used to protect the house occupants.
- 11 All hard standing on areas of actual or potential contamination should be non permeable.
- 12 Ensuring the Royd Clough is protected prior to any earthwork adjacent to the watercourse and undertake testing to ensure potential contamination does not leach into the watercourse.
- 13 Use water supply pipes that are resistant to hydrocarbons.

The remediation proposed is detailed on Table 7 and graphically presented on Figure 7.

During excavation work there will be periodic visits by the environmental engineer to assess the potential for any additional contamination and to, if necessary, design remediation or mitigating measures. The Contractors will be required to call in the environmental engineer if any material of a strange colour or odour is encountered during development. Such material will be tested at the discretion of the environmental engineer and appropriate remediation/mitigation undertaken. Kirklees will be informed of any additional or alternative remediation strategy.

During the excavation works it is imperative that contamination is not allowed to leach through the open ground and detrimentally affect Royd Edge Clough. In the light of this, bunding will be placed along the north bank (west and east of access road) and along the south bank (west of access road only) of Royd Edge Clough to prevent surface water leaching contaminants directly into the Clough during construction.

The area to the south of the access road contains contamination which cannot be removed and therefore it will be sealed to prevent contact with humans. It is possible that some leaching of contamination may occur through this material and enter the Clough. However the area has been open ground for many years and as the Royd Edge Clough is tested as uncontaminated, it is considered there is a low risk of contaminating the Clough. This area will be retained by a wall of concrete or gabions to ensure slope stability to secure the ground for development of housing. Material will be incorporated into the rear of the wall during construction as a minimum to prevent any leachate from draining through the ground into the river during construction. Leachate tests on the material in this area indicated levels within EQS and therefore it is unlikely that leachate will detrimentally affect the Clough. Monitoring and testing of the water will be undertaken during any earthworks to assess any effect on the Clough and additional mitigating measures will be put in place if required to protect the clough.

It is expected that the plots to the south of the access road will be constructed on reinforced rafts or on piled foundations, thus reducing excavation and movement of material across the site.

In case of undetected contamination personal protective equipment will be worn by all ground workers.

Any ash and clinker encountered will be compacted to <5% air voids to avoid combustion and sealed beneath areas of hard cover.

All material removed from the site will be carried by a licensed waste carrier and deposited at the appropriate landfill for the level of contamination. All waste soils will be carried and landfilled according to government regulations. Removal of material will be validated by waste slips and all remediation will be validated by appropriate soil testing.

## 9. PROPOSED VALIDATION

The remediation work will be validated by selective laboratory testing and reporting of results to Planning Services, plus olfactory and visual observations during selected site visits. The planning of works, consents and licenses and site management will be undertaken by Brook Group Holdings Ltd or their selected Contractor. The remediation proposed will ensure the site will be fit for purpose by removal of pathways for contaminated land to reach sensitive receptors.

Standards for contamination levels for the Phase II and Phase II investigations and design of Remediation were ATRISK 2009. For the Validation up to date standards of LQM / CIEH 2015 will be used.

Standards for imported material will be assessed against LQM / CIEH 2015 guidelines and as a risk assessment as to whether the material has the potential to harm sensitive receptors. The guidelines will be used for residential land with plant uptake. The SSVs have been derived using the CLEA model which follows the methodology laid out in Contaminated Land Reports (CLR) 7 to 10.

For this site both a Tier 1 and Tier 2 assessment will be undertaken using generic assessment criteria and site specific assessment criteria based on CLEA 2009 and ATRISK 2017 which are based on the new CLEA guidance 2008 and 2009 (SC050021/SR3 (the CLEA Report) and SC050021/SR2 (the TOX report), SC050021/SR4, CLEA Software version 1.071 (2015) and toxicological reports and SGV technical notes (2009)). The figures used for assessment of lead are from DEFRA(2014b), Category 4 Screening Levels, which are based on the 'low

level of toxicological concern (LLTC)'. C4SLs are 'estimates of contamination concentration in soil that present acceptable risk within the context of Part 2A'. In addition, assessment will use the LQM/CIEH S4ULs (2014) for Human Health Risk Assessment. The S4ULs are based on the principles of 'minimal' or 'tolerable' risk enshrined in SR2 (EA2009A), which has not been withdrawn and are based on the EA software. The guidance set out in these documents has been used to establish a conceptual model of the risks on the site.

The site will be used for the high risk residential use with landscaped gardens and hard covered parking. The risk assessment has used a scenario of residential use as the model for assessment. In deriving the SSVs a child has been chosen as the critical receptor with exposure over a lifetime being the most appropriate and conservative scenario.

The assessment of the risks to users on the site has been undertaken within the framework set out in guidance published by DEFRA and the Environment Agency for the assessment of risks to human health associated with chronic long term exposure to contaminated soils. The guidance set out in this documentation has been used to establish a conceptual model of the risks on the site following redevelopment. The Contaminated Land Exposure Assessment (CLEA) model provides a means of establishing concentrations of contamination in soils at a site. If results exceed these concentrations, then further assessment or intervention by mitigation or remediation may be required to reduce risks to human health.

Contamination by hydrocarbons and heavy metals was identified on the site. Sensitive receptors will be protected by the following mitigating measures.

- 1 Ingestion of and skin contact with hydrocarbons and undetected contamination by hard cover (houses, roads, pavements and hard standing) over the majority of the site and by uncontaminated topsoil in landscaped and garden areas, a geotextile in garden areas and use of PPE by ground workers.
- 2 Inhalation of hydrocarbons by use of hard cover over area of houses and non permeable paving. (the hydrocarbons detected are not the volatile range)
- 3 Inhalation by use of radon protective membrane.

Ashton Bennett Consultancy will supervise the remediation as described in this report and confirm the remediation with test results, photographs and a Validation Report.

Planning Services will be informed when the Remediation will be undertaken.

A Validation Report will be issued to Planning Services on completion of the Remediation and will include.

- Details of origin of topsoil
- Details of topsoil materials tested
- Details of sealing of contamination beneath hard cover
- Confirmation of removal of hot spots and testing of surface areas
- Details of any material removed to landfill
- Confirmation of placement of topsoil in landscaped areas
- Confirmation of laying of geotextile and topsoil in garden areas
- Confirmation of radon protection
- Details of soil tested for validation
- Details of WACs tests and contaminated soil removed to landfill
- Details of testing of groundwater and Royd Clough
- Plans and photographs to aid validation
- Waste slips of material taken to landfill

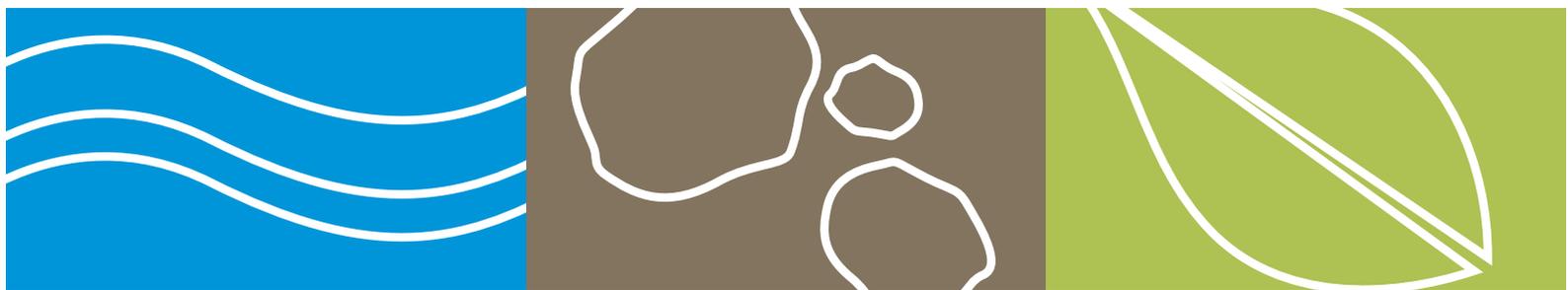
- Details of water supply pipes installed
- Confirmation of any asbestos removal
- Any other information or test results that are considered necessary during remediation

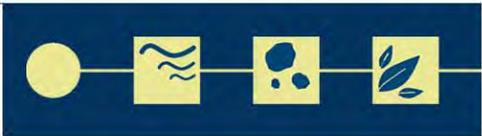
## 10. GENERAL REMARKS

This report truly reflects the conditions found during the desk study and the ground investigations. Whilst the desk study and ground investigations were undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research the results portrayed only pertain to the information attained and it is possible that other undetected information and undetected ground and gas conditions and undetected contamination and undetected mining may exist. The ground investigations were only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the Report BGH 2575 and this Report REMD 3537Rem are read in full to ensure that all recommendations have been understood.

This report is provided for the sole use of the clients (Royd Edge Mill Developments Ltd) and no responsibility will be accepted by this Consultancy to any other parties who rely on this report entirely at their own risk. The copyright for this report is held by Ashton Bennett Consultancy and no reproduction of any part or all of the report can be undertaken or any other reproduction undertaken without the written approval of this Consultancy.

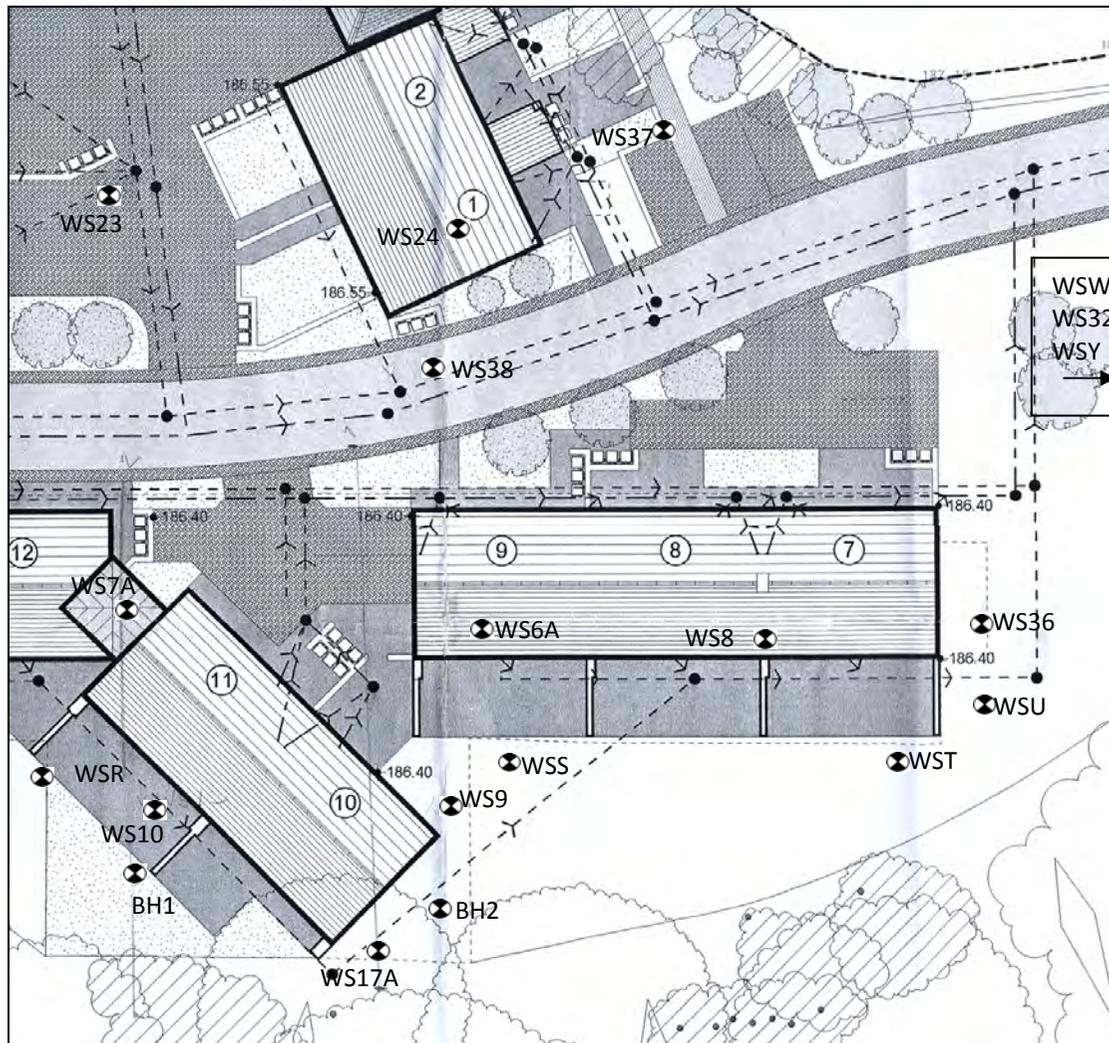
# Appendix A





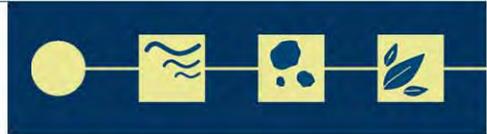
## Royd Edge Mill, Meltham – BOREHOLE LOCATION PLAN

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WSA – WSW	March 2009
WS1A – WS17A	Sept 2009

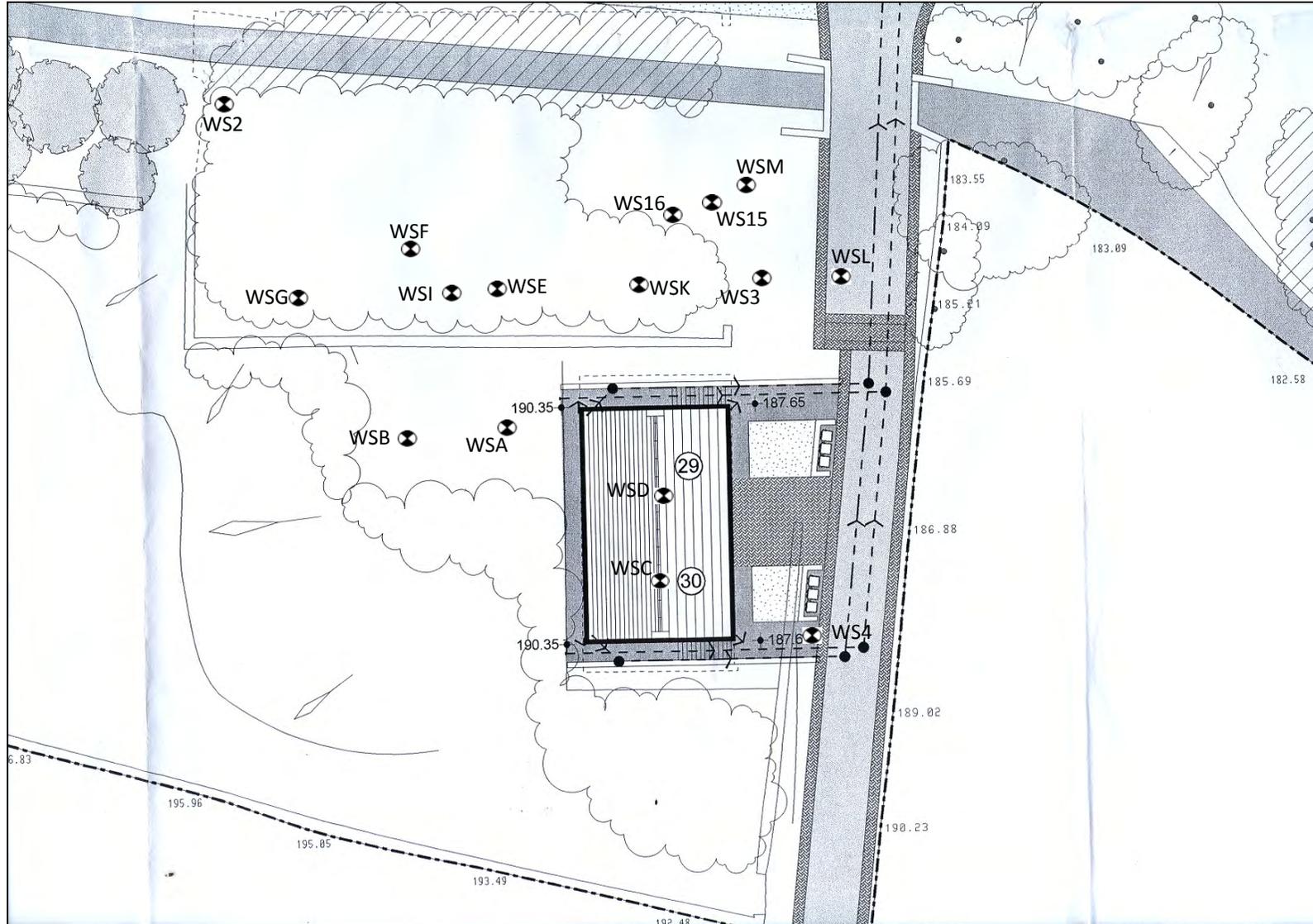


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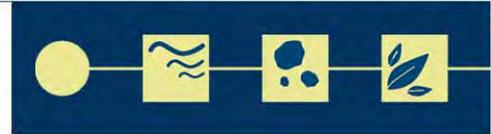


## Royd Edge Mill, Meltham – BOREHOLE LOCATION PLAN

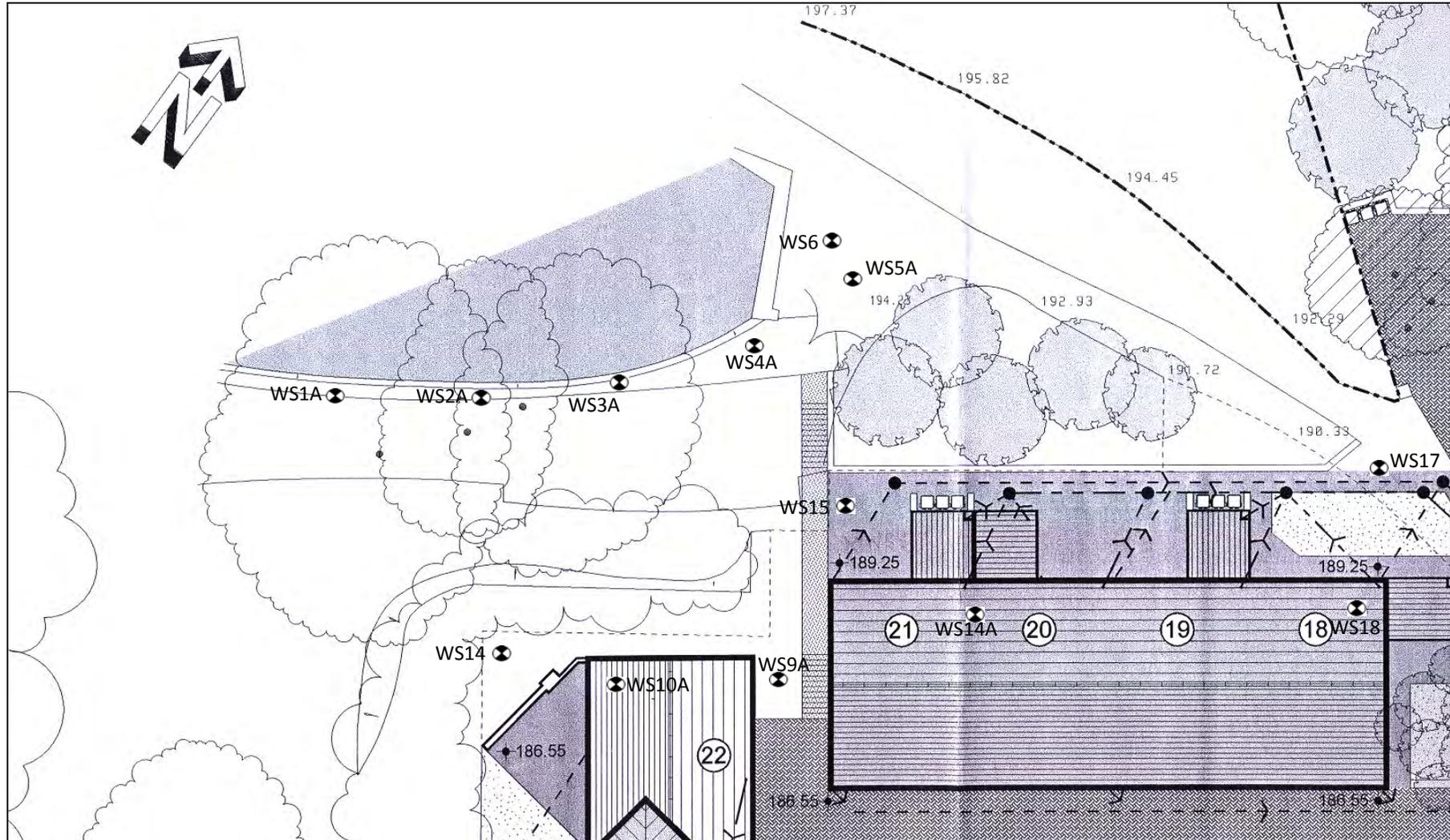


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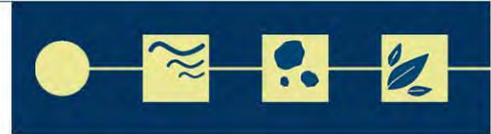


## Royd Edge Mill, Meltham – BOREHOLE LOCATION PLAN

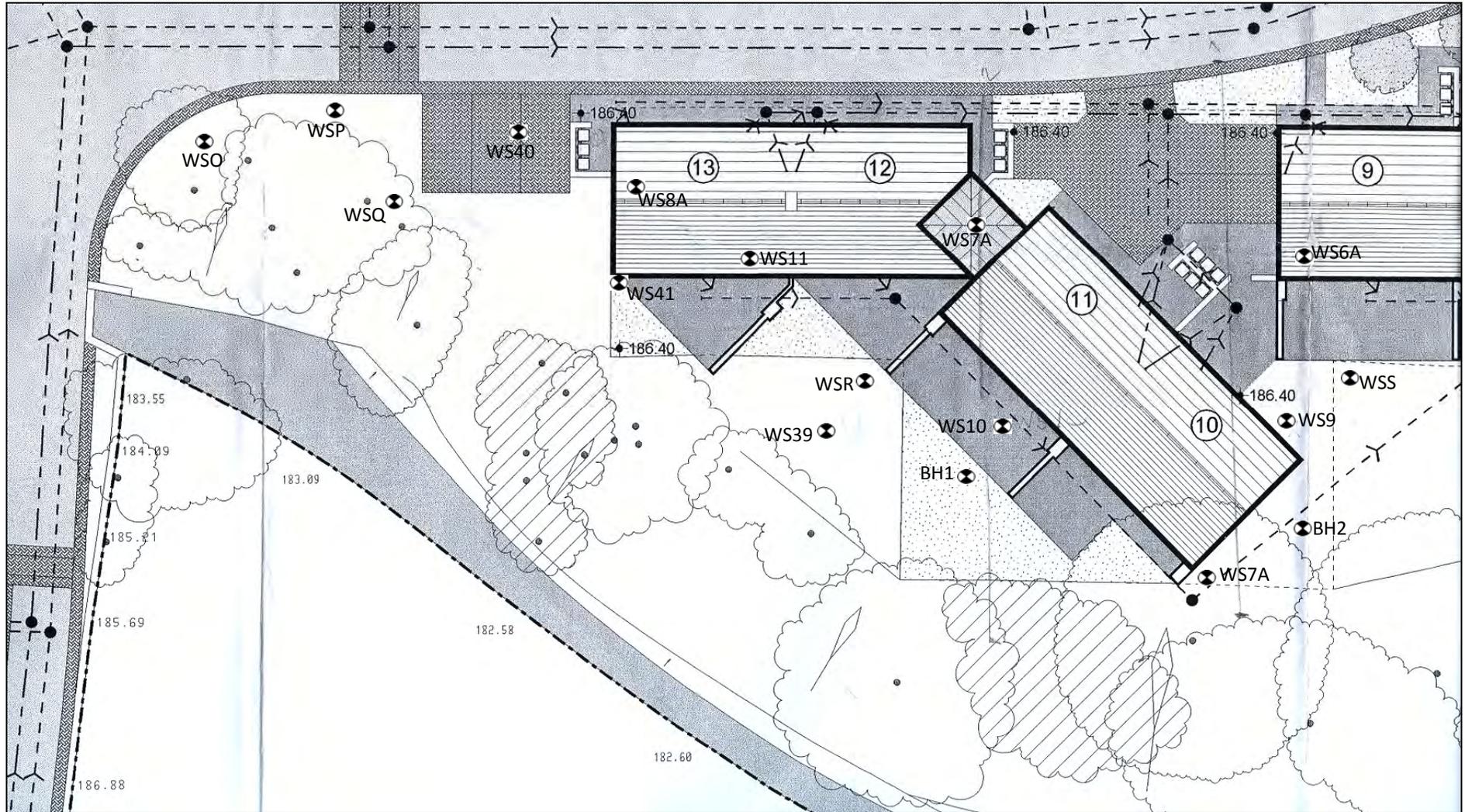


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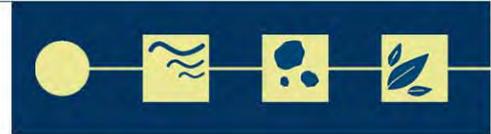


