

# **A1 Birtley to Coal House**

# Scheme Number: TR010031

6.3 Environmental Statement – Appendix9.2e Ground Investigation Factual Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 6

August 2019



## Infrastructure Planning

Planning Act 2008

## The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009

## A1 Birtley to Coal House Development Consent Order 20[xx]

## Environmental Statement -Appendix

Regulation Reference:	APFP Regulation 5(2)(a)
Planning Inspectorate Scheme	TR010031
Reference	
Application Document Reference	TR010031/APP/6.3
Author:	A1 Birtley to Coal House Project Team,
	Highways England

Version	Date	Status of Version
Rev 0	14 August 2019	Application Issue

### APPENDIX E MINESHAFT SURVEY REPORTS







**Geophysical Report** 

Project no. 192959

RSK

**JUNE 2018** 



## **RSK GENERAL NOTES**

Project No.:	192959	9-R01(01)		
Title:	Geophysical Report, A1 B2CH			
Client:	Central	alliance		
Date:	12 <sup>th</sup> October 2018			
Office:	RSK, S Telephor Fax: +44 <u>www.rsk</u>	pring Lodge, 172 Chester ne: +44 (0)1928 726006 4 (0)1928 725633 co.uk	Road, Helsby, Cheshire	e, WA6 0AR
Status:	Final			
Author		Chris Gorman BSC FGS Senior Geophysicist	Technical reviewer	Matt Stringfellow MSCi CGeol Principal Ge physicist
Signature			Signature	
Date:		12/10/2018	Date:	12/10/2018
		Stephen Owen MSci CGeol CSci		
Project mana	ger	Principal Geophysicist	Quality reviewer	Rebecca Dabbs
Signature		10/10/2010	Signature	10/10/2010
Date:		12/10/2018	Date:	12/10/2018

RSK Environment (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment.

Central alliance A1 B2CH 192959-R01(00)



## CONTENTS

EX	ECU	TIVE SU	JMMARY	1
1	INT	RODUC	STION	2
	1.1	Introdu	uctions	2
	1.2	Details	s of the Project	2
	1.3	Limitat	tions	2
2	THE	SITE		3
	2.1	Locatio	on and Regional Setting	3
	2.2	Geolog	ду	3
3	THE	SURV	EY	4
	3.1	Object	ive and Geophysical Approach	4
	3.2	The G	round Penetrating Radar Technique	4
		3.2.1	Theory	4
		3.2.2	Application to Site	5
		3.2.3	Equipment	5
		3.2.4	Survey Design	5
		3.2.5	Data Processing and Presentation	5
	3.3	The M	icrogravity Technique	6
		3.3.1	Theory	6
		3.3.2	Application to Site	7
		3.3.3	Equipment	7
	3.4	Survey	/ Design	7
	3.5	Data F	Processing and Presentation	8
4	DAT	A INTE	RPRETATION	10
	4.1	Data C	Quality	10
	4.2	Result	S	10
5	CON	ICLUS	ONS	12

### TABLES

Table 1: Summary of GPR processing methods	6
Table 2: Location of Moor Inn Pit higher confidence geophysical anomalies	11

#### FIGURES

Figure 1	Site Location Plan
Figure 2	Survey Layout
Figure 3	GPR Theory
Figure 4	MicroGravity Theory
Figure 5	Example GPR Data
Figure 6A&B	GPR Interpretation
Figure 7A&B	MicroGravity Data and Interpretation
Figure 8A&B	Combined Interpretation

### APPENDIX A

Equipment Specification Sheets

Central Alliance A1 B2CH 192959-R01(01)



# EXECUTIVE SUMMARY

On the instructions of Richard Hardwick on behalf of Central Alliance, RSK Environment Ltd has carried out a geophysical investigation to determine presence and location of two mineshafts along the A1 corridor near Gateshead, Tyne and Wear.

Project Findings	
Site Setting and Current Usage	The sites are situated along the A1 corridor near Gateshead, Tyne and Wear. The survey consists of two areas; the Nanny Pit located in the A1 central reservation just south of the Smithy Lane bridge, and the Moor Inn pit located adjacent to the A1 around the Bowes Incline hotel and restaurant. An extract of the Ordnance Survey map showing the location of the site is given in <b>Figure 1</b> .
Survey Objectives	To determine the presence and locations of the Nanny Pit and Moor Inn Pit mine workings.
Geophysical Techniques Employed	The geophysical survey consisted of a Ground Penetrated Radar (GPR) survey using a GSSI SIR4000 system with 200MHz and 400MHz antennae, anda microgravity survey using a Scintrex CG6 gravimeter. The geophysical fieldwork was conducted between the 4 <sup>th</sup> and the12 <sup>th</sup> June 2018.
Geophysical Investigation Findings	The results of the geophysical survey are shown in <b>Figure 6 and 7</b> . In the Nanny pit survey area no significant gravity anomalies were detected, but several high amplitude GPR anomalies were observed. In the Moor Inn Pit area three gravity anomalies were detected with one anomaly also coincident with a GPR response. Several other high amplitude GPR responses were observed in the beer garden and waste and recycling areas of the hotel. All the anomalies have been marked on the final interpretation drawings shown in <b>Figure 8A and B</b> , with anomalies marked as

	anomaly.
ecommendations	It is recommended that further intrusive work is conducted to determine the nature of the anomalies detected in this survey.

either higher or lower confidence depending on the nature and correlation of the



# **1** INTRODUCTION

## 1.1 Introductions

On the instructions of Richard Hardwick on behalf of Central Alliance, RSK Environment Limited, carried out a geophysical site investigation to seek to determine the location and extents of two mine shafts (Nanny Pit and Moor Inn Pit) indicated on Coal Authority reports, located adjacent to the A1 Gateshead, Tyne and Wear.