## Royd Edge Mill, Meltham – BOREHOLE LOCATION PLAN

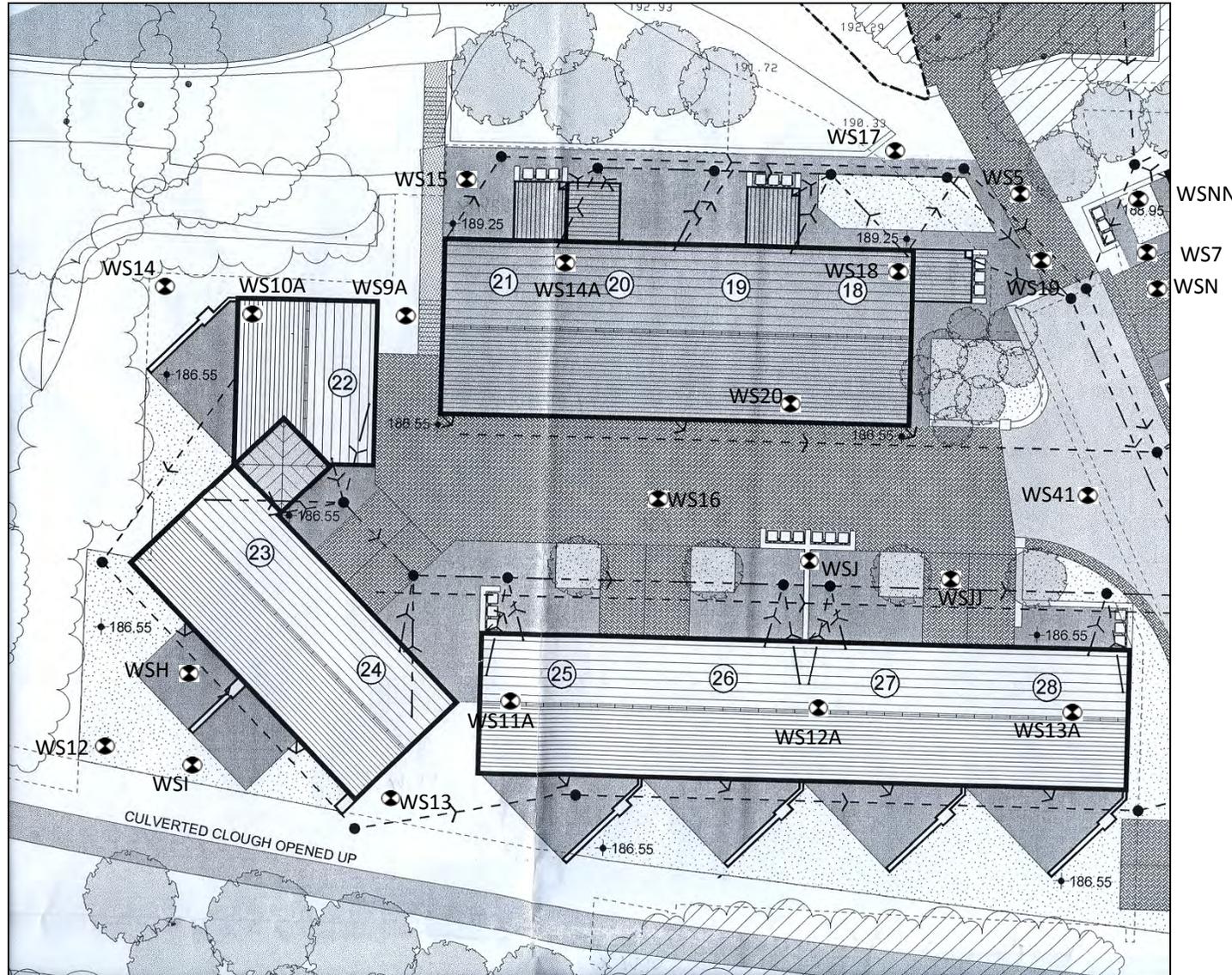


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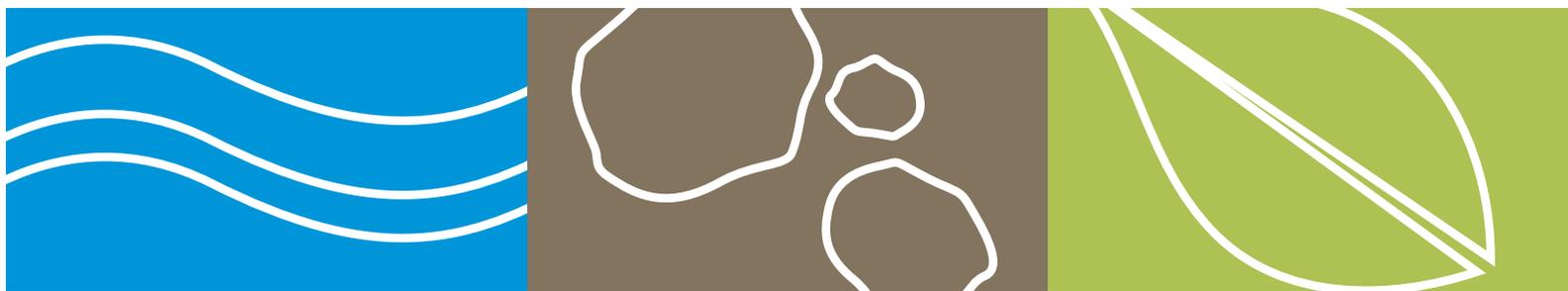
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## Royd Edge Mill, Meltham – BOREHOLE LOCATION PLAN



# Appendix B



CLIENT:		Brook Group Holdings Ltd				PERCUSSIVE BOREHOLE LOG		BOREHOLE NO.			
SITE NAME:		SITE LOCATION:						BH1			
Royd Edge Mill		Meltham									
METHOD OF DRILLING:		DIAMETER OF DRILL:						NATIONAL GRID		SHEET NO.	
Shell & Auger		150mm				REFERENCE:		1 of 1			
DRILLING COMPANY:		DATE:				E N	OD LEVEL:				
White Rose Drilling		09/10/2009									
BORING		SAMPLES			TESTS		STRATA		DESCRIPTION OF STRATA		
DATE	CASE	WATER	DEPTH	TYPE	N	Size (mm)	Depth (m)	Legend	Description of Strata	Level	
			0.05	B			0.05		MADE GROUND - Tarmac		
							0.20		MADE GROUND - Concrete		
							0.70		MADE GROUND - Loose brick gravel in clayey soil		
			1.00- 1.45 1.45	CPT D	9		1		MADE GROUND - Loose ash and stone in clay matrix		
			2.00- 2.45 2.45	CPT D	5		2				
							2.40				
									Firm brown CLAY with gravel of stone and mudstone		
	3.00		3.00- 3.45 3.45	SPT D	4		3				
			4.00- 4.45 4.45	SPT D	13		4				
			5.00- 5.45 5.45	SPT D	13		5				
			6.00- 6.45 6.45	SPT D	18		6				
			7.00- 7.45 7.45	SPT D	16		7				
		7.80	7.80- 8.25 8.30- 8.60 8.6	SPT D SPT D	40 >50		8				
							8.30		Weak grey weathered MUDSTONE		
							8.60				
							9		Borehole completed at 8.60m bgl.		
							10				
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills, Huddersfield Road Holmfirth, West Yorks HD9 3TW Tel: 01484 689531 Fax: 01484 689932							DRILLING NOTES:				
							Borehole backfilled with arisings				



<b>CLIENT:</b>		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			<b>Borehole No:</b>
<b>SITE NAME:</b>		Royd Edge Mill		<b>SITE LOCATION:</b>					Meltham
<b>METHOD OF DRILLING:</b>		Window Sampler		<b>DRILL DIAMETER:</b>		80mm		<b>JOB NO:</b>	2754
<b>DRILLING COMPANY:</b>		White Rose Drilling		<b>DATE:</b>		09/03/2009		<b>Sheet No:</b>	1 of
<b>NATIONAL GRID REFERENCE</b>				<b>OD LEVEL:</b>					-
<b>BORING</b>	<b>SAMPLES &amp; INSITU TESTS</b>				<b>TESTS</b>		<b>STRATA</b>		<b>DESCRIPTION OF STRATA</b>
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.40	D					0.35		MADE GROUND - Concrete
							1	1.00	MADE GROUND - Loose completely weathered shale with clay matrix
	1.40	D							Weak grey MUDSTONE/SHALE
				DRY			2	2.00	
							3		Borehole completed at 2.00m bgl.
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b>								<b>DRILLING NOTES:</b>	
Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932									

<b>CLIENT:</b>		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			<b>Borehole No:</b>
<b>SITE NAME:</b>		Royd Edge Mill		<b>SITE LOCATION:</b>					Meltham
<b>METHOD OF DRILLING:</b>		Window Sampler		<b>DRILL DIAMETER:</b>		80mm		<b>JOB NO:</b>	2754
<b>DRILLING COMPANY:</b>		White Rose Drilling		<b>DATE:</b>		09/03/2009		<b>Sheet No:</b>	1 of
<b>NATIONAL GRID REFERENCE</b>				<b>OD LEVEL:</b>					-
<b>BORING</b>	<b>SAMPLES &amp; INSITU TESTS</b>				<b>TESTS</b>		<b>STRATA</b>		<b>DESCRIPTION OF STRATA</b>
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					0.35		MADE GROUND - Concrete
							1	1.00	MADE GROUND - Loose completely weathered shale with clay matrix
	1.50	D							Weak grey MUDSTONE
				DRY			2	2.00	
							3		Borehole completed at 2.00m bgl.
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b>								<b>DRILLING NOTES:</b>	
Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932									

CLIENT:		Brook Group (Holdings) Ltd						WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		Borehole No:							
Royd Edge Mill		Meltham		WSC							
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:	Sheet No:						
Window Sampler		80mm		2754	1 of						
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE	OD LEVEL:						
White Rose Drilling		09/03/2009			-						
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA		
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata		
	0.20	D					0.135		MADE GROUND - Concrete		
									Weak friable weathered MUDSTONE/SHALE		
				DRY			1				
							1.10		Borehole completed at 1.10m bgl		
							2				
							3				
							4				
							5				
							6				
Ashton Bennett Consultancy								DRILLING NOTES:			
Unit K, Bridge Mills											
Huddersfield Road, Holmfirth, HD9 3TW											
Tel: 01484 689531 Fax: 01484 689932											

CLIENT:		Brook Group (Holdings) Ltd					WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:								WSD
METHOD OF DRILLING:		DRILL DIAMETER:					JOB NO:		Sheet No:	
DRILLING COMPANY:		DATE:					NATIONAL GRID REFERENCE		OD LEVEL:	
Royd Edge Mill		Meltham					2754		1 of	
Window Sampler		80mm					09/03/2009		-	
White Rose Drilling										
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA	
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata	
							0.135		MADE GROUND - Concrete	
	0.60	D							MADE GROUND - Very loose ash and clinker in a matrix of clay with gravel of brick and concrete	
	0.70	D								
							1			
	1.20	D								
	1.60	D								
							1.90			
				DRY			2	2.00	Weak grey weathered MUDSTONE/SHALE	
									Borehole completed at 2.00m bgl	
							3			
							4			
							5			
							6			
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>		

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSE					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		80mm		2754		1 of	
White Rose Drilling		09/03/2009						-	
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.10	D							MADE GROUND - Loose reworked clay
	0.25	D							
							0.85	1	Firm brown grey silty CLAY
							2.10	2	Weak grey friable MUDSTONE/SHALE
				DRY			3.10	3	
								4	Borehole completed at 3.10m bgl
								5	
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		Sheet No:					
Royd Edge Mill		Meltham		WSF	1 of	-	-	-	
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		NATIONAL GRID REFERENCE	OD LEVEL:	-	
Window Sampler		80mm		2754					
DRILLING COMPANY:		DATE:							
White Rose Drilling		09/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.10	D							MADE GROUND - Clayey sand with sandstone cobbles and reworked clay and layered bricks
							0.85	1	Firm brown grey silty CLAY
							2.10	2	Weak grey friable MUDSTONE/SHALE
				DRY			3.10	3	Borehole completed at 3.10m bgl
								4	
								5	
								6	

**Ashton Bennett Consultancy**

Unit K, Bridge Mills  
Huddersfield Road, Holmfirth, HD9 3TW  
Tel: 01484 689531 Fax: 01484 689932

**DRILLING NOTES:**



CLIENT:		Brook Group (Holdings) Ltd				WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		Borehole No:					
Royd Edge Mill		Meltham		WSH					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:	Sheet No:				
Window Sampler		80mm		2754	1 of				
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE	OD LEVEL:				
White Rose Drilling		09/03/2009			-				
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.80	D					0.50		MADE GROUND - Loose black ash and clinker in a clay matrix with gravel of sandstone
							1		Firm brown grey silty CLAY
							2		
							2.80		Weak friable grey MUDSTONE/SHALE
				DRY			3		
							3.10		
							4		Borehole completed at 3.10m bgl
							5		
							6		
Ashton Bennett Consultancy								DRILLING NOTES:	
Unit K, Bridge Mills									
Huddersfield Road, Holmfirth, HD9 3TW									
Tel: 01484 689531 Fax: 01484 689932									

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSI					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		09/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.10	D							MADE GROUND - Loose ash and clinke and clay with fragments of brick and stone
							1		
							1.10		Firm brown grey silty CLAY with fragments of sandstone
	1.50	D							
							2		
							2.10		Weak grey MUDSTONE/SHALE
				DRY			2.80		
							3		Borehole completed at 2.80m bg!
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITe LOCATION:		WSJJ					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		09/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					1	1.00	MADE GROUND - Loose brick and silt with reworked clay and stone fragments
	1.50	D					2	2.10	MADE GROUND - Loose sand and silt with sandstone gravel and reworked clay
	2.50	D					3	3.30	MADE GROUND - Loose silt with sandstone gravel and sand (black metal at 3.00m bgl)
				DRY				3.60	Weak grey silty friable MUDSTONE/SHALE
							4		Borehole completed at 3.60m bgl
							5		
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

<b>CLIENT:</b>		Brook Group (Holdings) Ltd					<b>WINDOW SAMPLER BOREHOLE LOG</b>			<b>Borehole No:</b>	
<b>SITE NAME:</b>		Royd Edge Mill								<b>SITE LOCATION:</b>	
<b>METHOD OF DRILLING:</b>		Window Sampler					<b>DRILL DIAMETER:</b>		80mm	<b>JOB NO:</b>	2754
<b>DRILLING COMPANY:</b>		White Rose Drilling					<b>DATE:</b>		09/03/2009	<b>NATIONAL GRID REFERENCE</b>	<b>Sheet No:</b>
										<b>OD LEVEL:</b>	-
<b>BORING</b>	<b>SAMPLES &amp; INSITU TESTS</b>				<b>TESTS</b>		<b>STRATA</b>		<b>DESCRIPTION OF STRATA</b>		
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata		
							0.20		MADE GROUND - Concrete		
				DRY			0.35		MADE GROUND - Yellow concrete		
									Borehole completed at 0.35m bgl due to rejection.		
							1				
							2				
							3				
							4				
							5				
							6				
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>			

CLIENT:		Brook Group (Holdings) Ltd				WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		WSK					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		09/03/2009		-			
White Rose Drilling		09/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					1		MADE GROUND - Soft wet sand and gravel of sandstone and reworked clay
							1.10		
							2		MADE GROUND - Loose sand and gravel of sandstone
	3.00	D					3	3.00	
				DRY			3.30		Weak dark grey black MUDSTONE/SHALE
							4		Borehole completed at 3.30m bgl.
							5		
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		W.S.L					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		09/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.20	D							MADE GROUND - Loose sand with gravel of sandstone and brick
							1		
							1.10		
	1.60	D							MADE GROUND - Loose sand with gravel of sandstone and brick with reworked clay
							2		
							2.10		
	2.60	D							MADE GROUND - Loose gravel of sandstone and brick
							3		
							2.80		
							3.10		Weak grey MUDSTONE/SHALE
				DRY					
							4		
							5		
							6		
Ashton Bennett Consultancy									DRILLING NOTES:
Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932									

CLIENT:		Brook Group (Holdings) Ltd				WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		WSM					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE			OD LEVEL:		
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm					-		
White Rose Drilling		09/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					1		MADE GROUND - Loose gravel of sandstone and brick
	1.50	D					2		MADE GROUND - Loose gravel of sandstone and brick with reworked clay
							3		MADE GROUND - Loose gravel of sandstone and brick
							4		Weak grey MUDSTONE/SHALE
				DRY			5		Borehole completed at 3.10m bgl.
							6		
Ashton Bennett Consultancy								DRILLING NOTES:	
Unit K, Bridge Mills									
Huddersfield Road, Holmfirth, HD9 3TW									
Tel: 01484 689531 Fax: 01484 689932									

CLIENT:		Brook Group (Holdings) Ltd				WINDOW SAMPLER BOREHOLE LOG			Borehole No:
SITE NAME:		SITE LOCATION:		WSN					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		10/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.20		MADE GROUND - Concrete core
							0.50		MADE GROUND - Loose hardcore and gravel of sandstone
	0.80	D					1 1.00		MADE GROUND - Sand and gravel of sandstone with brown grey reworked clay
	1.80	D					2 2.10		MADE GROUND - Sand and reworked clay with black ash and clinker and gravel of sandstone
							2.50		MADE GROUND - Gravel of sandstone and reworked clay
	2.80	D					2.95		MADE GROUND - Soft grey reworked mudstone
							3 3.10		MADE GROUND - Yellow gravel of sandstone in sand
	3.80	D							Weak grey MUDSTONE
							4 4.00		Weak yellow SANDSTONE
				DRY			4.60		
							5		Borehole completed at 4.60m bgl.
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSNN					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		10/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.20		MADE GROUND - Concrete core
							0.50		MADE GROUND - Loose hardcore and gravel of sandstone
	1.00	D					1.00	1	MADE GROUND - Sand and gravel of sandstone with brown grey reworked clay
									MADE GROUND - Sand and reworked clay with black ash and clinker and gravel of sandstone
							2.10	2	MADE GROUND - Gravel of sandstone and reworked clay
	2.50	D					2.50		MADE GROUND - Soft grey reworked mudstone
							2.95		MADE GROUND - Yellow gravel of sandstone in sand
							3.10		Weak grey MUDSTONE
							4.00	4	Weak yellow SANDSTONE
				DRY			4.60		
								5	Borehole completed at 4.60m bgl.
								6	
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSO					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE			OD LEVEL:		
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm					-		
White Rose Drilling		10/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.10		MADE GROUND - Concrete core
									MADE GROUND - Loose gravel of sandstone and sand
	0.50	D					0.40		MADE GROUND - Loose black ash and clinker
							1	1.00	MADE GROUND - Loose gravel of sandstone and sand
	1.50	D					1.50		MADE GROUND - Loose black ash and clinker and stone
							2	2.00	MADE GROUND - Loose black ash and clinker with sand and gravel of sandstone
	2.50	D					3	3.00	MADE GROUND - Loose black ash and clinker with very loose gravel and cobbles of sandstone
							4		
	3.50	D					4.80		MADE GROUND - Very soft clay with gravel of sandstone and ash and clinker
							5	5.00	
				DRY			5.10		SANDSTONE
							6		Borehole completed at 5.10m bgl.
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSP					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE			OD LEVEL:		
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm					-		
White Rose Drilling		10/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.12		MADE GROUND - Concrete core
									MADE GROUND - Loose gravel of sandstone and sand and brick fill
	0.80	D					0.60		MADE GROUND - Loose black ash and clinker
							1	1.00	MADE GROUND - Loose black ash and clinker with gravel of sandstone and brick
	1.80	D					2	2.10	MADE GROUND - Loose black ash and clinker
							2.50		Very weak yellow SANDSTONE with sand and gravel of sandstone
							3	3.10	Weak yellow SANDSTONE
							4		
							4.80		Weak to moderately strong yellow SANDSTONE
				DRY			5	5.10	
							6		Borehole completed at 5.10m bgl.
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSQ					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		10/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.12		MADE GROUND - Concrete core
									MADE GROUND - Sloose gravel of sandstone and sand
	0.80	D					0.50		MADE GROUND - Loose black ash and clinker
							1	1.00	MADE GROUND - Loose black ash and clinker with gravel of sandstone and sand
	1.50	D							
							2	2.00	Very weak SANDSTONE sand and gravel of sandstone
	2.50	D							
							3	3.10	
				DRY					Borehole completed at 3.10m bgl.
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		Borehole No:					
Royd Edge Mill		Meltham		WSR					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:	Sheet No:				
Window Sampler		80mm		2754	1 of				
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
White Rose Drilling		10/03/2009				-			
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					0.20		MADE GROUND - Topsoil and yellow sand with sandstone fragments
							0.60		MADE GROUND - Red brown fine grained sand and stone and gravel of sandstone
							1.00	1	MADE GROUND - Loose ash and clinker
	1.50	D					2.10	2	MADE GROUND - Loose black ash and clinker with gravel of sandstone
							3.00	3	MADE GROUND - Loose black ash and clinker with some gravel of sandstone
				DRY			3.00	3	Unable to penetrate further with drill.
								4	Borehole completed at 3.00m bgl.
								5	
								6	
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	



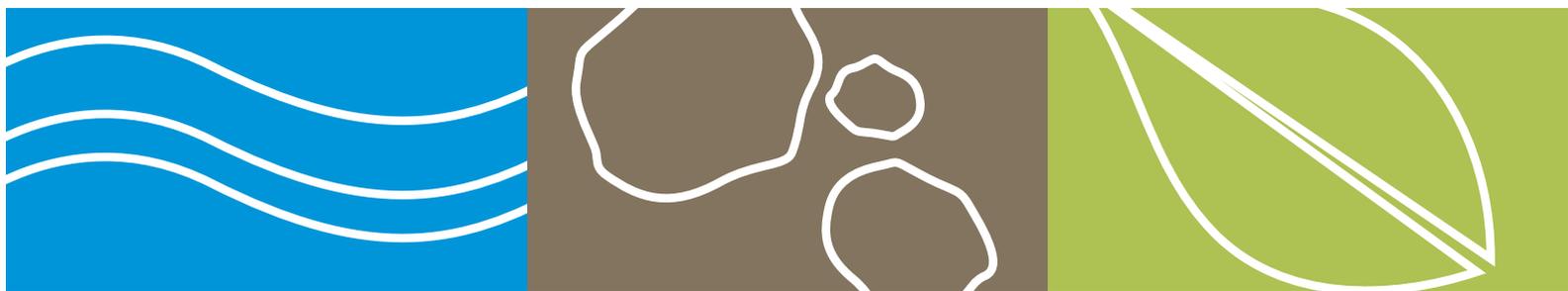
CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WST					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE		OD LEVEL:			
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm		10/03/2009		-			
White Rose Drilling									
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					0.50		MADE GROUND - Peaty soil and roots
							1	1.00	MADE GROUND - Loose black ash and roots and sandstone cobbles
	1.50	D					1.60		MADE GROUND - Soft reworked clay with yellow sand and sandstone cobbles
							2	2.10	MADE GROUND - Loose black ash and clinker and sandstone gravel and cobbles
	2.50	D					2.50		MADE GROUND - Loose black ash and clinker and sandstone cobbles
	3.00	D					3	3.10	MADE GROUND - Loose yellow grey silty sand with ash and clinker
							4		Firm yellow brown sandy CLAY with gravel of sandstone
				DRY			4.90		
							5		Borehole completed at 4.90m bgl.
							6		
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

CLIENT:		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			Borehole No:
SITE NAME:		SITE LOCATION:		WSU					
METHOD OF DRILLING:		DRILL DIAMETER:		JOB NO:		Sheet No:			
DRILLING COMPANY:		DATE:		NATIONAL GRID REFERENCE			OD LEVEL:		
Royd Edge Mill		Meltham		2754		1 of			
Window Sampler		80mm					-		
White Rose Drilling		10/03/2009							
BORING	SAMPLES & INSITU TESTS				TESTS		STRATA		DESCRIPTION OF STRATA
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	0.50	D					0.50		MADE GROUND - Soft grey sandy reworked clay with topsoil
							1		MADE GROUND - Loose black ash and clinker with gravel of sandstone
							1.10		
							2		MADE GROUND - Very loose black ash and clinker and sand
							2.10		
	2.50	D					3		MADE GROUND - Very loose black ash and clinker and stone
							3.10		
							4		Soft black very sandy CLAY with gravel of sandstone
							4.10		
	4.00	D					5		Soft sandy CLAY with gravel of sandstone
							5.10		
				DRY			6		Borehole completed at 5.10m bgl.
<b>Ashton Bennett Consultancy</b> Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932								<b>DRILLING NOTES:</b>	

<b>CLIENT:</b>		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			<b>Borehole No:</b>
<b>SITE NAME:</b>		Royd Edge Mill		<b>SITE LOCATION:</b>					Meltham
<b>METHOD OF DRILLING:</b>		Window Sampler		<b>DRILL DIAMETER:</b>		80mm		<b>JOB NO:</b>	2754
<b>DRILLING COMPANY:</b>		White Rose Drilling		<b>DATE:</b>		10/03/2009		<b>NATIONAL GRID REFERENCE</b>	<b>Sheet No:</b>
									1 of
									OD LEVEL:
									-
<b>BORING</b>	<b>SAMPLES &amp; INSITU TESTS</b>				<b>TESTS</b>		<b>STRATA</b>		<b>DESCRIPTION OF STRATA</b>
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
	1.00	D					1	1.00	MADE GROUND - Loose brick and sandstone cobbles
	1.50	D					1.60		MADE GROUND - Brown sandy clay with brick and sandstone fragments
							2	2.10	Soft brown sandy CLAY
				DRY					
							3		Borehole completed at 2.10m bgl.
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b>								<b>DRILLING NOTES:</b>	
Unit K, Bridge Mills									
Huddersfield Road, Holmfirth, HD9 3TW									
Tel: 01484 689531 Fax: 01484 689932									

<b>CLIENT:</b>		Brook Group (Holdings) Ltd				<b>WINDOW SAMPLER BOREHOLE LOG</b>			<b>Borehole No:</b>
<b>SITE NAME:</b>		Royd Edge Mill		<b>SITE LOCATION:</b>					Meltham
<b>METHOD OF DRILLING:</b>		Window Sampler		<b>DRILL DIAMETER:</b>		80mm		<b>JOB NO:</b>	
<b>DRILLING COMPANY:</b>		White Rose Drilling		<b>DATE:</b>		10/03/2009		<b>Sheet No:</b>	
				<b>NATIONAL GRID REFERENCE</b>				<b>OD LEVEL:</b>	
								-	
<b>BORING</b>	<b>SAMPLES &amp; INSITU TESTS</b>				<b>TESTS</b>		<b>STRATA</b>		<b>DESCRIPTION OF STRATA</b>
Sample Run	Depth	Type	N Value	Water	ENV	MC%	Depth (m)	Key	Description of Strata
							0.10	MADE GROUND - Tarmac coring	
							0.30	MADE GROUND - Loose hardcore	
	0.60	D					0.60	MADE GROUND - loose hardcore and soft silty clay with gravel of sandstone	
							---	Firm brown grey silty CLAY	
							1	---	
	1.50	D					---		
							2	---	
				DRY			2.10	---	
							3		Borehole completed at 2.10m bgl
							4		
							5		
							6		
<b>Ashton Bennett Consultancy</b>								<b>DRILLING NOTES:</b>	
Unit K, Bridge Mills Huddersfield Road, Holmfirth, HD9 3TW Tel: 01484 689531 Fax: 01484 689932									

# Appendix C





**STRUCTURAL SOILS LTD**  
**TEST REPORT**



Report No. 780300 R01

1774

Date 22-October-2009 Contract Royd Edge

Client Ashton Bennett Consultancy  
Address Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth HD9 3TW

For the Attention of Frances Bennett

Samples submitted by client	08/10/2009	Client Reference	
Testing Started	09/10/2009	Client Order No.	
Testing Completed	22/10/2009	Instruction Type	Written

UKAS Accredited Tests Undertaken

- P1 Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2
- P2 Liquid Limit (definitive method) BS1377:Part 2:1990,clause 4.3
- P3 Liquid Limit (one point method) BS1377:Part 2:1990,clause 4.4
- P4 Plastic Limit BS1377:Part 2:1990,clause 5.3
- P5 Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4

Tests Undertaken at an External Laboratory

- P24 Sulphate content (water extract) BS1377:Part 3:1990,clause 5.3
- P26 pH value BS1377:Part 3:1990,clause 9.5

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of

Approved signatories: Mark Athorne (Laboratory Manager) ~~Sean Royle (Senior Technician)~~

*M Athorne*

Page 1 of 5



## STRUCTURAL SOILS LTD

### SUMMARY OF TESTING

Report No. 780300 R01

Sample Reference	Tests Undertaken	Preparation and remarks*
BH 09 @ 2.10m	P24, P26	
WS 01 @ 5.50m	P1,P3,P4,P5	Wet sieving
WS 03 @ 6.90m	P24, P26	
WS 04 @ 6.90m	P24, P26	
WS 07 @ 6.50m	P24, P26	
WS 10 @ 1.10m	P1,P2,P4,P5	Wet sieving
WS 11 @ 1.70m	P1,P2,P4,P5	Wet sieving
WS 12 @ 1.60m	P1,P2,P4,P5	Wet sieving

\* Tests were undertaken on samples 'as received' unless otherwise stated

Page 2 of 5







Our Ref: EFS/091108M (Ver. 2)

Your Ref:

May 1, 2009



TES Bretby  
PO Box 100  
Bretby Business Park  
Ashby Road  
Burton-on-Trent  
Staffordshire  
DE15 0XD

Telephone: 01283 554400  
Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 14/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091108M (Ver. 2)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

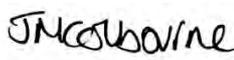
The 2 samples described in this report were logged for analysis by TES Bretby on 03-Mar-2009.  
The analysis was completed by: 01-May-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS or MCERTS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Page 2)
- Table of PAH (MS-SIM) (80) Results (Pages 3 to 4)
- Table of PCB Congener Results (Page 5)
- GC-FID Chromatograms (Pages 6 to 7)
- Table of Report Notes (Page 8)
- Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 01-May-2009

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based,  
and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)  
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	S1	<b>Job Number:</b>	S09_1108M
<b>LIMS ID Number:</b>	CL0904560	<b>Date Booked in:</b>	03-Mar-09
<b>QC Batch Number:</b>	0697	<b>Date Extracted:</b>	04-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	05-Mar-09
<b>Directory:</b>	0304PAH.MS5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.42	0.26	85	UM
Acenaphthylene	208-96-8	4.47	0.14	87	U
Acenaphthene	83-32-9	4.60	1.77	96	UM
Fluorene	86-73-7	4.99	2.85	99	UM
Phenanthrene	85-01-8	5.85	23.41	100	UM
Anthracene	120-12-7	5.90	8.09	99	U
Fluoranthene	206-44-0	7.22	18.23	100	UM
Pyrene	129-00-0	7.51	13.20	96	UM
Benzo[a]anthracene	56-55-3	9.21	5.40	97	UM
Chrysene	218-01-9	9.26	5.22	97	UM
Benzo[b]fluoranthene	205-99-2	10.74	5.38	95	UM
Benzo[k]fluoranthene	207-08-9	10.78	2.00	94	UM
Benzo[a]pyrene	50-32-8	11.17	4.04	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.56	2.02	98	UM
Dibenzo[a,h]anthracene	53-70-3	12.59	0.50	89	UM
Benzo[g,h,i]perylene	191-24-2	12.88	1.46	94	UM
Coronene	191-07-1 *	15.19	0.29	56	N
Total (USEPA16) PAHs	-	-	94.00	-	N

\* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	93
Phenanthrene-d10	92
Chrysene-d12	98
Perylene-d12	92

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	89
Terphenyl-d14	89

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	S3	<b>Job Number:</b>	S09_1108M
<b>LIMS ID Number:</b>	CL0904561	<b>Date Booked in:</b>	03-Mar-09
<b>QC Batch Number:</b>	0697	<b>Date Extracted:</b>	04-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	05-Mar-09
<b>Directory:</b>	0304PAH.MS5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.60	0.25	93	UM
Fluorene	86-73-7	4.99	0.35	98	UM
Phenanthrene	85-01-8	5.85	3.12	99	UM
Anthracene	120-12-7	5.90	1.23	98	U
Fluoranthene	206-44-0	7.22	3.72	100	UM
Pyrene	129-00-0	7.51	2.78	97	UM
Benzo[a]anthracene	56-55-3	9.20	1.10	95	UM
Chrysene	218-01-9	9.26	1.22	99	UM
Benzo[b]fluoranthene	205-99-2	10.74	1.31	99	UM
Benzo[k]fluoranthene	207-08-9	10.78	0.47	98	UM
Benzo[a]pyrene	50-32-8	11.17	0.94	97	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.56	0.54	90	UM
Dibenzo[a,h]anthracene	53-70-3	12.59	0.11	85	UM
Benzo[g,h,i]perylene	191-24-2	12.88	0.46	95	UM
Coronene	191-07-1 *	15.18	0.10	85	N
Total (USEPA16) PAHs	-	-	< 17.80	-	N

\* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	91
Phenanthrene-d10	91
Chrysene-d12	96
Perylene-d12	92

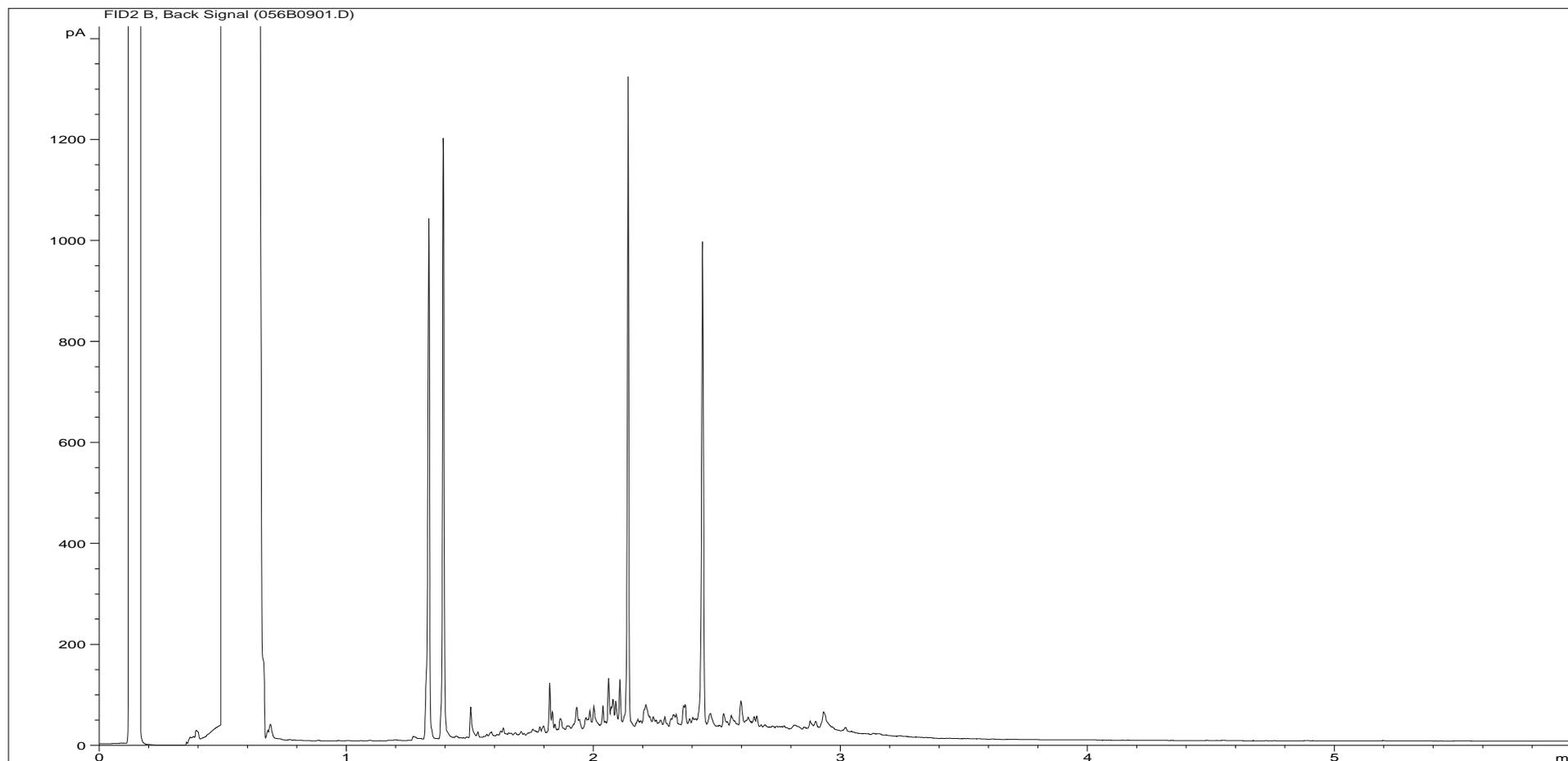
Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	89
Terphenyl-d14	92

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



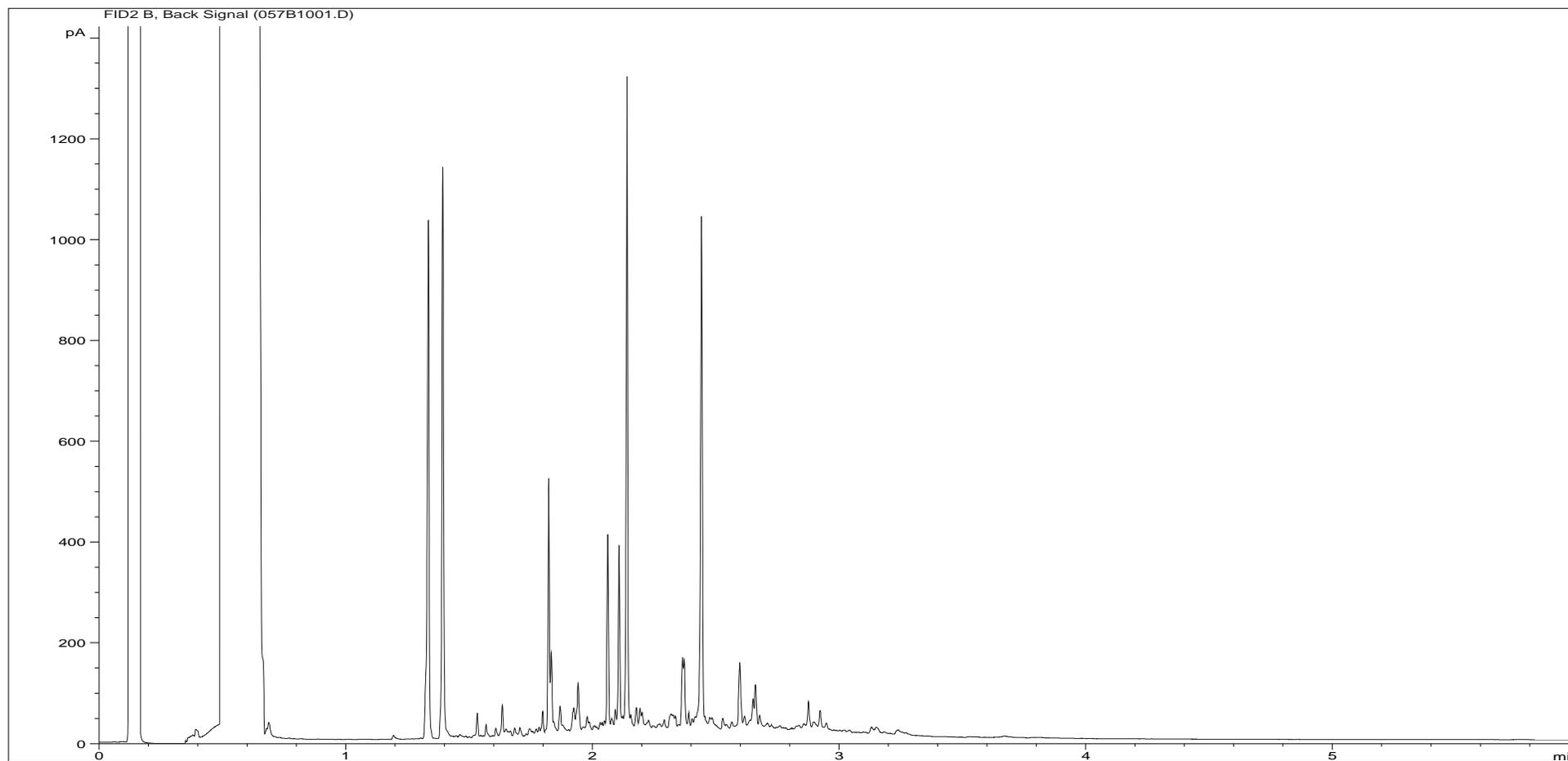
# Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	CL0904560	<b>Job Number:</b>	S09_1108M
<b>Multiplier:</b>	8	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	S1
<b>Acquisition Date/Time:</b>	09-Mar-09, 11:24:36		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0309TPH_GC14\030909 2009-03-09 09-23-19\056B0901.D		

Where individual results are flagged see report notes for status.

# Petroleum Hydrocarbons (C8 to C40) by GC/FID



<b>Sample ID:</b>	CL0904561	<b>Job Number:</b>	S09_1108M
<b>Multiplier:</b>	8	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	S3
<b>Acquisition Date/Time:</b>	09-Mar-09, 11:36:32		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0309TPH_GC14\030909 2009-03-09 09-23-19\057B1001.D		

Where individual results are flagged see report notes for status.

# Report Notes

## Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

## Water analysis specific:

Results expressed as mg/l unless stated otherwise

## Oil analysis specific:

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

## Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

## VOC analysis specific:

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

## Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

## Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

## Asbestos analysis specific:

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

## General notes:

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory



Our Ref: EFS/091422 (Ver. 1)

Your Ref:

March 26, 2009



TES Bretby

PO Box 100

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0XD

Telephone: 01283 554400

Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 27/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091422 (Ver. 1)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

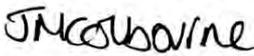
The 18 samples described in this report were logged for analysis by TES Bretby on 16-Mar-2009.  
The analysis was completed by: 26-Mar-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Page 2)
- Table of PAH (MS-SIM) (80) Results (Pages 3 to 7)
- Table of Report Notes (Page 8)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 26-Mar-2009

Tests marked 'A' have been subcontracted to another laboratory.

TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSK JAR	<b>Job Number:</b>	S09_1422
<b>LIMS ID Number:</b>	CL0905904	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	-	< 0.08	-
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	-	< 0.08	-
Anthracene	120-12-7	-	< 0.08	-
Fluoranthene	206-44-0	-	< 0.08	-
Pyrene	129-00-0	-	< 0.08	-
Benzo[a]anthracene	56-55-3	-	< 0.08	-
Chrysene	218-01-9	-	< 0.08	-
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-
Benzo[a]pyrene	50-32-8	-	< 0.08	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-
Total (USEPA16) PAHs	-	-	< 1.28	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	94
Phenanthrene-d10	87
Chrysene-d12	82
Perylene-d12	74

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	112

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSL JAR	<b>Job Number:</b>	S09_1422
<b>LIMS ID Number:</b>	CL0905906	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	20-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	50.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	-	< 4.00	-
Acenaphthylene	208-96-8	-	< 4.00	-
Acenaphthene	83-32-9	4.37	48.04	93
Fluorene	86-73-7	4.74	62.19	98
Phenanthrene	85-01-8	5.57	543.79	99
Anthracene	120-12-7	5.62	204.60	92
Fluoranthene	206-44-0	6.89	467.00	92
Pyrene	129-00-0	7.17	340.63	90
Benzo[a]anthracene	56-55-3	8.84	140.06	99
Chrysene	218-01-9	8.89	124.14	95
Benzo[b]fluoranthene	205-99-2	10.36	127.89	98
Benzo[k]fluoranthene	207-08-9	10.39	49.48	95
Benzo[a]pyrene	50-32-8	10.78	111.49	95
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	67.50	96
Dibenzo[a,h]anthracene	53-70-3	12.18	13.70	93
Benzo[g,h,i]perylene	191-24-2	12.43	54.31	88
Total (USEPA16) PAHs	-	-	< 2362.82	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	109
Acenaphthene-d10	107
Phenanthrene-d10	114
Chrysene-d12	121
Perylene-d12	122

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	83
Terphenyl-d14	85

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSM JAR	<b>Job Number:</b>	S09_1422
<b>LIMS ID Number:</b>	CL0905909	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	20-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	5.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.22	1.44	99
Acenaphthylene	208-96-8	4.25	0.88	86
Acenaphthene	83-32-9	4.37	18.54	96
Fluorene	86-73-7	4.74	21.84	98
Phenanthrene	85-01-8	5.57	171.16	99
Anthracene	120-12-7	5.62	73.32	93
Fluoranthene	206-44-0	6.89	181.13	92
Pyrene	129-00-0	7.17	131.04	91
Benzo[a]anthracene	56-55-3	8.84	55.80	100
Chrysene	218-01-9	8.89	48.64	100
Benzo[b]fluoranthene	205-99-2	10.36	51.02	98
Benzo[k]fluoranthene	207-08-9	10.39	19.20	95
Benzo[a]pyrene	50-32-8	10.78	44.32	96
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	27.63	96
Dibenzo[a,h]anthracene	53-70-3	12.18	5.39	81
Benzo[g,h,i]perylene	191-24-2	12.43	22.40	88
Total (USEPA16) PAHs	-	-	873.75	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	102
Phenanthrene-d10	109
Chrysene-d12	117
Perylene-d12	122

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	99

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSQ JAR	<b>Job Number:</b>	S09_1422
<b>LIMS ID Number:</b>	CL0905916	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.37	0.12	97
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	5.80	0.49	99
Anthracene	120-12-7	5.85	0.11	93
Fluoranthene	206-44-0	7.15	0.72	92
Pyrene	129-00-0	7.44	0.60	93
Benzo[a]anthracene	56-55-3	9.14	0.41	90
Chrysene	218-01-9	9.19	0.45	95
Benzo[b]fluoranthene	205-99-2	10.68	0.51	77
Benzo[k]fluoranthene	207-08-9	10.71	0.20	80
Benzo[a]pyrene	50-32-8	11.10	0.38	96
Indeno[1,2,3-cd]pyrene	193-39-5	12.49	0.26	90
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	12.80	0.23	89
Total (USEPA16) PAHs	-	-	< 4.80	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	91
Phenanthrene-d10	93
Chrysene-d12	109
Perylene-d12	116

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	81

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSR JAR	<b>Job Number:</b>	S09_1422
<b>LIMS ID Number:</b>	CL0905919	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.37	0.16	97
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	5.80	0.42	98
Anthracene	120-12-7	-	< 0.08	-
Fluoranthene	206-44-0	7.15	0.58	93
Pyrene	129-00-0	7.44	0.49	93
Benzo[a]anthracene	56-55-3	9.14	0.31	91
Chrysene	218-01-9	9.19	0.37	97
Benzo[b]fluoranthene	205-99-2	10.68	0.43	92
Benzo[k]fluoranthene	207-08-9	10.71	0.17	94
Benzo[a]pyrene	50-32-8	11.11	0.26	86
Indeno[1,2,3-cd]pyrene	193-39-5	12.49	0.31	98
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	12.80	0.36	93
Total (USEPA16) PAHs	-	-	< 4.26	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	89
Acenaphthene-d10	90
Phenanthrene-d10	90
Chrysene-d12	101
Perylene-d12	106

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	90
Terphenyl-d14	85

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Report Notes

**Soil/Solid analysis specific:**

Results expressed as mg/kg on an air dried basis unless stated otherwise  
S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

**Water analysis specific:**

Results expressed as mg/l unless stated otherwise

**Oil analysis specific:**

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

**Filter analysis specific:**

Results expressed as mg on filter unless stated otherwise

**VOC analysis specific:**

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

**Gas (Tedlar bag) analysis specific:**

Results expressed as ug/l unless stated otherwise

**Air (Carbon tube) analysis specific:**

Results expressed as ug on tube unless stated otherwise

**Asbestos analysis specific:**

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

**General notes:**

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

**END OF REPORT**

Where individual results are flagged see report notes for for status.

Our Ref: EFS/091422M (Ver. 1)

Your Ref:

May 1, 2009



TES Bretby  
PO Box 100  
Bretby Business Park  
Ashby Road  
Burton-on-Trent  
Staffordshire  
DE15 0XD

Telephone: 01283 554400  
Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 27/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091422M (Ver. 1)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

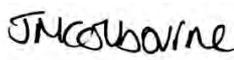
The 18 samples described in this report were logged for analysis by TES Bretby on 16-Mar-2009.  
The analysis was completed by: 01-May-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS or MCERTS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Pages 2 to 3)
- Table of PAH (MS-SIM) (80) Results (Pages 4 to 8)
- Table of Report Notes (Page 9)
- Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 01-May-2009

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based,  
and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)  
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.

TES ID Number	Client Sample Description	Units :														pH Units
		Method Codes :														
		Method Reporting Limits :														
		Accreditation Code:														
CU/		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	WSLM3	
		ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PAHMSUS	TMSS	U		
		2	0.1	3	3	3.5	0.10	2.5	0.5	19.5	10	0.08	0.2			
		UM	U	UM	UM	UM	U	UM	U	UM	UM		U			
		Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	PAH by MS-16(0.08)	Tot. Moisture @ 105C	pH units		
0905904	WSK JAR											Req	17.3	6.6		
0905903	WSK 3.0										137		12.4	6.7		
0905906	WSL JAR											Req	7.9	10.6		
0905905	WSL 1.6	<2.1	<0.1	<3.2‡	<3.2	<3.8	<0.1	<2.7	<0.5	<20.9	60		18.6	8.2		
0905909	WSM JAR (NVM)											Req	11.6	10.3		
0905907	WSM 0.5												13.5	9.4		
0905908	WSM 1.5	<2.2	<0.1	<3.3‡	<3.3	<3.9	<0.1	<2.8	<0.6	<21.7			26.2	7.4		
0905910	WSN 0.8	6.9	0.16	20.9‡	16	32.5	<0.1	17.3	<0.5	70.5			13.9	8.1		
0905911	WSN 1.8	16.1	<0.1	23‡	38.9	27.3	<0.1	23.9	<0.5	<20.4			20.6	8.3		
0905912	WSO 0.5												14.1	8.4		
0905913	WSO 1.5										1300		14.4	7.5		
0905914	WSP 0.8	36	<0.1	19.0‡	48.8	5.4	<0.1	35.3	<0.5	<20.0	424		18.5	7.4		
0905916	WSQ JAR											Req	21.3	8.3		
0905915	WSQ 0.8	13.9	<0.1	13.5‡	49.9	6.6	<0.1	29.6	0.8	<19.7			15.7	7.0		
0905919	WSR JAR											Req	27.0	7.8		
0905917	WSR 0.5										333		18.0	8.1		
0905918	WSR 1.5	117.2	0.48	18.9‡	60.2	56.1	<0.1	30.5	0.8	34.4			25.8	7.6		
0905920	WSS 0.5	49	0.68	45.6‡	203.1	1250	<0.1	55	1.6	170.3			25.2	10.9		
<b>TES Bretby</b> PO Box 100, Bretby Business Park, Burton-on-Trent, Staffordshire, DE15 0XD Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422		<b>Client Name</b> Ashton Bennett Consultancy	<b>Ashton Bennett Consultancy</b> Ms F Bennett								<b>Soils Sample Analysis</b>					
		<b>Contact</b> Royd Edge									<b>Date Printed</b> 01-May-09					
										<b>Report Number</b> EFS/091422M						
										<b>Table Number</b> 1						



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSK JAR	<b>Job Number:</b>	S09_1422M
<b>LIMS ID Number:</b>	CL0905904	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.55	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	94
Phenanthrene-d10	87
Chrysene-d12	82
Perylene-d12	74

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	112

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:** Ashton Bennett Consultancy: Royd Edge  
**Sample Details:** WSL JAR **Job Number:** S09\_1422M  
**LIMS ID Number:** CL0905906 **Date Booked in:** 16-Mar-09  
**QC Batch Number:** 0915 **Date Extracted:** 20-Mar-09  
**Quantitation File:** Initial Calibration **Date Analysed:** 23-Mar-09  
**Directory:** 323PAH\_MS14\ **Matrix:** Soil  
**Dilution:** 50.0 **Ext Method:** Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 4.00	-	UM
Acenaphthylene	208-96-8	-	< 4.00	-	U
Acenaphthene	83-32-9	4.37	52.16	93	UM
Fluorene	86-73-7	4.74	67.52	98	UM
Phenanthrene	85-01-8	5.57	590.43	99	UM
Anthracene	120-12-7	5.62	222.10	92	U
Fluoranthene	206-44-0	6.89	507.00	92	UM
Pyrene	129-00-0	7.17	369.85	90	UM
Benzo[a]anthracene	56-55-3	8.84	152.07	99	UM
Chrysene	218-01-9	8.89	134.79	95	UM
Benzo[b]fluoranthene	205-99-2	10.36	138.86	98	UM
Benzo[k]fluoranthene	207-08-9	10.39	53.72	95	UM
Benzo[a]pyrene	50-32-8	10.78	121.05	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	73.30	96	UM
Dibenzo[a,h]anthracene	53-70-3	12.18	14.90	93	UM
Benzo[g,h,i]perylene	191-24-2	12.43	58.97	88	UM
Total (USEPA16) PAHs	-	-	< 2565.49	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	109
Acenaphthene-d10	107
Phenanthrene-d10	114
Chrysene-d12	121
Perylene-d12	122

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	83
Terphenyl-d14	85

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSM JAR (NVM)	<b>Job Number:</b>	S09_1422M
<b>LIMS ID Number:</b>	CL0905909	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	20-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	5.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.22	1.63	99	U
Acenaphthylene	208-96-8	4.25	1.00	86	U
Acenaphthene	83-32-9	4.37	20.97	96	U
Fluorene	86-73-7	4.74	24.71	98	U
Phenanthrene	85-01-8	5.57	193.62	99	U
Anthracene	120-12-7	5.62	82.94	93	U
Fluoranthene	206-44-0	6.89	204.90	92	U
Pyrene	129-00-0	7.17	148.24	91	U
Benzo[a]anthracene	56-55-3	8.84	63.10	100	U
Chrysene	218-01-9	8.89	55.02	100	U
Benzo[b]fluoranthene	205-99-2	10.36	57.71	98	U
Benzo[k]fluoranthene	207-08-9	10.39	21.70	95	U
Benzo[a]pyrene	50-32-8	10.78	50.14	96	U
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	31.26	96	U
Dibenzo[a,h]anthracene	53-70-3	12.18	6.10	81	U
Benzo[g,h,i]perylene	191-24-2	12.43	25.30	88	U
Total (USEPA16) PAHs	-	-	988.41	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	102
Phenanthrene-d10	109
Chrysene-d12	117
Perylene-d12	122

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	99

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSQ JAR	<b>Job Number:</b>	S09_1422M
<b>LIMS ID Number:</b>	CL0905916	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.37	0.15	97	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.80	0.62	99	UM
Anthracene	120-12-7	5.85	0.14	93	U
Fluoranthene	206-44-0	7.15	0.91	92	UM
Pyrene	129-00-0	7.44	0.80	93	UM
Benzo[a]anthracene	56-55-3	9.14	0.52	90	UM
Chrysene	218-01-9	9.19	0.57	95	UM
Benzo[b]fluoranthene	205-99-2	10.68	0.65	77	UM
Benzo[k]fluoranthene	207-08-9	10.71	0.30	80	UM
Benzo[a]pyrene	50-32-8	11.10	0.48	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.49	0.33	90	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	12.80	0.29	89	UM
Total (USEPA16) PAHs	-	-	< 6.10	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	91
Phenanthrene-d10	93
Chrysene-d12	109
Perylene-d12	116

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	86
Terphenyl-d14	81

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSR JAR	<b>Job Number:</b>	S09_1422M
<b>LIMS ID Number:</b>	CL0905919	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0915	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	0319PAH.GC5\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.37	0.22	97	UM
Acenaphthylene	208-96-8	-	< 0.11	-	U
Acenaphthene	83-32-9	-	< 0.11	-	UM
Fluorene	86-73-7	-	< 0.11	-	UM
Phenanthrene	85-01-8	5.80	0.58	98	UM
Anthracene	120-12-7	-	< 0.11	-	U
Fluoranthene	206-44-0	7.15	0.79	93	UM
Pyrene	129-00-0	7.44	0.67	93	UM
Benzo[a]anthracene	56-55-3	9.14	0.42	91	UM
Chrysene	218-01-9	9.19	0.51	97	UM
Benzo[b]fluoranthene	205-99-2	10.68	0.59	92	UM
Benzo[k]fluoranthene	207-08-9	10.71	0.23	94	UM
Benzo[a]pyrene	50-32-8	11.11	0.36	86	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.49	0.42	98	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.11	-	UM
Benzo[g,h,i]perylene	191-24-2	12.80	0.49	93	UM
Total (USEPA16) PAHs	-	-	< 5.84	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	89
Acenaphthene-d10	90
Phenanthrene-d10	90
Chrysene-d12	101
Perylene-d12	106

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	90
Terphenyl-d14	85

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Report Notes

## Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

## Water analysis specific:

Results expressed as mg/l unless stated otherwise

## Oil analysis specific:

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

## Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

## VOC analysis specific:

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

## Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

## Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

## Asbestos analysis specific:

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

## General notes:

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

Where individual results are flagged see report notes for for status.



Our Ref: EFS/091427M (Ver. 2)

Your Ref:

May 1, 2009



TES Bretby  
PO Box 100  
Bretby Business Park  
Ashby Road  
Burton-on-Trent  
Staffordshire  
DE15 0XD

Telephone: 01283 554400  
Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 27/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091427M (Ver. 2)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

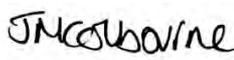
The 8 samples described in this report were logged for analysis by TES Bretby on 16-Mar-2009.  
The analysis was completed by: 01-May-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS or MCERTS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Pages 2 to 3)
- Table of GRO Results (Page 4)
- Table of PAH (MS-SIM) (80) Results (Pages 5 to 8)
- Table of TPH (Si) banding (std) (Page 9)
- GC-FID Chromatograms (Pages 10 to 11)
- Table of Report Notes (Page 12)
- Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 01-May-2009

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based,  
and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)  
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.







# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSS JAR	<b>Job Number:</b>	S09_1427M
<b>LIMS ID Number:</b>	CL0905926	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.23	0.32	96	UM
Acenaphthylene	208-96-8	-	< 0.11	-	U
Acenaphthene	83-32-9	-	< 0.11	-	UM
Fluorene	86-73-7	-	< 0.11	-	UM
Phenanthrene	85-01-8	5.60	0.45	97	UM
Anthracene	120-12-7	-	< 0.11	-	U
Fluoranthene	206-44-0	6.93	0.80	84	UM
Pyrene	129-00-0	7.21	0.64	80	UM
Benzo[a]anthracene	56-55-3	8.88	0.33	95	UM
Chrysene	218-01-9	8.93	0.41	98	UM
Benzo[b]fluoranthene	205-99-2	10.40	0.55	96	UM
Benzo[k]fluoranthene	207-08-9	10.44	0.19	93	UM
Benzo[a]pyrene	50-32-8	10.83	0.36	93	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.31	87	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.11	-	UM
Benzo[g,h,i]perylene	191-24-2	12.48	0.29	82	UM
Total (USEPA16) PAHs	-	-	< 5.18	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	92
Phenanthrene-d10	93
Chrysene-d12	96
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	94

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:** Ashton Bennett Consultancy: Royd Edge  
**Sample Details:** WST JAR **Job Number:** S09\_1427M  
**LIMS ID Number:** CL0905929 **Date Booked in:** 16-Mar-09  
**QC Batch Number:** 0907 **Date Extracted:** 19-Mar-09  
**Quantitation File:** Initial Calibration **Date Analysed:** 23-Mar-09  
**Directory:** 323PAH\_MS14\ **Matrix:** Soil  
**Dilution:** 5.0 **Ext Method:** Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.22	2.59	99	UM
Acenaphthylene	208-96-8	-	< 0.50	-	U
Acenaphthene	83-32-9	4.37	1.05	90	UM
Fluorene	86-73-7	4.74	0.58	96	UM
Phenanthrene	85-01-8	5.57	14.66	99	UM
Anthracene	120-12-7	5.62	4.54	94	U
Fluoranthene	206-44-0	6.89	65.53	92	UM
Pyrene	129-00-0	7.17	55.18	90	UM
Benzo[a]anthracene	56-55-3	8.84	28.31	99	UM
Chrysene	218-01-9	8.89	27.76	98	UM
Benzo[b]fluoranthene	205-99-2	10.36	39.52	98	UM
Benzo[k]fluoranthene	207-08-9	10.39	13.48	95	UM
Benzo[a]pyrene	50-32-8	10.78	32.05	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	24.39	96	UM
Dibenzo[a,h]anthracene	53-70-3	12.18	4.29	88	UM
Benzo[g,h,i]perylene	191-24-2	12.43	21.43	88	UM
Total (USEPA16) PAHs	-	-	< 335.87	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	102
Phenanthrene-d10	110
Chrysene-d12	118
Perylene-d12	120

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	100

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSV JAR	<b>Job Number:</b>	S09_1427M
<b>LIMS ID Number:</b>	CL0905932	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.11	-	UM
Acenaphthylene	208-96-8	-	< 0.11	-	U
Acenaphthene	83-32-9	-	< 0.11	-	UM
Fluorene	86-73-7	-	< 0.11	-	UM
Phenanthrene	85-01-8	5.60	0.12	96	UM
Anthracene	120-12-7	-	< 0.11	-	U
Fluoranthene	206-44-0	6.93	0.25	82	UM
Pyrene	129-00-0	7.21	0.20	79	UM
Benzo[a]anthracene	56-55-3	8.88	0.12	96	UM
Chrysene	218-01-9	8.93	0.15	98	UM
Benzo[b]fluoranthene	205-99-2	10.40	0.21	94	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.11	-	UM
Benzo[a]pyrene	50-32-8	10.83	0.10	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.12	76	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.11	-	UM
Benzo[g,h,i]perylene	191-24-2	12.48	0.11	85	UM
Total (USEPA16) PAHs	-	-	< 2.14	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	96
Phenanthrene-d10	95
Chrysene-d12	89
Perylene-d12	97

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	101

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	Tank	<b>Job Number:</b>	S09_1427M
<b>LIMS ID Number:</b>	CL0905933	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	20-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.15	-	UM
Acenaphthylene	208-96-8	-	< 0.15	-	U
Acenaphthene	83-32-9	4.40	1.89	64	UM
Fluorene	86-73-7	4.77	4.04	68	UM
Phenanthrene	85-01-8	5.60	13.73	96	UM
Anthracene	120-12-7	5.64	1.60	96	U
Fluoranthene	206-44-0	6.93	5.38	86	UM
Pyrene	129-00-0	7.21	6.29	85	UM
Benzo[a]anthracene	56-55-3	8.88	0.98	96	UM
Chrysene	218-01-9	8.93	2.65	99	UM
Benzo[b]fluoranthene	205-99-2	10.40	3.30	96	UM
Benzo[k]fluoranthene	207-08-9	10.44	1.05	93	UM
Benzo[a]pyrene	50-32-8	10.82	1.98	94	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	2.00	88	UM
Dibenzo[a,h]anthracene	53-70-3	12.22	0.38	95	UM
Benzo[g,h,i]perylene	191-24-2	12.48	1.60	81	UM
Total (USEPA16) PAHs	-	-	< 46.96	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	103
Acenaphthene-d10	103
Phenanthrene-d10	100
Chrysene-d12	108
Perylene-d12	122

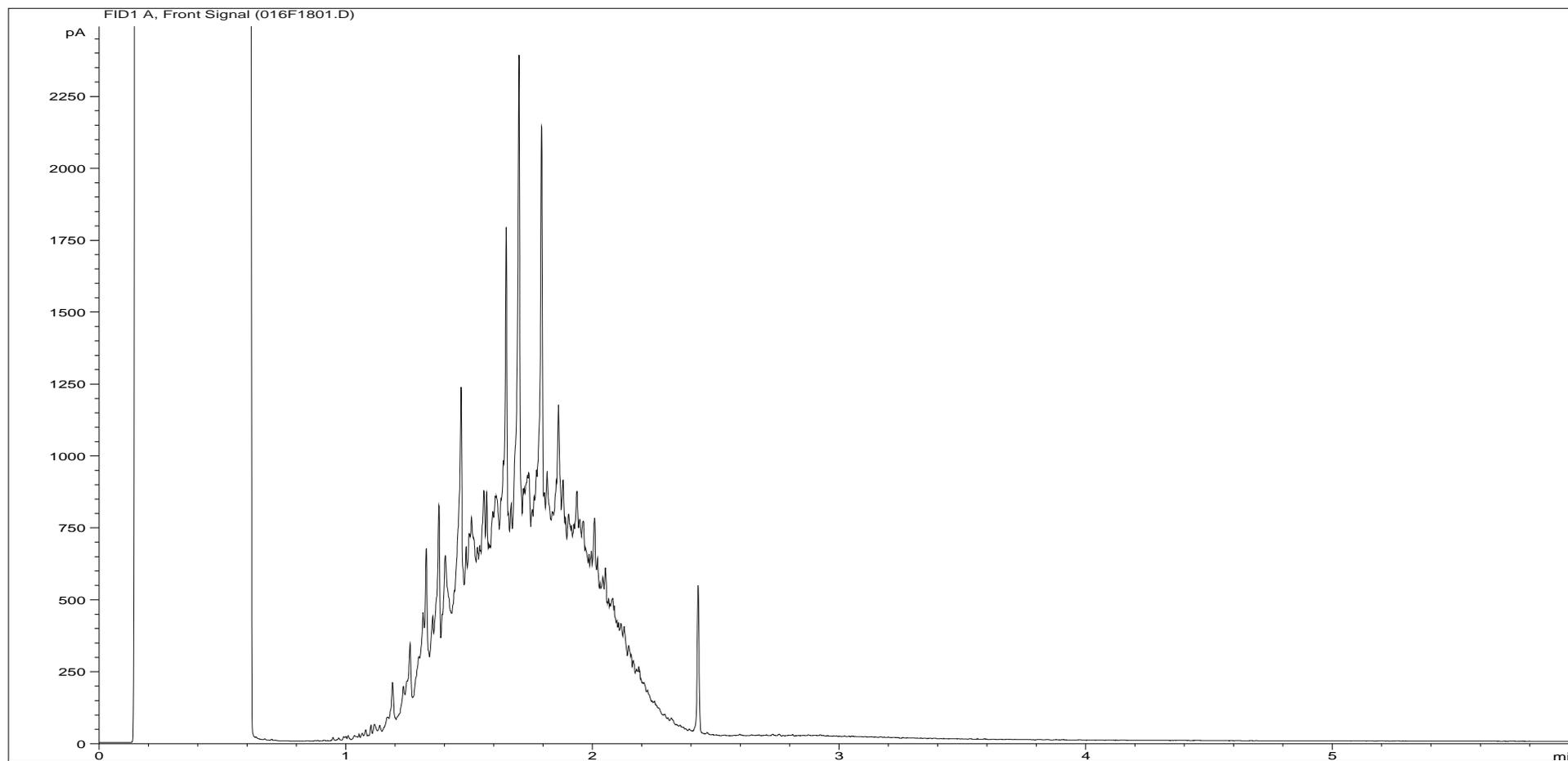
Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	92
Terphenyl-d14	89

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



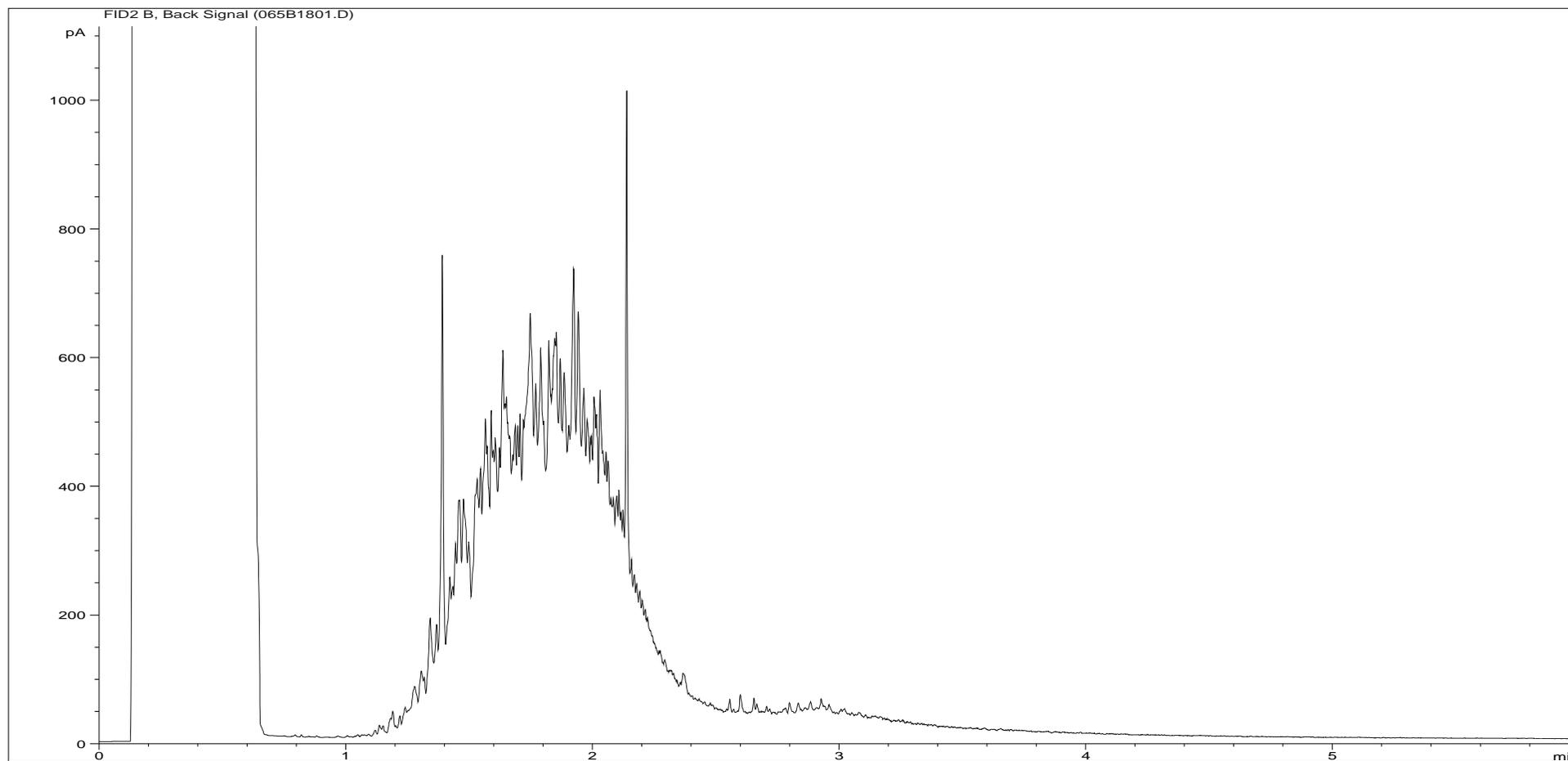
**Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.**



<b>Sample ID:</b>	CL0905933ALI	<b>Job Number:</b>	S09_1427M
<b>Multiplier:</b>	16.38	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	5	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	Tank
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:11:31		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\016F1801.D		

Where individual results are flagged see report notes for status.

**Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.**



<b>Sample ID:</b>	CL0905933ARO	<b>Job Number:</b>	S09_1427M
<b>Multiplier:</b>	12.6	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	5	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	Tank
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:11:31		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\065B1801.D		

Where individual results are flagged see report notes for status.

# Report Notes

## Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

## Water analysis specific:

Results expressed as mg/l unless stated otherwise

## Oil analysis specific:

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

## Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

## VOC analysis specific:

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

## Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

## Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

## Asbestos analysis specific:

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

## General notes:

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory



Our Ref: EFS/091428 (Ver. 1)

Your Ref:

March 26, 2009



TES Bretby  
PO Box 100  
Bretby Business Park  
Ashby Road  
Burton-on-Trent  
Staffordshire  
DE15 0XD

Telephone: 01283 554400  
Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 27/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091428 (Ver. 1)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

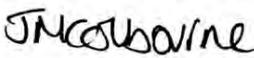
The 20 samples described in this report were logged for analysis by TES Bretby on 16-Mar-2009.  
The analysis was completed by: 26-Mar-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)  
Table of GRO Results (Page 4)  
Table of PAH (MS-SIM) (80) Results (Pages 5 to 9)  
Table of TPH (Si) banding (std) (Page 10)  
GC-FID Chromatograms (Pages 11 to 16)  
Table of Report Notes (Page 17)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 26-Mar-2009

Tests marked 'A' have been subcontracted to another laboratory.

TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.







# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSB JAR	<b>Job Number:</b>	S09_1428
<b>LIMS ID Number:</b>	CL0905936	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	-	< 0.08	-
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	4.39	0.09	89
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	5.60	1.01	98
Anthracene	120-12-7	5.65	0.22	91
Fluoranthene	206-44-0	6.93	1.05	85
Pyrene	129-00-0	7.21	0.78	81
Benzo[a]anthracene	56-55-3	8.88	0.34	93
Chrysene	218-01-9	8.93	0.32	97
Benzo[b]fluoranthene	205-99-2	10.40	0.36	94
Benzo[k]fluoranthene	207-08-9	10.44	0.14	95
Benzo[a]pyrene	50-32-8	10.83	0.27	92
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.19	85
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	12.48	0.17	85
Total (USEPA16) PAHs	-	-	< 5.26	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	109
Phenanthrene-d10	112
Chrysene-d12	113
Perylene-d12	120

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	97

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSE JAR	<b>Job Number:</b>	S09_1428
<b>LIMS ID Number:</b>	CL0905942	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	5.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.22	0.42	97
Acenaphthylene	208-96-8	-	< 0.40	-
Acenaphthene	83-32-9	4.37	6.90	96
Fluorene	86-73-7	4.74	8.66	97
Phenanthrene	85-01-8	5.57	61.07	99
Anthracene	120-12-7	5.62	22.51	93
Fluoranthene	206-44-0	6.88	70.75	92
Pyrene	129-00-0	7.17	52.46	91
Benzo[a]anthracene	56-55-3	8.84	22.90	99
Chrysene	218-01-9	8.89	20.28	98
Benzo[b]fluoranthene	205-99-2	10.36	21.92	98
Benzo[k]fluoranthene	207-08-9	10.39	8.08	95
Benzo[a]pyrene	50-32-8	10.78	18.48	95
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	11.48	90
Dibenzo[a,h]anthracene	53-70-3	12.18	2.42	94
Benzo[g,h,i]perylene	191-24-2	12.43	9.22	88
Total (USEPA16) PAHs	-	-	< 337.95	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	102
Phenanthrene-d10	110
Chrysene-d12	117
Perylene-d12	119

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	100

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSF JAR	<b>Job Number:</b>	S09_1428
<b>LIMS ID Number:</b>	CL0905944	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.23	0.17	96
Acenaphthylene	208-96-8	4.27	0.09	95
Acenaphthene	83-32-9	4.39	0.09	93
Fluorene	86-73-7	4.77	0.10	96
Phenanthrene	85-01-8	5.60	1.17	98
Anthracene	120-12-7	5.65	0.50	96
Fluoranthene	206-44-0	6.92	3.01	85
Pyrene	129-00-0	7.21	2.43	81
Benzo[a]anthracene	56-55-3	8.88	1.35	95
Chrysene	218-01-9	8.93	1.38	97
Benzo[b]fluoranthene	205-99-2	10.40	1.87	95
Benzo[k]fluoranthene	207-08-9	10.43	0.59	92
Benzo[a]pyrene	50-32-8	10.82	1.26	95
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	1.00	91
Dibenzo[a,h]anthracene	53-70-3	12.22	0.21	92
Benzo[g,h,i]perylene	191-24-2	12.48	0.82	82
Total (USEPA16) PAHs	-	-	16.04	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	110
Phenanthrene-d10	113
Chrysene-d12	115
Perylene-d12	123

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	93

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSG JAR	<b>Job Number:</b>	S09_1428
<b>LIMS ID Number:</b>	CL0905947	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	50.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.22	5.65	100
Acenaphthylene	208-96-8	4.25	4.13	87
Acenaphthene	83-32-9	4.37	103.79	96
Fluorene	86-73-7	4.74	133.25	97
Phenanthrene	85-01-8	5.56	768.89	99
Anthracene	120-12-7	5.62	294.94	93
Fluoranthene	206-44-0	6.89	806.32	92
Pyrene	129-00-0	7.17	585.96	91
Benzo[a]anthracene	56-55-3	8.84	248.63	99
Chrysene	218-01-9	8.89	224.56	99
Benzo[b]fluoranthene	205-99-2	10.36	227.86	98
Benzo[k]fluoranthene	207-08-9	10.39	83.88	95
Benzo[a]pyrene	50-32-8	10.78	193.32	96
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	117.55	97
Dibenzo[a,h]anthracene	53-70-3	12.18	24.12	92
Benzo[g,h,i]perylene	191-24-2	12.43	92.14	87
Total (USEPA16) PAHs	-	-	3914.99	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	101
Phenanthrene-d10	107
Chrysene-d12	115
Perylene-d12	119

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	95
Terphenyl-d14	95

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSJ 1.0	<b>Job Number:</b>	S09_1428
<b>LIMS ID Number:</b>	CL0905951	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	-	< 0.08	-
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	5.60	0.60	97
Anthracene	120-12-7	5.65	0.19	93
Fluoranthene	206-44-0	6.93	0.73	85
Pyrene	129-00-0	7.21	0.60	82
Benzo[a]anthracene	56-55-3	8.88	0.33	96
Chrysene	218-01-9	8.93	0.35	99
Benzo[b]fluoranthene	205-99-2	10.40	0.32	96
Benzo[k]fluoranthene	207-08-9	10.43	0.11	93
Benzo[a]pyrene	50-32-8	10.82	0.25	92
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.15	88
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	12.48	0.13	79
Total (USEPA16) PAHs	-	-	< 4.16	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	107
Acenaphthene-d10	105
Phenanthrene-d10	111
Chrysene-d12	116
Perylene-d12	124

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	93

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

## ALIPHATIC / AROMATIC FRACTION BY GC/FID

**Customer and Site Details:** Ashton Bennett Consultancy : Royd Edge  
**Job Number:** S09\_1428  
**QC Batch Number:** 90907  
**Directory:** D:\TES\DATA\Y2009\0321TPH\_GC14\032109 2009-03-21 09-20-07\068B2101.D  
**Method:** Ultra Sonic

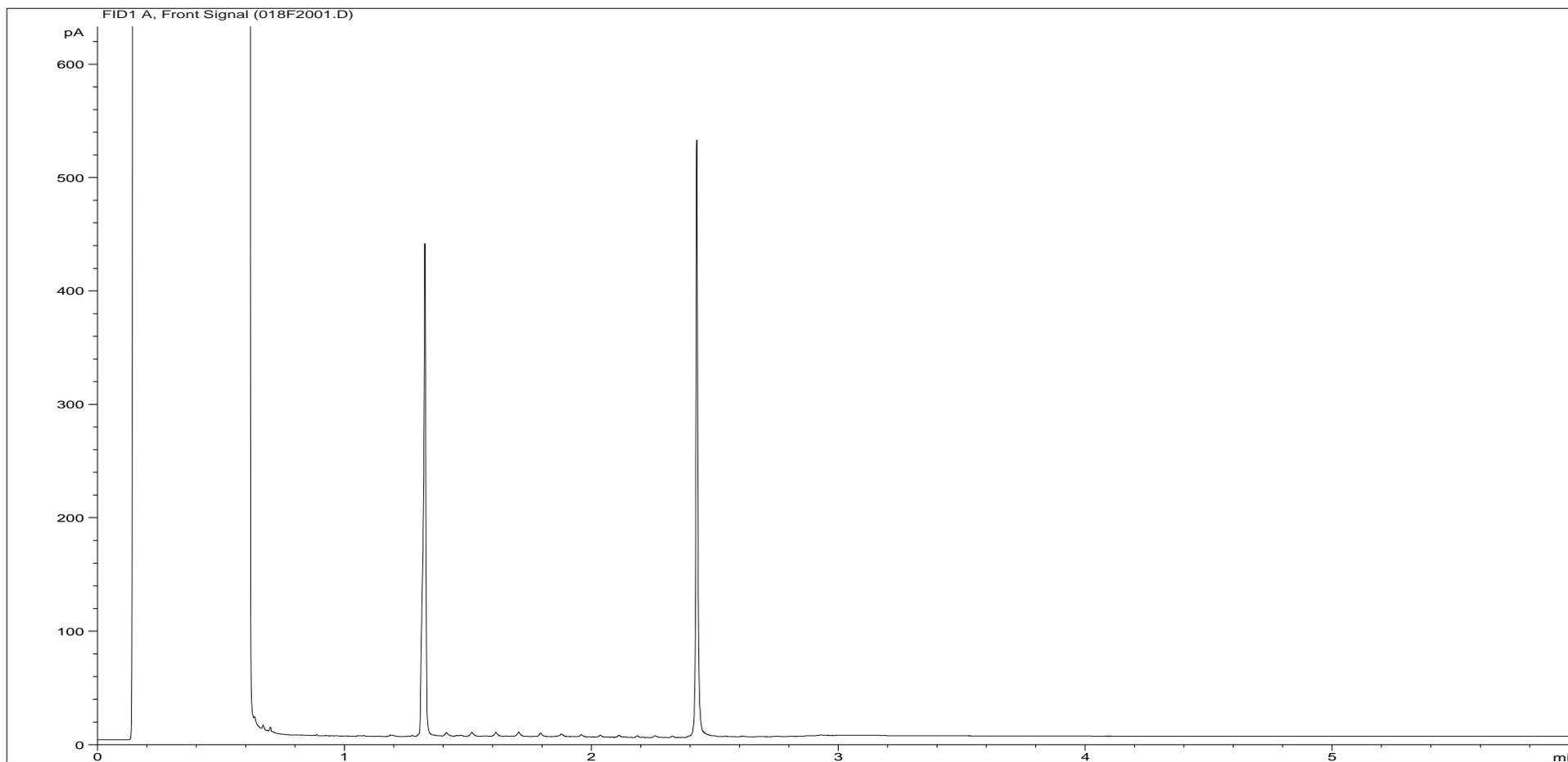
**Matrix:** Soil  
**Date Booked in:** 16-Mar-09  
**Date Extracted:** 19-Mar-09  
**Date Analysed:** 21-Mar-09, 13:47:49

**Separation:** Silica gel  
**Eluents:** Hexane, DCM

\* This sample data is not UKAS accredited.

		Concentration, (mg/kg) - as wet weight									
		>C8 - C10		>C10 - C12		>C12 - C16		>C16 - C21		>C21 - C35	
Sample ID	Client ID	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics
* CL0905935	WSA JAR	<4	<4	<4	<4	<4	<4	<4	<4	<8.76	36.7
* CL0905936	WSB JAR	<4	<4	<4	<4	<4	15.5	<4	33.4	<8.76	24.7
* CL0905952	WSJ 2.0	<4.29	<4	<4.29	<4	<4.29	<4	35	23.3	191	176

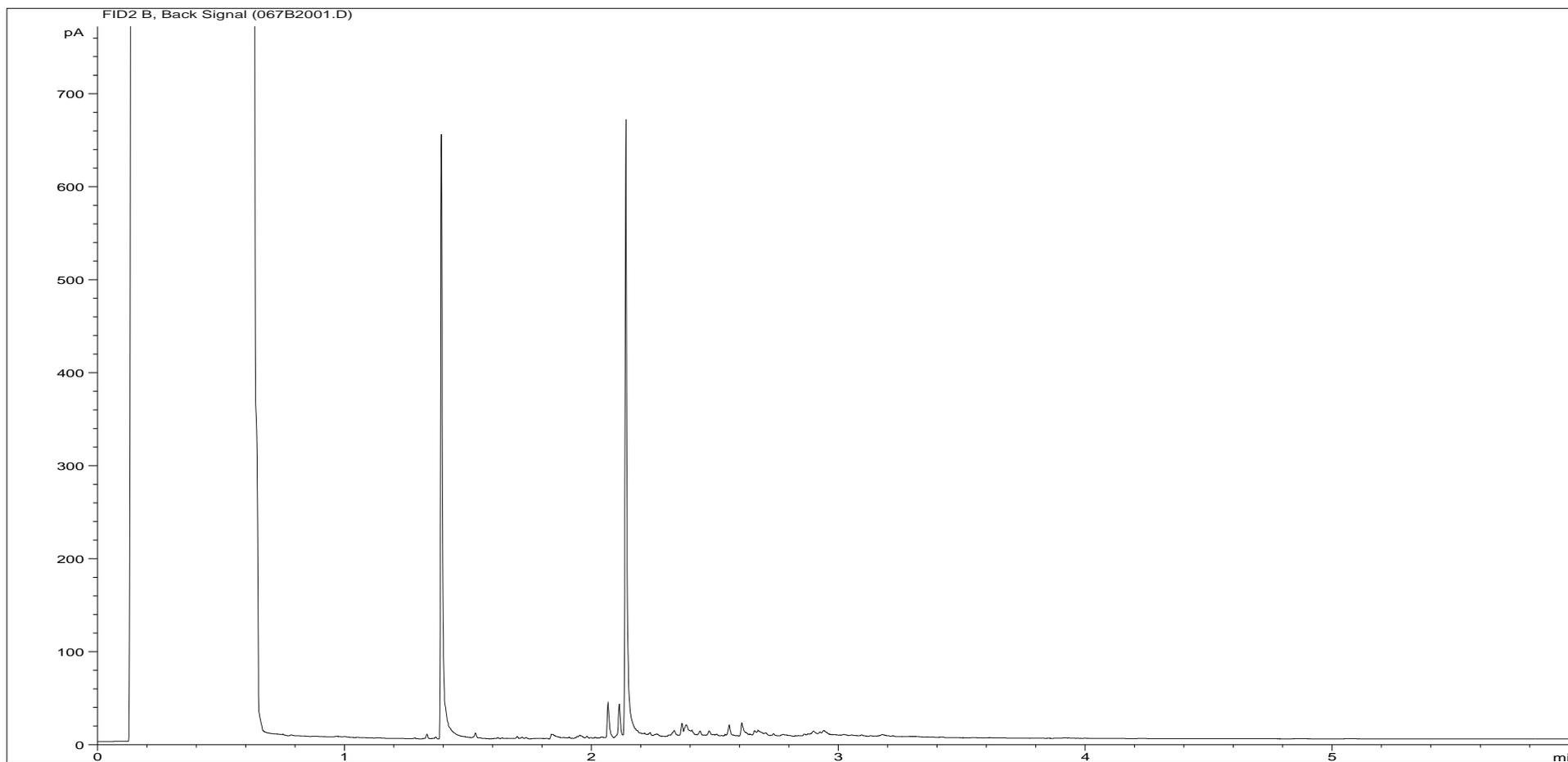
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905935ALI	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	14.82	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSA JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:35:39		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\018F2001.D		

Where individual results are flagged see report notes for for status.

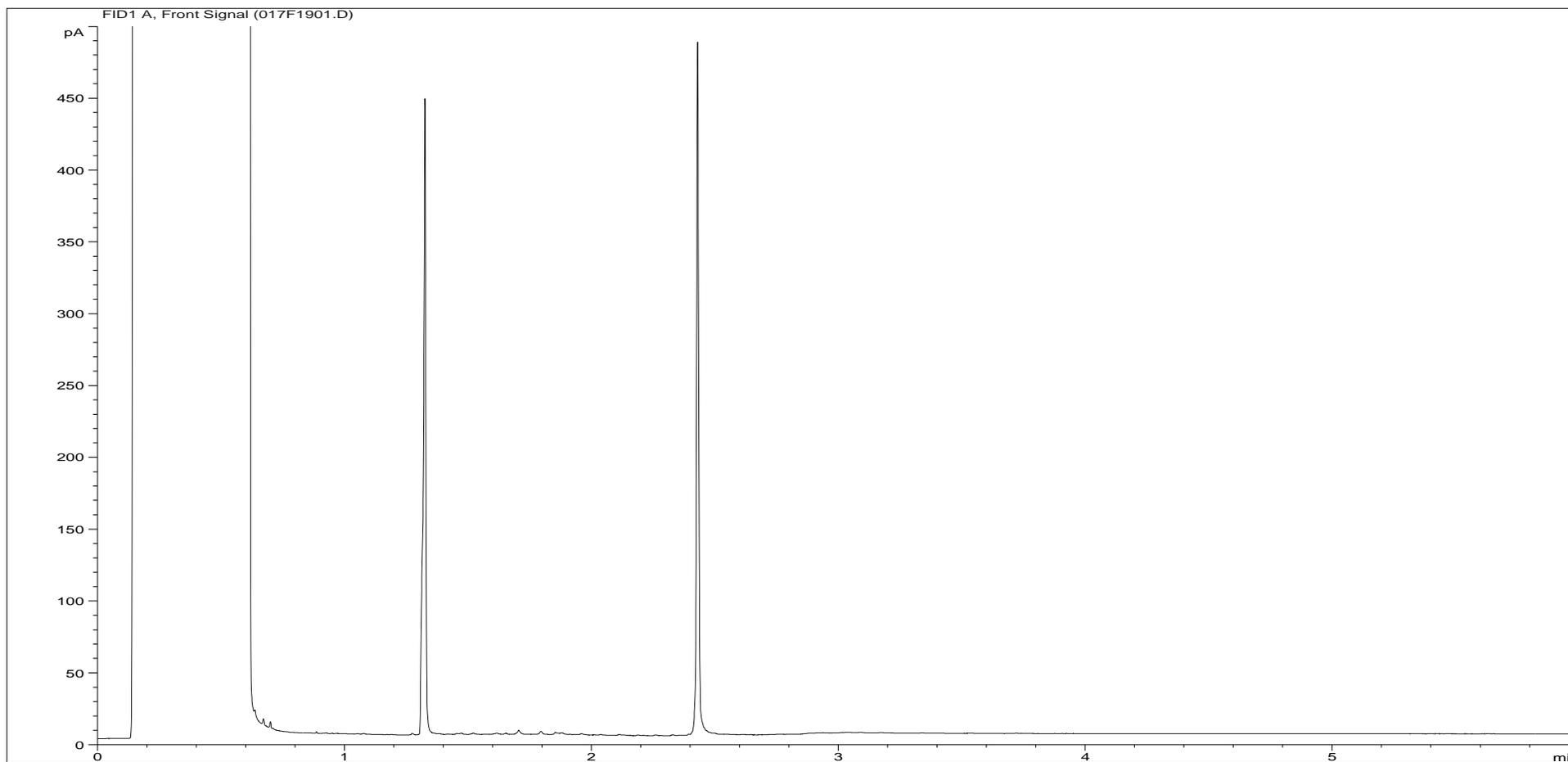
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905935ARO	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	11.4	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSA JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:35:39		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\067B2001.D		

Where individual results are flagged see report notes for for status.

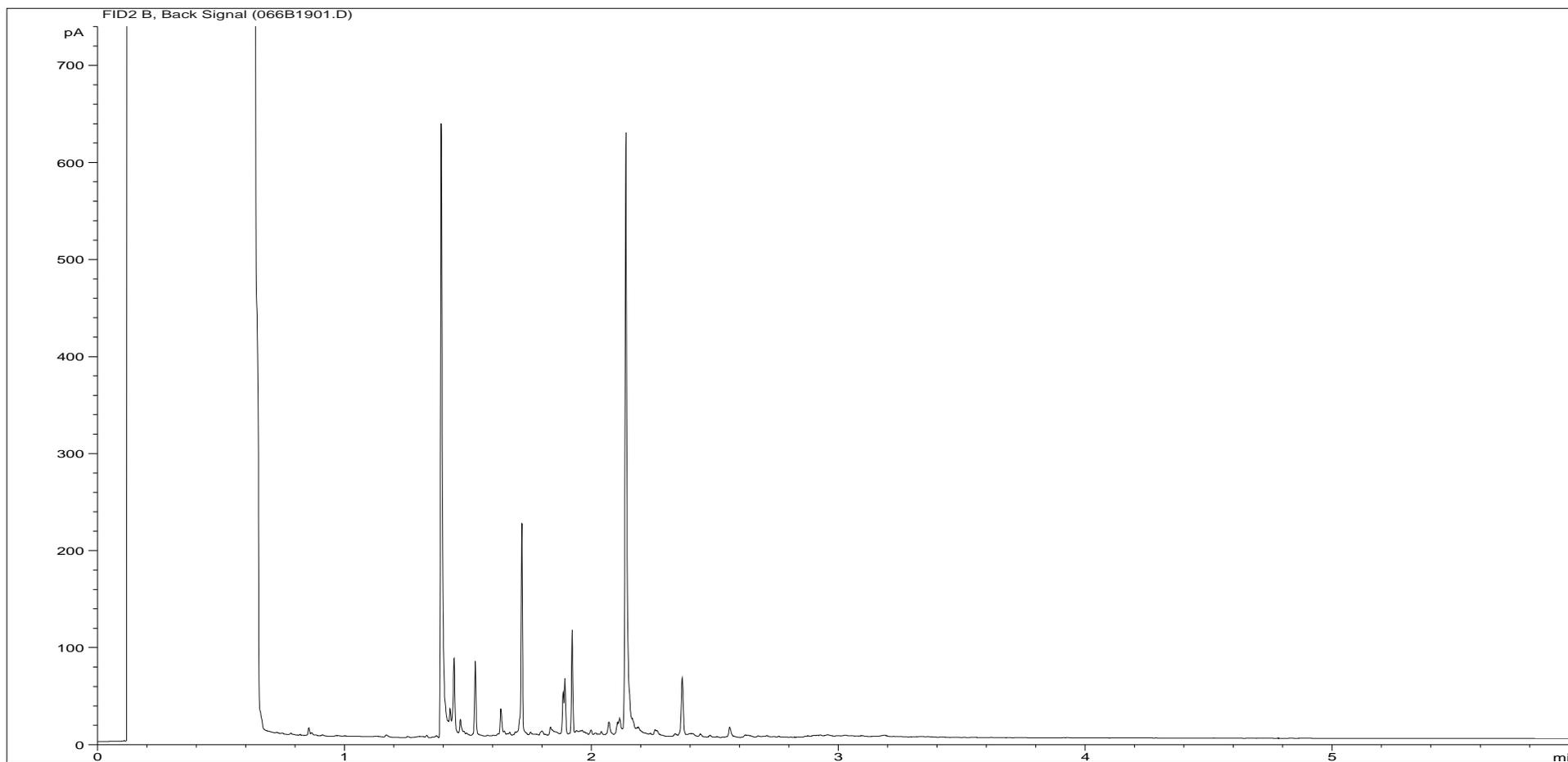
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905936ALI	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	14.82	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSB JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:23:36		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\017F1901.D		

Where individual results are flagged see report notes for for status.

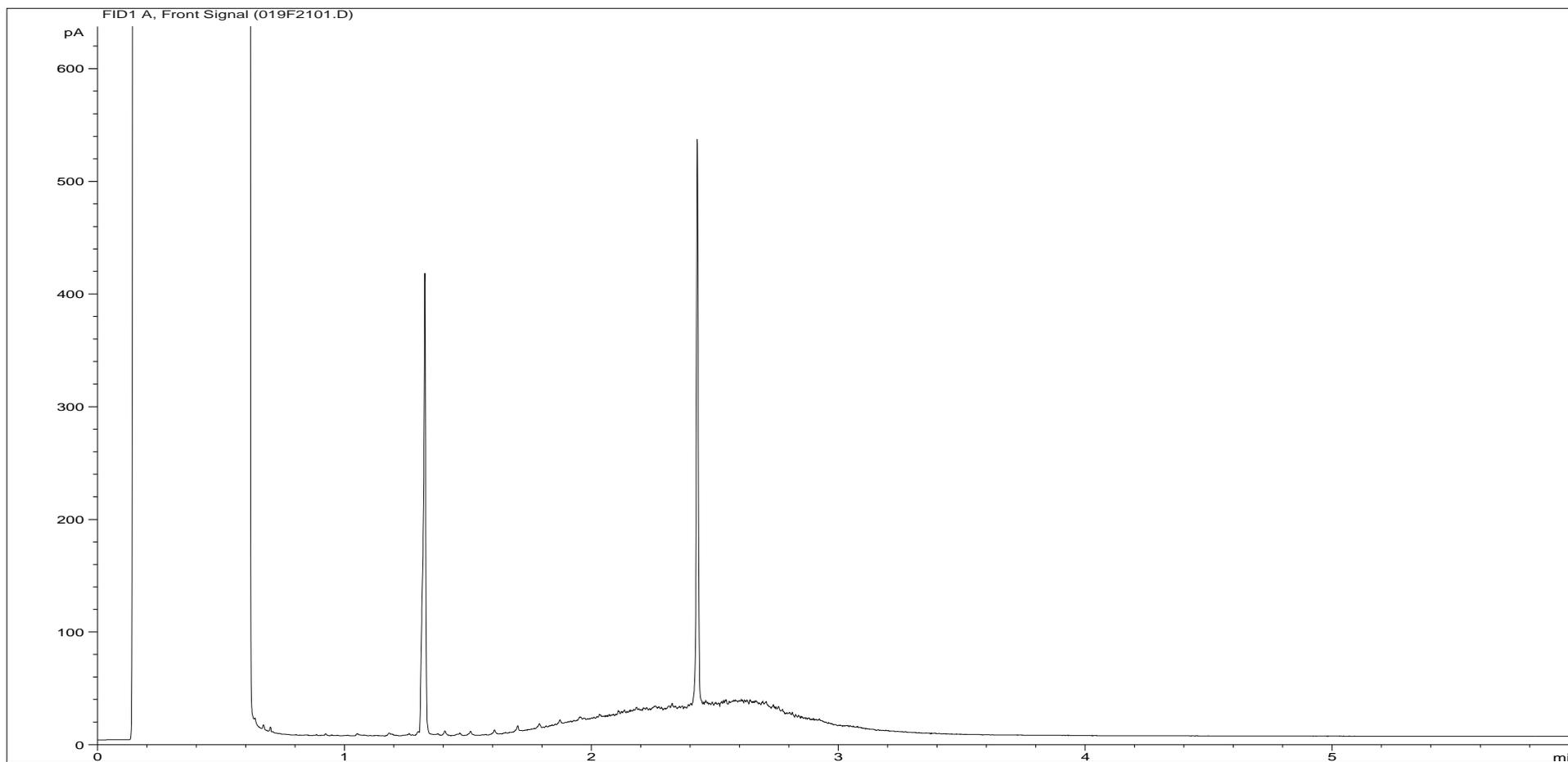
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905936ARO	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	11.02	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSB JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:23:36		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\066B1901.D		

Where individual results are flagged see report notes for for status.

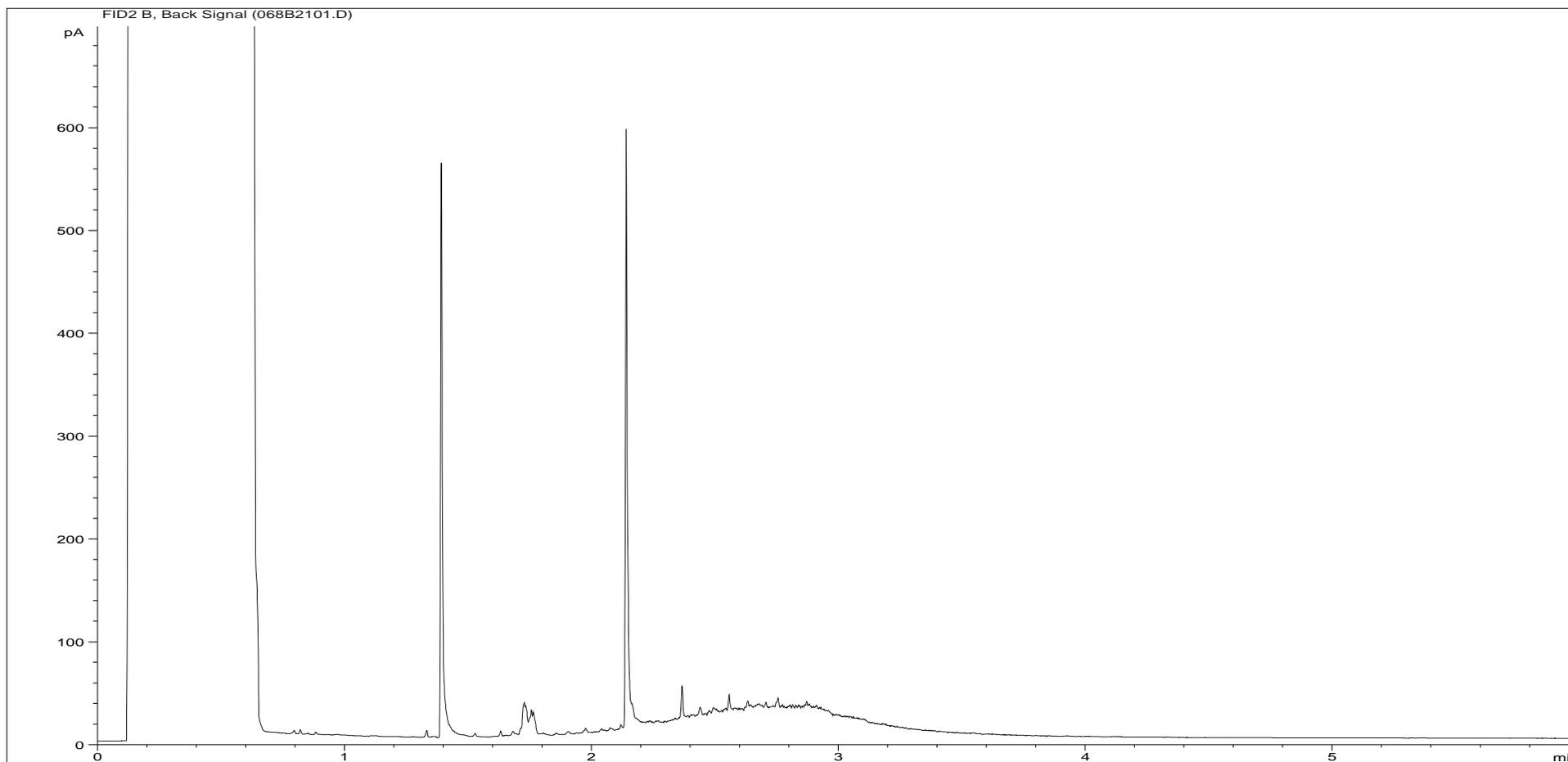
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905952ALI	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	17.16	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSJ 2.0
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:47:49		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\019F2101.D		

Where individual results are flagged see report notes for for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905952ARO	<b>Job Number:</b>	S09_1428
<b>Multiplier:</b>	13.2	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSJ 2.0
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:47:49		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\068B2101.D		

Where individual results are flagged see report notes for for status.

# Report Notes

**Soil/Solid analysis specific:**

Results expressed as mg/kg on an air dried basis unless stated otherwise  
S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

**Water analysis specific:**

Results expressed as mg/l unless stated otherwise

**Oil analysis specific:**

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

**Filter analysis specific:**

Results expressed as mg on filter unless stated otherwise

**VOC analysis specific:**

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

**Gas (Tedlar bag) analysis specific:**

Results expressed as ug/l unless stated otherwise

**Air (Carbon tube) analysis specific:**

Results expressed as ug on tube unless stated otherwise

**Asbestos analysis specific:**

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

**General notes:**

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

**END OF REPORT**

Where individual results are flagged see report notes for for status.

Our Ref: EFS/091428M (Ver. 1)

Your Ref:

May 1, 2009



TES Bretby

PO Box 100

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0XD

Telephone: 01283 554400

Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 27/04/09 when they will be discarded. Please call 01283 554547 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for TES Bretby

A handwritten signature in black ink that reads 'J Colbourne'.

J Colbourne  
Project Co-ordinator  
01283 554547



# TEST REPORT

## SOIL SAMPLE ANALYSIS



TES Report No. EFS/091428M (Ver. 1)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

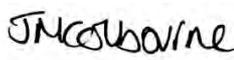
The 20 samples described in this report were logged for analysis by TES Bretby on 16-Mar-2009.  
The analysis was completed by: 01-May-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS or MCERTS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Pages 2 to 3)
- Table of GRO Results (Page 4)
- Table of PAH (MS-SIM) (80) Results (Pages 5 to 9)
- Table of TPH (Si) banding (std) (Page 10)
- GC-FID Chromatograms (Pages 11 to 16)
- Table of Report Notes (Page 17)
- Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
TES Bretby :  
Jane Colbourne

  
Project Co-ordinator

Date of Issue: 01-May-2009

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based,  
and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)  
TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for for status.

TES ID Number	Client Sample Description	Units :														
		Method Codes :														
		Method Reporting Limits :														
		Accreditation Code:														
CU/		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	pH Units	
		ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	TMSS	TPHUSSI	WSLM3	
		2	0.1	3	3	3.5	0.10	2.5	0.5	19.5	10	0.08	0.2	10.0		
		UM	U	UM	UM	UM	U	UM	U	UM	UM		U		U	
		Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	PAH by MS.16(0.08)	Tot. Moisture @ 105C	TPH by GCFD (AR/SI)	pH units	
0905935	WSA JAR												19.4	Req	8.1	
0905934	WSA 1.4												16.2		5.5	
0905936	WSB JAR	61.7	0.12	32.7‡	67.3	144.2	0.12	9.3	4.9	36.3		Req	19.5	Req	6.8	
0905938	WSC JAR												16.6		5.9	
0905937	WSC 0.2	14.5	<0.1	28.6‡	51.1	68.8	<0.1	13	1.6	34.7			16.6		5.4	
0905940	WSD JAR												14.9		6.7	
0905939	WSD 0.7												15.0		6.2	
0905942	WSE JAR											Req	17.8		7.9	
0905941	WSE 0.1												19.3		7.2	
0905944	WSF JAR											Req	24.2		7.4	
0905943	WSF 0.1										1570		22.2		7.4	
0905947	WSG JAR											Req	12.4		10.1	
0905945	WSG 0.1												18.8		8.3	
0905946	WSG 1.5 (NVM)										173‡		14.8		5.7	
0905948	WSH 0.8	2.1	<0.1	50.0‡	256.5	17.3	<0.1	39.9	<0.5	71.4	80		16.3		7.3	
0905949	WSI 1.5										93		19.0		7.5	
0905950	WSJ 0.5	16.4	0.1	73.3‡	55.8	104.5	0.13	38.2	<0.5	48.5			24.9		8.5	
0905951	WSJ 1.0											Req	21.2		9.4	
0905952	WSJ 2.0												20.5	Req	7.1	
0905953	WSK 0.5	7.1	<0.1	31.5‡	31.5	20.7	<0.1	25	0.7	64			16.3		5.9	
<b>TES Bretby</b> PO Box 100, Bretby Business Park, Burton-on-Trent, Staffordshire, DE15 0XD Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422		<b>Client Name</b>		<b>Ashton Bennett Consultancy</b>						<b>Soils Sample Analysis</b>						
		<b>Contact</b>		Ms F Bennett						<b>Date Printed</b>		01-May-09				
		<b>Royd Edge</b>						<b>Report Number</b>		EFS/091428M						
								<b>Table Number</b>		1						
																

		Units :	% M/M	mg/kg	mg/kg	mg/kg	% M/M										
		Method Codes :	FOCS	FTIRSWPER	GROHSA	SFAS	WSLM59										
		Method Reporting Limits :	0.04	50	0.1	0.5	0.02										
		Accreditation Code:	N	N		N	N										
TES ID Number	Client Sample Description	S.O.M. % (Calc)	TPH FTIRPER (AR)	GRO (AA)	Sulphide as S (AR)	F.O.C. %											
0905935	WSA JAR	4.29		Req		2.49											
0905934	WSA 1.4	2.82				1.64											
0905936	WSB JAR	2.16		Req		1.25											
0905938	WSC JAR	3.1	<60			1.8											
0905937	WSC 0.2	4.69				2.72											
0905940	WSD JAR	3.26				1.89											
0905939	WSD 0.7	3.31				1.92											
0905942	WSE JAR	3.08				1.79											
0905941	WSE 0.1	0.21			5.7	0.12											
0905944	WSF JAR	21.98				12.75											
0905943	WSF 0.1	19.31			20.2	11.2											
0905947	WSG JAR	5.71				3.31											
0905945	WSG 0.1	18.12			<0.6	10.51											
0905946	WSG 1.5 (NVM)	0.98				0.57											
0905948	WSH 0.8	3.22				1.87											
0905949	WSI 1.5	1.43				0.83											
0905950	WSJ 0.5	12.4				7.23											
0905951	WSJ 1.0	2.94				1.7											
0905952	WSJ 2.0	3.18		Req		1.84											
0905953	WSK 0.5	1.09				0.63											

<b>TES Bretby</b> PO Box 100, Bretby Business Park, Burton-on-Trent, Staffordshire, DE15 0XD Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422	<b>Client Name</b> Ashton Bennett Consultancy	<b>Royd Edge</b>		<b>Soils Sample Analysis</b>		
	<b>Contact</b> Ms F Bennett			<b>Date Printed</b> 01-May-09		
			<b>Report Number</b> EFS/091428M			
			<b>Table Number</b> 1			



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSB JAR	<b>Job Number:</b>	S09_1428M
<b>LIMS ID Number:</b>	CL0905936	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.39	0.11	89	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.60	1.25	98	UM
Anthracene	120-12-7	5.65	0.27	91	U
Fluoranthene	206-44-0	6.93	1.30	85	UM
Pyrene	129-00-0	7.21	0.97	81	UM
Benzo[a]anthracene	56-55-3	8.88	0.42	93	UM
Chrysene	218-01-9	8.93	0.40	97	UM
Benzo[b]fluoranthene	205-99-2	10.40	0.45	94	UM
Benzo[k]fluoranthene	207-08-9	10.44	0.17	95	UM
Benzo[a]pyrene	50-32-8	10.83	0.34	92	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.24	85	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	12.48	0.21	85	UM
Total (USEPA16) PAHs	-	-	< 6.53	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	109
Phenanthrene-d10	112
Chrysene-d12	113
Perylene-d12	120

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	97

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSE JAR	<b>Job Number:</b>	S09_1428M
<b>LIMS ID Number:</b>	CL0905942	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	5.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.22	0.51	97	UM
Acenaphthylene	208-96-8	-	< 0.50	-	U
Acenaphthene	83-32-9	4.37	8.40	96	UM
Fluorene	86-73-7	4.74	10.54	97	UM
Phenanthrene	85-01-8	5.57	74.29	99	UM
Anthracene	120-12-7	5.62	27.38	93	U
Fluoranthene	206-44-0	6.88	86.07	92	UM
Pyrene	129-00-0	7.17	63.82	91	UM
Benzo[a]anthracene	56-55-3	8.84	27.90	99	UM
Chrysene	218-01-9	8.89	24.67	98	UM
Benzo[b]fluoranthene	205-99-2	10.36	26.67	98	UM
Benzo[k]fluoranthene	207-08-9	10.39	9.83	95	UM
Benzo[a]pyrene	50-32-8	10.78	22.48	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	13.97	90	UM
Dibenzo[a,h]anthracene	53-70-3	12.18	2.94	94	UM
Benzo[g,h,i]perylene	191-24-2	12.43	11.22	88	UM
Total (USEPA16) PAHs	-	-	< 411.13	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	102
Phenanthrene-d10	110
Chrysene-d12	117
Perylene-d12	119

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	100

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSF JAR	<b>Job Number:</b>	S09_1428M
<b>LIMS ID Number:</b>	CL0905944	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.23	0.22	96	UM
Acenaphthylene	208-96-8	4.27	0.12	95	U
Acenaphthene	83-32-9	4.39	0.12	93	UM
Fluorene	86-73-7	4.77	0.10	96	UM
Phenanthrene	85-01-8	5.60	1.54	98	UM
Anthracene	120-12-7	5.65	0.70	96	U
Fluoranthene	206-44-0	6.92	3.97	85	UM
Pyrene	129-00-0	7.21	3.21	81	UM
Benzo[a]anthracene	56-55-3	8.88	1.78	95	UM
Chrysene	218-01-9	8.93	1.82	97	UM
Benzo[b]fluoranthene	205-99-2	10.40	2.47	95	UM
Benzo[k]fluoranthene	207-08-9	10.43	0.78	92	UM
Benzo[a]pyrene	50-32-8	10.82	1.66	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	1.00	91	UM
Dibenzo[a,h]anthracene	53-70-3	12.22	0.28	92	UM
Benzo[g,h,i]perylene	191-24-2	12.48	1.08	82	UM
Total (USEPA16) PAHs	-	-	21.16	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	110
Phenanthrene-d10	113
Chrysene-d12	115
Perylene-d12	123

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	93

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSG JAR	<b>Job Number:</b>	S09_1428M
<b>LIMS ID Number:</b>	CL0905947	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	23-Mar-09
<b>Directory:</b>	323PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	50.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.22	6.45	100	UM
Acenaphthylene	208-96-8	4.25	4.71	87	U
Acenaphthene	83-32-9	4.37	118.48	96	UM
Fluorene	86-73-7	4.74	152.11	97	UM
Phenanthrene	85-01-8	5.56	877.73	99	UM
Anthracene	120-12-7	5.62	336.69	93	U
Fluoranthene	206-44-0	6.89	920.46	92	UM
Pyrene	129-00-0	7.17	668.90	91	UM
Benzo[a]anthracene	56-55-3	8.84	283.82	99	UM
Chrysene	218-01-9	8.89	256.35	99	UM
Benzo[b]fluoranthene	205-99-2	10.36	260.11	98	UM
Benzo[k]fluoranthene	207-08-9	10.39	95.75	95	UM
Benzo[a]pyrene	50-32-8	10.78	220.68	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.14	134.19	97	UM
Dibenzo[a,h]anthracene	53-70-3	12.18	27.53	92	UM
Benzo[g,h,i]perylene	191-24-2	12.43	105.18	87	UM
Total (USEPA16) PAHs	-	-	4469.17	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	101
Phenanthrene-d10	107
Chrysene-d12	115
Perylene-d12	119

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	95
Terphenyl-d14	95

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	WSJ 1.0	<b>Job Number:</b>	S09_1428M
<b>LIMS ID Number:</b>	CL0905951	<b>Date Booked in:</b>	16-Mar-09
<b>QC Batch Number:</b>	0907	<b>Date Extracted:</b>	19-Mar-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	21-Mar-09
<b>Directory:</b>	320PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.60	0.80	97	UM
Anthracene	120-12-7	5.65	0.24	93	U
Fluoranthene	206-44-0	6.93	0.93	85	UM
Pyrene	129-00-0	7.21	0.80	82	UM
Benzo[a]anthracene	56-55-3	8.88	0.42	96	UM
Chrysene	218-01-9	8.93	0.44	99	UM
Benzo[b]fluoranthene	205-99-2	10.40	0.41	96	UM
Benzo[k]fluoranthene	207-08-9	10.43	0.14	93	UM
Benzo[a]pyrene	50-32-8	10.82	0.32	92	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.19	0.19	88	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	12.48	0.16	79	UM
Total (USEPA16) PAHs	-	-	< 5.28	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	107
Acenaphthene-d10	105
Phenanthrene-d10	111
Chrysene-d12	116
Perylene-d12	124

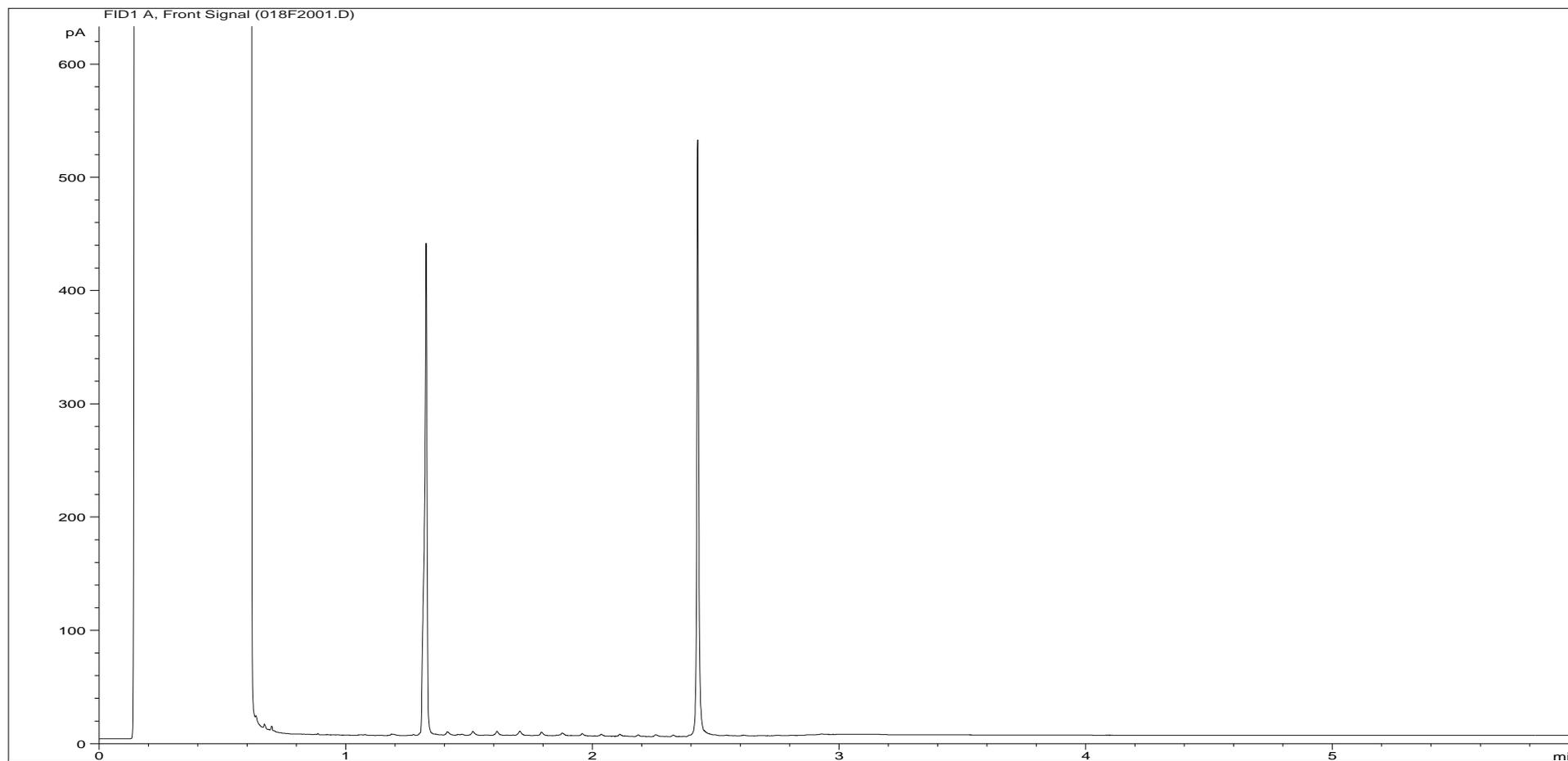
Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	93

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



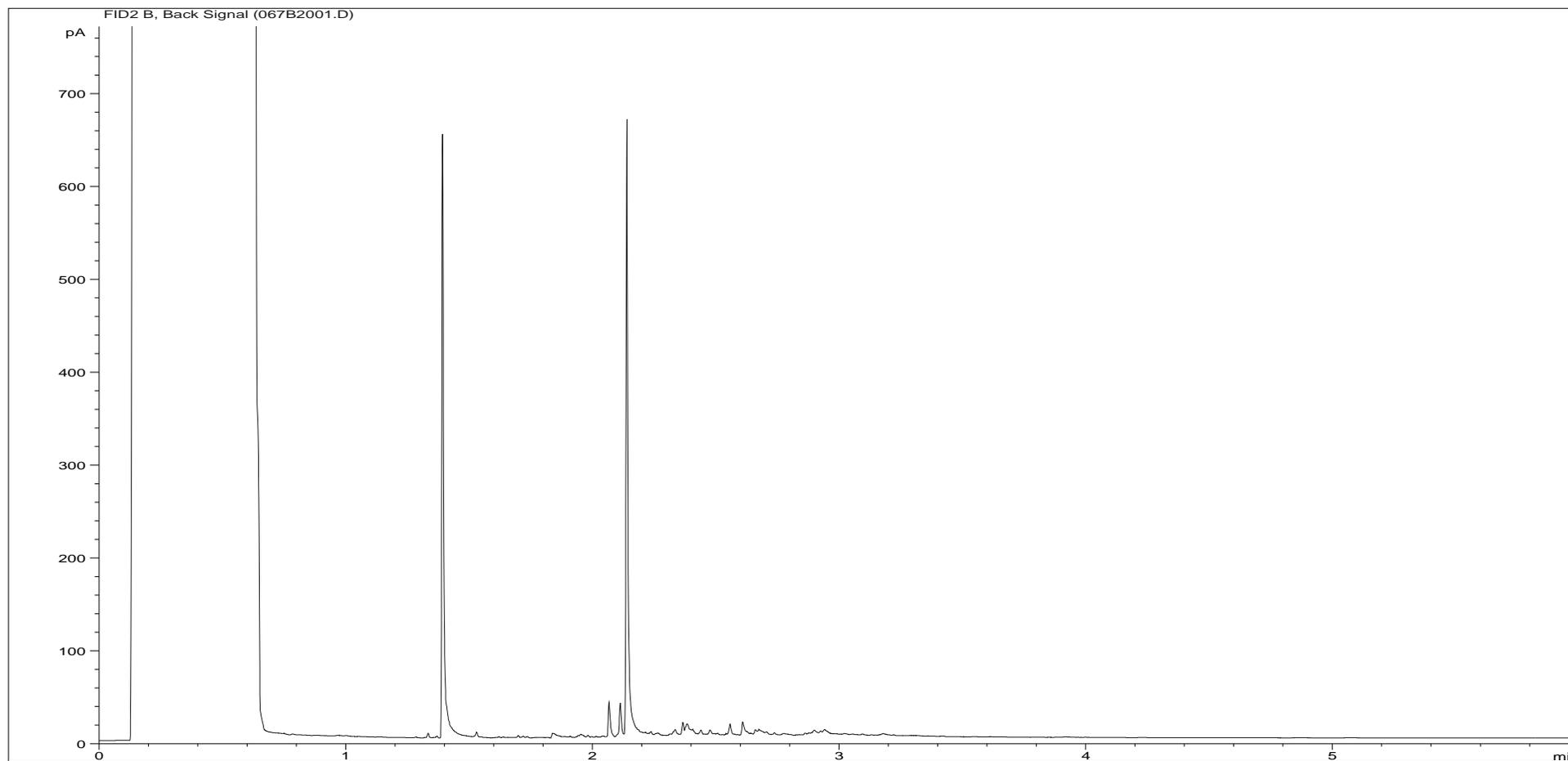
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905935ALI	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	14.82	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSA JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:35:39		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\018F2001.D		

Where individual results are flagged see report notes for status.

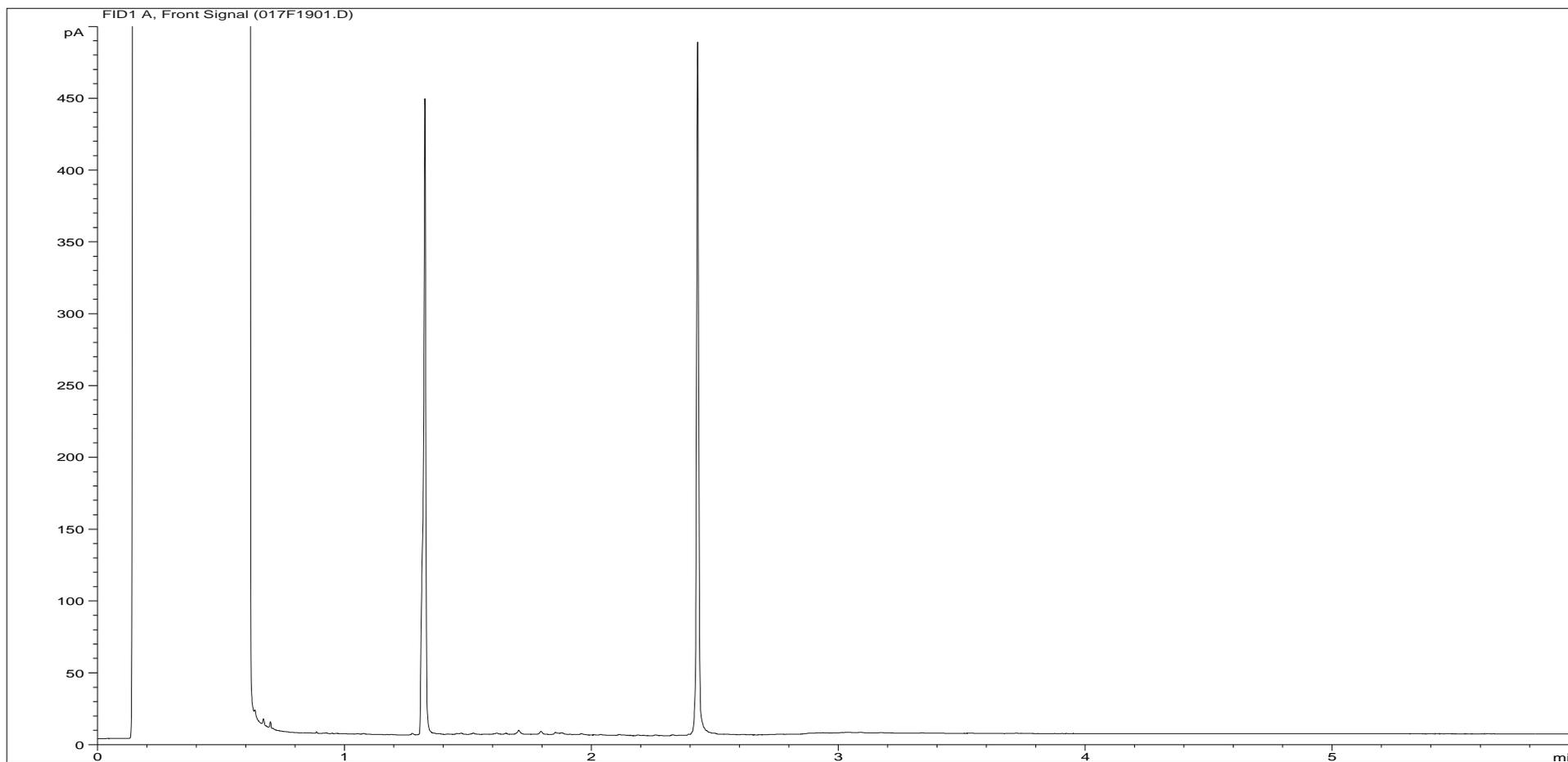
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905935ARO	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	11.4	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSA JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:35:39		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\067B2001.D		

Where individual results are flagged see report notes for status.

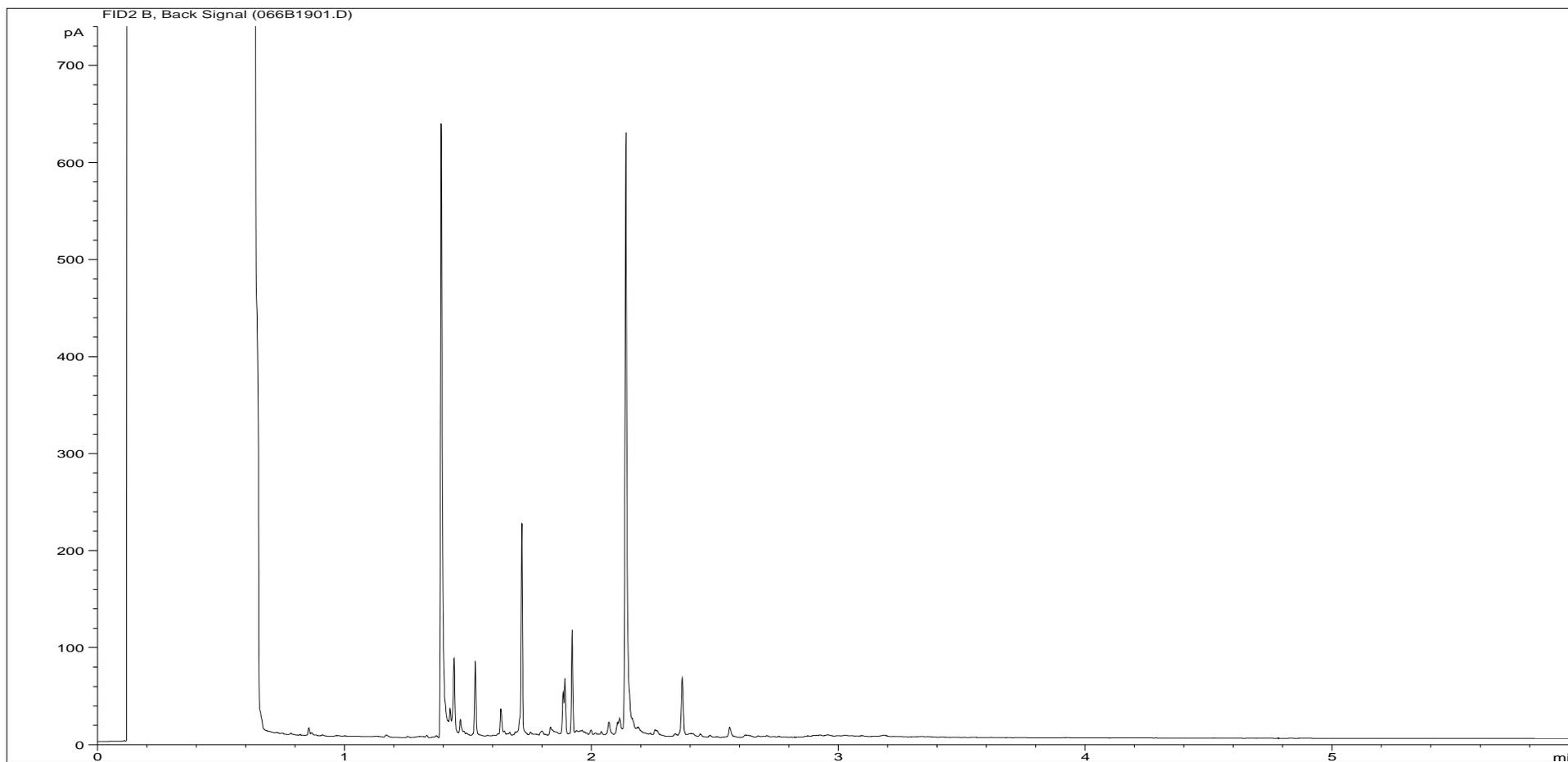
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905936ALI	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	14.82	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSB JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:23:36		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\017F1901.D		

Where individual results are flagged see report notes for status.

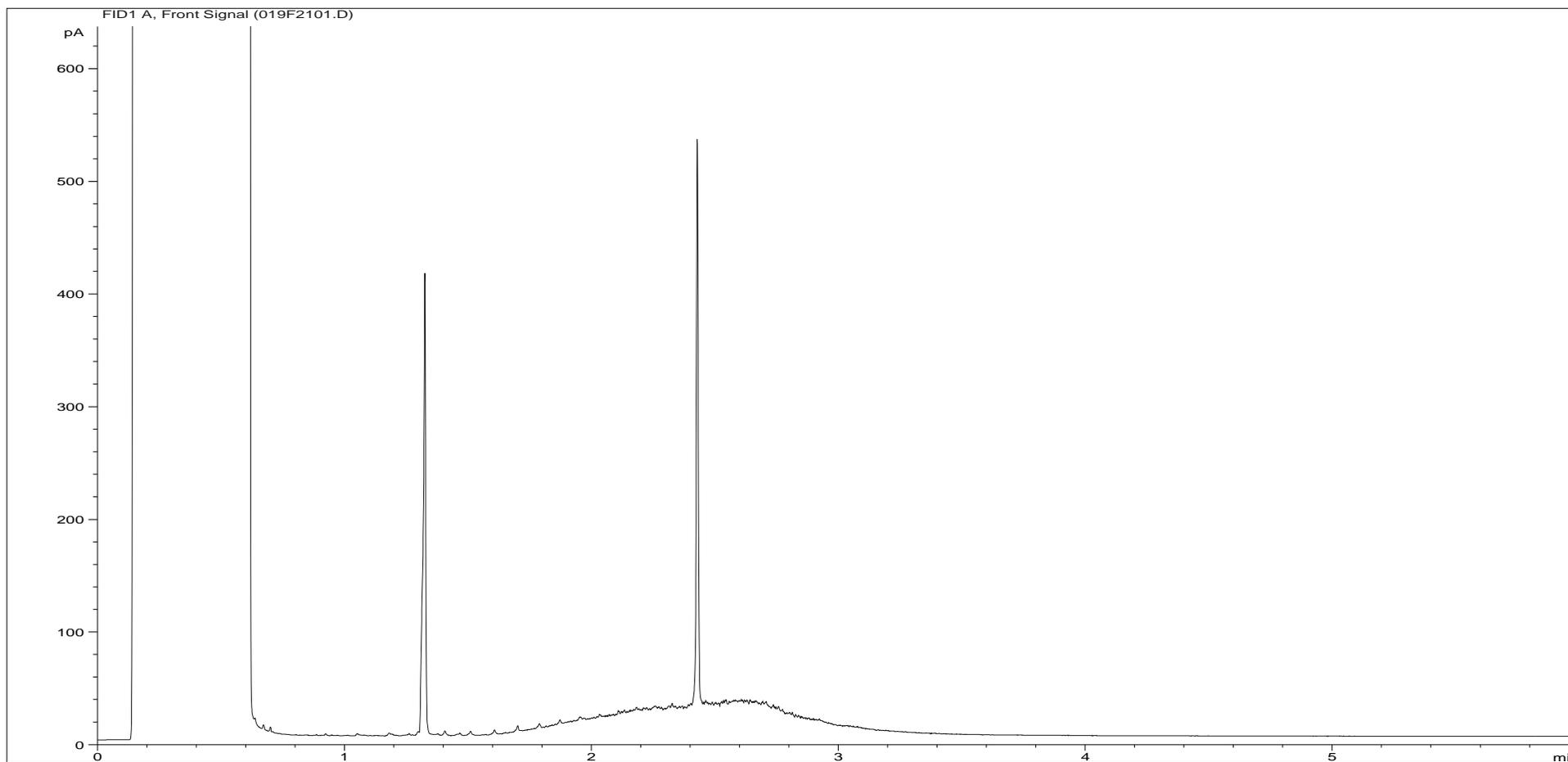
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905936ARO	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	11.02	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSB JAR
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:23:36		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\066B1901.D		

Where individual results are flagged see report notes for status.

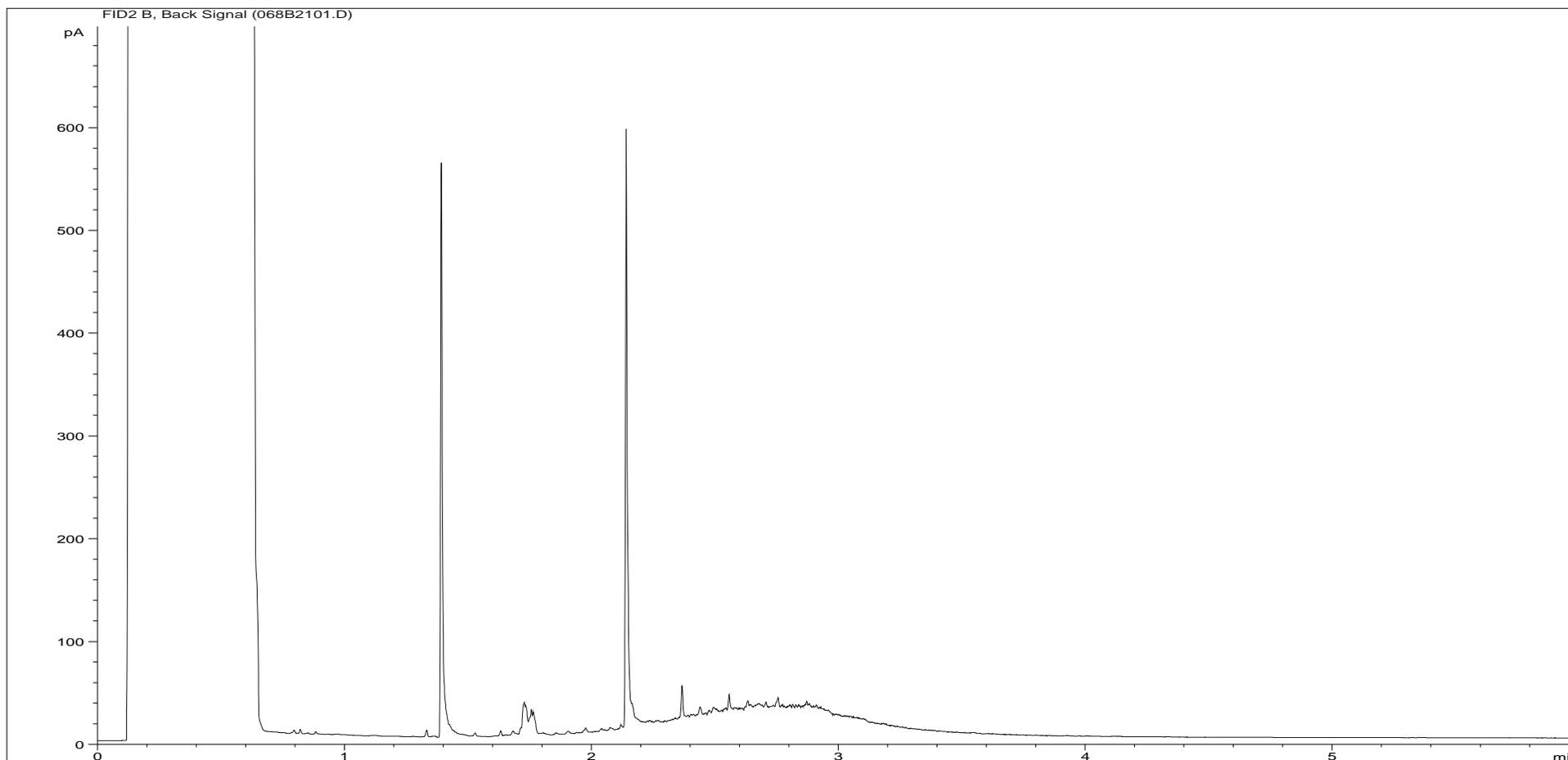
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0905952ALI	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	17.16	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSJ 2.0
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:47:49		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\019F2101.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0905952ARO	<b>Job Number:</b>	S09_1428M
<b>Multiplier:</b>	13.2	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_MAX_RUNF.M	<b>Client Sample Ref:</b>	WSJ 2.0
<b>Acquisition Date/Time:</b>	21-Mar-09, 13:47:49		
<b>Datafile:</b>	D:\TES\DATA\Y2009\0321TPH_GC14\032109 2009-03-21 09-20-07\068B2101.D		

Where individual results are flagged see report notes for status.

# Report Notes

## Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

## Water analysis specific:

Results expressed as mg/l unless stated otherwise

## Oil analysis specific:

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

## Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

## VOC analysis specific:

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

## Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

## Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

## Asbestos analysis specific:

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

## General notes:

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory

Where individual results are flagged see report notes for for status.



Our Ref: EFS/095285M (Ver. 1)

Your Ref: 2754

October 12, 2009



Scientifics Ltd  
Bretby Business Park  
Ashby Road  
Burton-on-Trent  
Staffordshire  
DE15 0YZ

Telephone: 01283 554400  
Facsimile: 01283 554422

Ms F Bennett  
Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

For the attention of Ms F Bennett

Dear Ms Bennett

**SOIL Sample Analysis - Royd Edge**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 10/11/09 when they will be discarded. Please call 01283 554458 for an extension of this date.

Please be aware that from 1 January 2003 our policy for the retention of paper based laboratory records and analysis reports will be 6 years.

The work was carried out in accordance with Scientifics Ltd Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for Scientifics

A handwritten signature in black ink, appearing to read "D Simpson". The signature is written in a cursive, flowing style.

D Simpson  
Project Co-ordinator  
01283 554458

# TEST REPORT

## SOIL SAMPLE ANALYSIS



Report No. EFS/095285M (Ver. 1)

Ashton Bennett Consultancy  
Unit K  
Bridge Mills  
Huddersfield Road  
Holmfirth  
HD9 3TW

**Site: Royd Edge**

The 4 samples described in this report were logged for analysis by Scientifics on 29-Sep-2009.  
The analysis was completed by: 12-Oct-2009

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS or MCERTS accredited  
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by Scientifics Ltd.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Pages 2 to 3)
- Table of PAH (MS-SIM) (80) Results (Pages 4 to 5)
- Table of GRO Results (Page 6)
- Table of TPH (Si) banding (UK-CWG) (Page 7)
- GC-FID Chromatograms (Pages 8 to 11)
- Table of Report Notes (Page 12)
- Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
Scientifics :  
Dave Simpson

  
Project Co-ordinator

Date of Issue: 12-Oct-2009

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked 'A' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based,  
and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)  
Scientifics Ltd accepts no responsibility for any sampling not carried out by our personnel.





# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	BH1	<b>Job Number:</b>	S09_5285M
<b>LIMS ID Number:</b>	CL0923573	<b>Date Booked in:</b>	29-Sep-09
<b>QC Batch Number:</b>	3132	<b>Date Extracted:</b>	09-Oct-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	09-Oct-09
<b>Directory:</b>	009PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	5.33	0.22	96	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	6.60	0.38	88	UM
Pyrene	129-00-0	6.88	0.30	87	UM
Benzo[a]anthracene	56-55-3	8.52	0.21	93	UM
Chrysene	218-01-9	8.57	0.24	98	UM
Benzo[b]fluoranthene	205-99-2	10.03	0.20	94	UM
Benzo[k]fluoranthene	207-08-9	10.07	0.09	94	UM
Benzo[a]pyrene	50-32-8	10.45	0.15	90	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 2.56	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	92
Phenanthrene-d10	99
Chrysene-d12	94
Perylene-d12	92

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	103
Terphenyl-d14	98

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

<b>Customer and Site Details:</b>	Ashton Bennett Consultancy: Royd Edge		
<b>Sample Details:</b>	BH3	<b>Job Number:</b>	S09_5285M
<b>LIMS ID Number:</b>	CL0923574	<b>Date Booked in:</b>	29-Sep-09
<b>QC Batch Number:</b>	3132	<b>Date Extracted:</b>	09-Oct-09
<b>Quantitation File:</b>	Initial Calibration	<b>Date Analysed:</b>	10-Oct-09
<b>Directory:</b>	009PAH_MS14\	<b>Matrix:</b>	Soil
<b>Dilution:</b>	1.0	<b>Ext Method:</b>	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.12	-	UM
Acenaphthylene	208-96-8	-	< 0.12	-	U
Acenaphthene	83-32-9	-	< 0.12	-	UM
Fluorene	86-73-7	-	< 0.12	-	UM
Phenanthrene	85-01-8	5.33	0.43	97	UM
Anthracene	120-12-7	5.38	0.10	95	U
Fluoranthene	206-44-0	6.60	0.97	89	UM
Pyrene	129-00-0	6.88	0.70	86	UM
Benzo[a]anthracene	56-55-3	8.52	0.53	93	UM
Chrysene	218-01-9	8.57	0.52	99	UM
Benzo[b]fluoranthene	205-99-2	10.03	0.53	94	UM
Benzo[k]fluoranthene	207-08-9	10.06	0.18	96	UM
Benzo[a]pyrene	50-32-8	10.45	0.37	92	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.81	0.24	94	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.12	-	UM
Benzo[g,h,i]perylene	191-24-2	12.09	0.21	85	UM
Total (USEPA16) PAHs	-	-	< 5.44	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	109
Acenaphthene-d10	101
Phenanthrene-d10	111
Chrysene-d12	113
Perylene-d12	115

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	96

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

## Gasoline Range Organics (BTEX and Aromatic/Aliphatic Carbon Ranges)

**Customer and Site Details:** Ashton Bennett Consultancy : Royd Edge  
**Job Number:** S09\_5285  
**Directory:** D:\TES\DATA\Y2009\1002HSA\_GC12\100209 2009-10-02 09-22-33\126B2601.D  
**Method:** HEADSPACE GCFID  
 Accreditation Code: N

**Matrix:** Soil  
**Date Booked in:** 29-Sep-09  
**Date extracted:** 02-Oct-09  
**Date Analysed:** 02-Oct-09, 17:22:  
**Units:** mg/kg

Sample ID	Client ID	BTEX				Aromatics		Aliphatics		Total GRO
		Benzene	Toluene	Ethyl benzene	Xylenes	C5 - C7	>C7 - C8	C5 - C6	>C6 - C8	C5 - C10
* CL0923573	BH1	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.2	<0.2	<0.2
* CL0923574	BH3	<0.01	<0.01	<0.01	<0.03	<0.01	<0.01	<0.3	<0.3	<0.3

## ALIPHATIC / AROMATIC FRACTION BY GC/FID

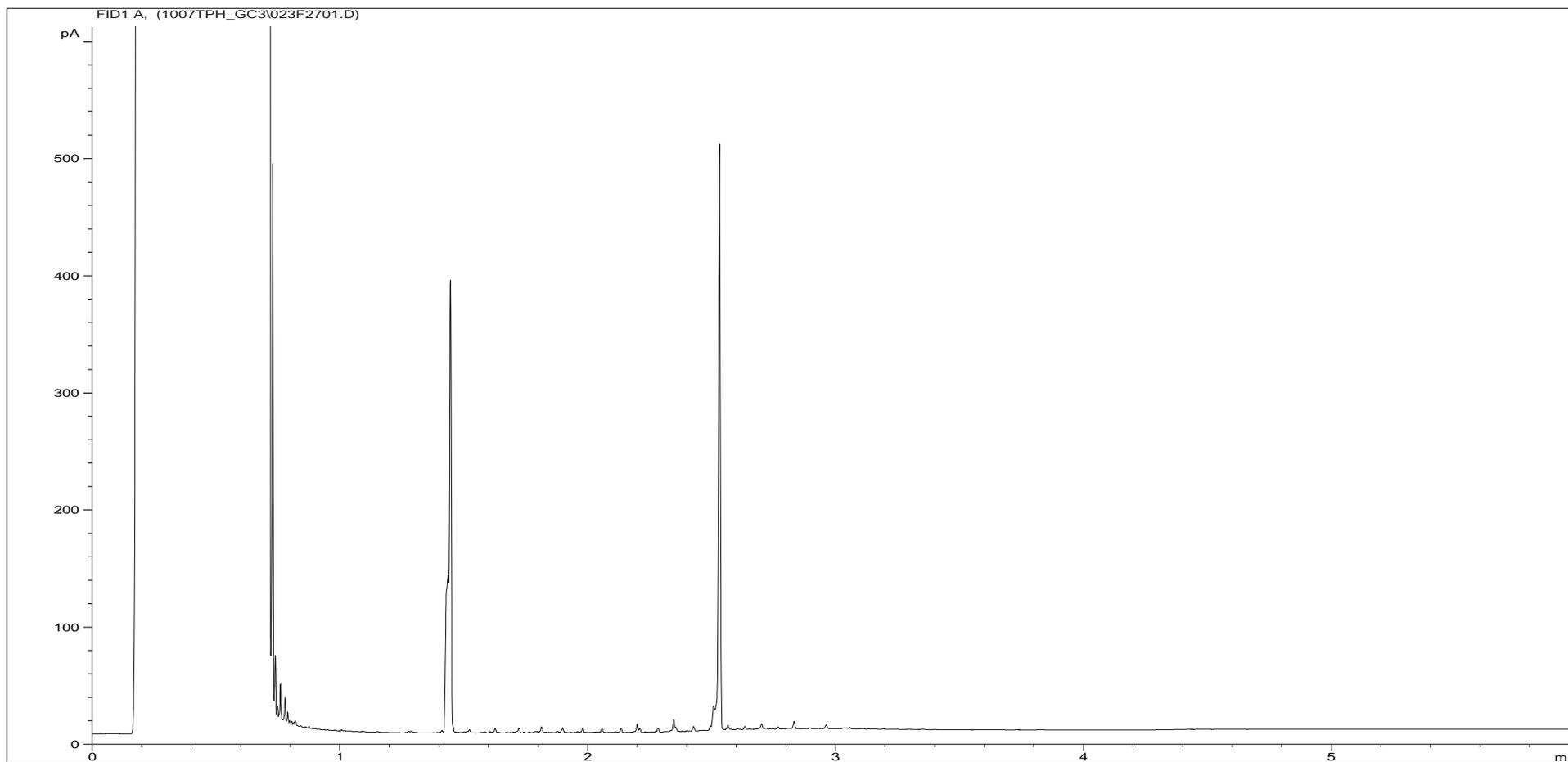
**Customer and Site Details:** Ashton Bennett Consultancy : Royd Edge  
**Job Number:** S09\_5285  
**QC Batch Number:** 93088  
**Directory:** D:\TES\DATA\Y2009\1007TPH\_GC3\073B2801.D  
**Method:** Ultra Sonic

**Separation:** Silica gel  
**Eluents:** Hexane, DCM

**Matrix:** Soil  
**Date Booked in:** 29-Sep-09  
**Date Extracted:** 06-Oct-09  
**Date Analysed:** 07-Oct-09

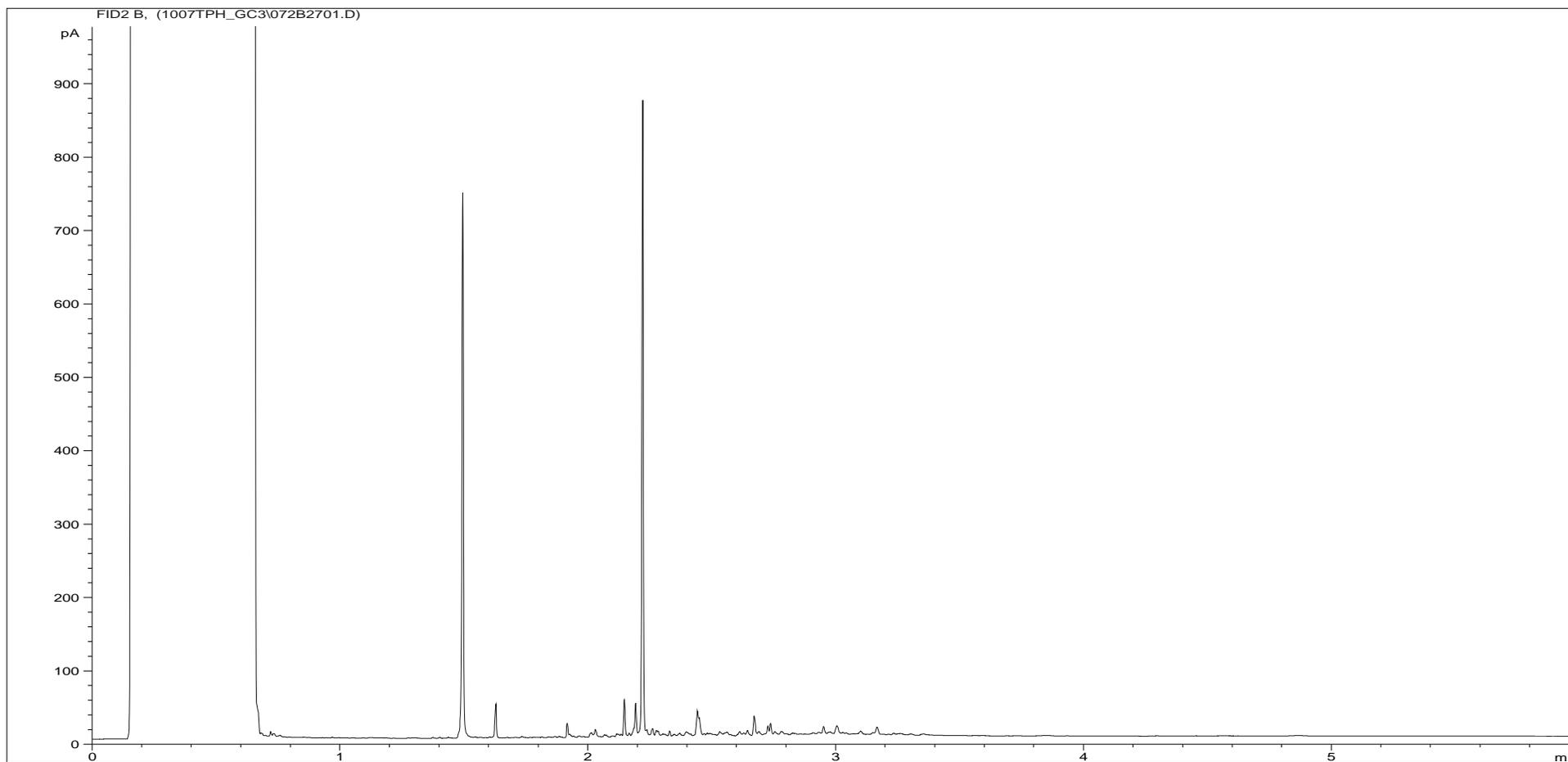
This sample data is not accredited.		Concentration, (mg/kg) - as dry weight.										
		>C8 - C10	>C8 - C10	>C10 - C12	>C10 - C12	>C12 - C16	>C12 - C16	>C16 - C35	>C16 - C21	>C35 - C40	>C21 - C35	>C35 - C40
Sample ID	Client ID	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aromatics
* CL0923573	BH1	<5	<5	<5	<5	<5	<5	<13.7	9.98	<5	51.6	4.66
* CL0923574	BH3	<6	<6	<6	<6	<6	<6	23.3	<6	<6	27.1	<6

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



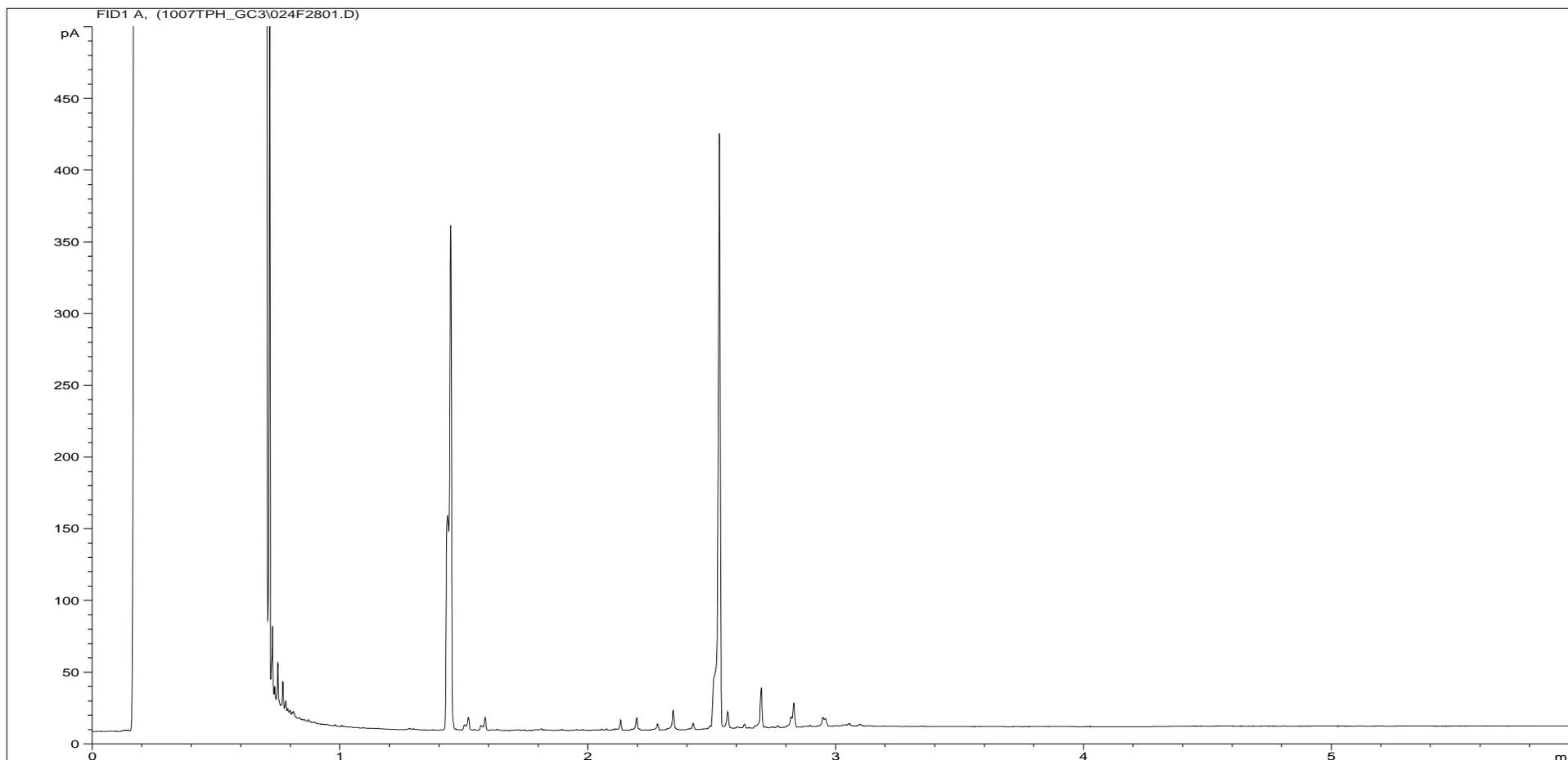
<b>Sample ID:</b>	CL0923573ALI	<b>Job Number:</b>	S09_5285M
<b>Multiplier:</b>	15.2	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH1
<b>Acquisition Date/Time:</b>	07-Oct-09		
<b>Datafile:</b>	D:\TES\DATA\Y2009\1007TPH_GC3\023F2701.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



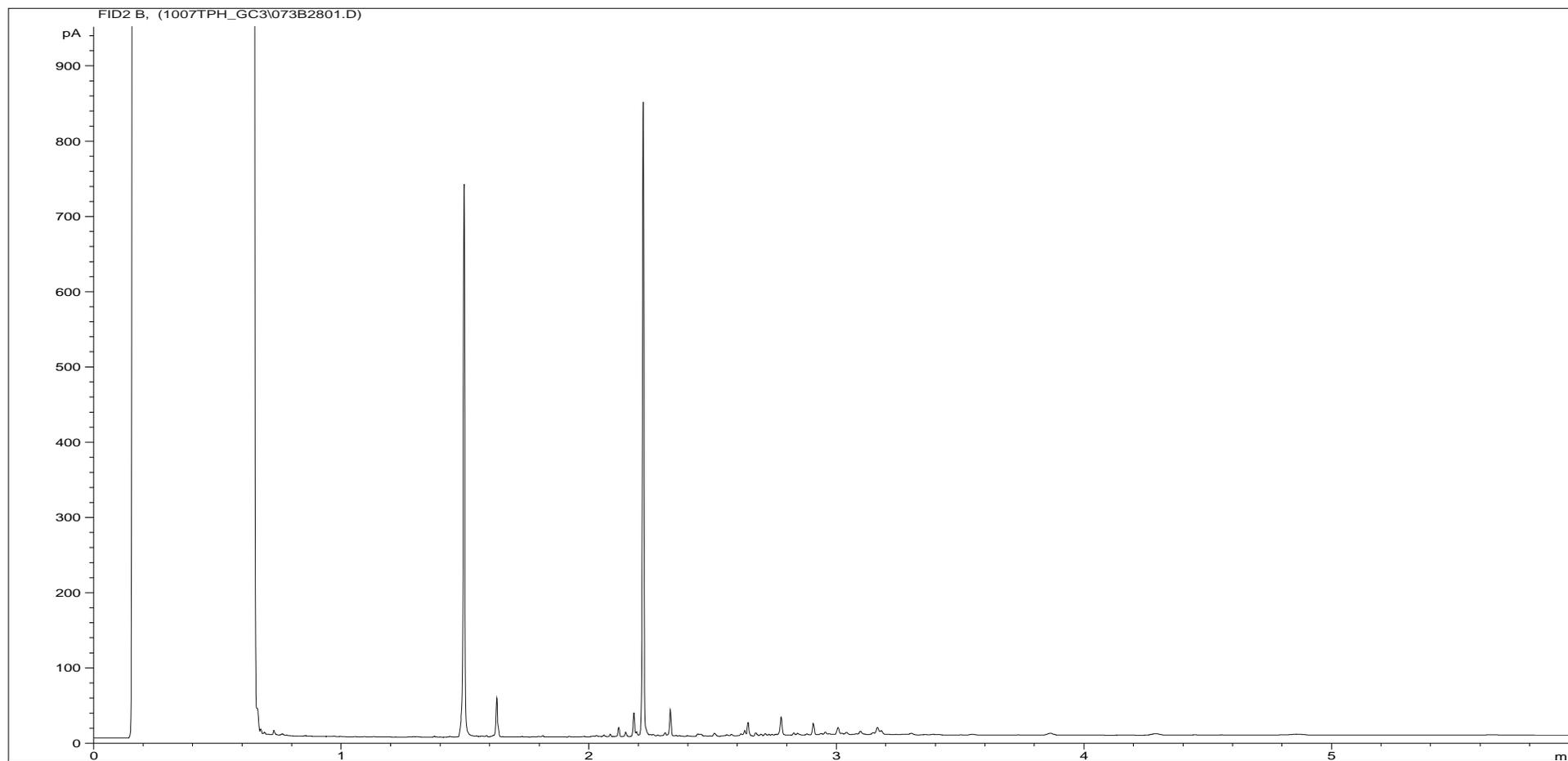
<b>Sample ID:</b>	CL0923573ARO	<b>Job Number:</b>	S09_5285M
<b>Multiplier:</b>	11.6	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH1
<b>Acquisition Date/Time:</b>	07-Oct-09		
<b>Datafile:</b>	D:\TES\DATA\Y2009\1007TPH_GC3\072B2701.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



<b>Sample ID:</b>	CL0923574ALI	<b>Job Number:</b>	S09_5285M
<b>Multiplier:</b>	15.2	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH3
<b>Acquisition Date/Time:</b>	07-Oct-09		
<b>Datafile:</b>	D:\TES\DATA\Y2009\1007TPH_GC3\024F2801.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



<b>Sample ID:</b>	CL0923574ARO	<b>Job Number:</b>	S09_5285M
<b>Multiplier:</b>	12	<b>Client:</b>	Ashton Bennett Consultancy
<b>Dilution:</b>	1	<b>Site:</b>	Royd Edge
<b>Acquisition Method:</b>	5UL_RUNF.M	<b>Client Sample Ref:</b>	BH3
<b>Acquisition Date/Time:</b>	07-Oct-09		
<b>Datafile:</b>	D:\TES\DATA\Y2009\1007TPH_GC3\073B2801.D		

# Report Notes

## Soil/Solid analysis specific:

S04 analysis not conducted in accordance with BS1377 unless otherwise stated  
Water Soluble Sulphate on 2:1 water:soil extract  
AR denotes analysis conducted on the As Received sample

## Water analysis specific:

Results expressed as mg/l unless stated otherwise

## Oil analysis specific:

Results expressed as mg/kg unless stated otherwise  
S.G. expressed as g/cm<sup>3</sup> @ 15°C

## Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

## VOC analysis specific:

Explanatory notes for data flagging  
**U** = undetected above reporting limit  
**J** = concentration at instrument was below lowest calibration standard  
**E** = concentration at instrument was above top calibration standard  
**B** = compound was detected in method blank

## Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

## Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

## Asbestos analysis specific:

**CH** denotes Chrysotile  
**CR** denotes Crocidolite  
**AM** denotes Amosite  
**NADIS** denotes No Asbestos Detected in Sample  
**NBFO** denotes No Bulk fibres Observed

## General notes:

**^** this analysis was subcontracted to another laboratory  
**\$** Within laboratory tolerances  
**\$\$** unable to analyse due to nature of sample  
**¥** Results for guidance only, possible interference  
**&** Blank corrected  
**I.S** insufficient sample for analysis  
**Intf** Unable to analyse due to interferences  
**N.D** Not determined  
**N.R** Not recorded  
**N.Det** Not detected  
**Req** Analysis Requested, see attached sheets for results  
**p** Raised detection limit due to nature of sample  
**\*** denotes that all accreditation has been removed by the laboratory for this result.  
**‡** denotes that Mcerts accreditation has been removed by the laboratory for this result.  
**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected.

If you require further details of the circumstances leading to the removal of the accreditation from any data item please do not hesitate to contact the laboratory