## 1.2 Details of the Project

The project was carried out to an agreed brief as set out in the WSP document HE551462-WSP-+HGT\_BCH-SP-GE-0600\_001 dated July 2017, and included the following:

- A GPR survey,
- A Micro-gravity survey,
- An Interpretative report.

## 1.3 Limitations

Non intrusive geophysical techniques seek to locate boundaries across which there is a marked contrast in physical properties. Such a contrast may be detected remotely because it gives rise to a geophysical anomaly, which is indicative of variation in a physical property relative to some background value. Insufficient contrast (including high levels of cultural noise) can result in masking of the sought anomaly. Therefore, there may be other conditions prevailing at the site which have not been revealed by this investigation and which have therefore not been taken into account in this report.

The response of the ground to different physical forces can be highly variable. Interpretation of the responses contained in this report is based on experience in similar environments and site conditions.

The materials encountered and samples obtained during on-site intrusive investigations represent only a small proportion of the materials present on-site. It should be accepted, therefore, that the interpretation from remotely sensed geophysical data may be inconsistent with that arising from direct methods of investigation.



# 2 THE SITE

## 2.1 Location and Regional Setting

The survey consists of two sites; the Nanny Pit site is located on the A1 south-east of the Smithy Lane Bridge with the survey area consisting of the central reservation and the two outside lanes. The second site is the Moor Inn Pit site which is located around the Bowes Incline Hotel and Restaurant located approximately 20m to the North of the main A1 carriageway.

The Nanny Pit site is located at National Grid reference NZ 257 582 and the Moor Inn Pit site at NZ 278 570. An extract of the 1:50,000 Ordnance Survey map showing the location of the sites is given in **Figure 1**. **Figure 2** illustrates the site layout.

### 2.2 Geology

The published geological map of the area (BGS Online) indicates that the site is underlain by till and glacial deposits overlying Pennine Middle Coal Measures containing mudstones, siltstone and sandstones from the Carboniferous. Reports generated from the Coal Authority indicate historic coal mining in the area and have indentified two potential mine shafts named the Nanny Pit and Moor Inn Pit.



# 3 THE SURVEY

## 3.1 **Objective and Geophysical Approach**

Historic maps show a number of mineshafts located within the boundary of the highway along the A1 between Birtley to Coalhouse. A geophysical survey was commissioned to seek to determine and constrain the location and extents of the mine shaft caps over Nanny Pit and Moor Inn Pit.

The geophysical techniques employed were that of Micro-gravity and GPR. The geophysical fieldwork was conducted between the 4<sup>th</sup>-12<sup>th</sup> June 2018.

## 3.2 The Ground Penetrating Radar Technique

In GPR surveys, electromagnetic waves of frequencies between 50MHz and 1.5GHz are transmitted into the ground or structure. This energy is reflected back to the surface when it encounters significant contrasts in dielectric properties.

### 3.2.1 Theory

Both surface and borehole GPR techniques use electromagnetic waves of frequencies between 50MHz and 1.5GHz to probe the subsurface (**Figure 3**A). A radio wave transmitter ( $T_x$ ) is used to generate a short (<20ns) pulse of radio waves of specific frequency (depending on the antenna selected). These radio waves penetrate into the subsurface. Some of the energy carried by these waves is transmitted to greater and greater distances, while some of the energy is reflected back towards the receiver ( $R_x$ ) whenever a contrast in electrical properties is encountered. The amount of energy reflected is dependent on the contrast in electrical properties encountered by the radio waves.

The receiver measures the variation in strength of the reflected signals with *time*. The resulting profile is called a 'trace' and is a one-dimensional representation of the subsurface beneath the transmitter and receiver. To build up a two dimensional section of the subsurface (a radargram), the transmitter and receiver are traversed across the surface at a controlled speed.

In order to present time sections as *depth* sections, some form of calibration is required through borehole or core information, or through an assessment of the electrical (dielectric) properties of the surveyed materials. It is important to note that such conversions are not always practical.

The higher frequency antennas provide high resolution data over shallow depths (< 0.5m), and are mostly employed for near surface structural investigations (e.g., characterising rebar in concrete, **Figure 3B**). The lower frequency antennas can probe to greater depths (up to 30m, depending on subsurface conditions) but exhibit a reduced degree of resolution. These antennas are typically employed in geological/hydrogeological investigations (e.g., locating cave systems and sinkholes).



### 3.2.2 Application to Site

A GPR system with two separate antenna frequencies of 400MHz and 200MHz were deployed across the entire accessible area in each of the sites in order to provide the appropriate depth penetration and resolution to identify areas of potential voiding or the location of buried obstructions that maybe associated with a buried mine shaft. The presence of in-situ structures within otherwise homogeneous ground in the shallow subsurface may constitute a strong contrast in dielectric (electrical) properties, depending upon the material type of the object and depth. Metallic objects and reinforcement constitute the strongest contrast in dielectric properties and generate the strongest (highest amplitude) reflections. Materials such as natural stone, unreinforced concrete and brick offer a reduced contrast, and subsequently generate lower amplitude reflections in the data and produce characteristics such as reverberation and signal polarity reversal.

When surveyed with a GPR antenna, diffraction events are observed on the recorded radargrams. From our experience, a 400 MHz antenna typically provides reliable reflection data up to 2.0 metres below ground level (mbgl), whilst the 200MHz antenna can achieve up to 4.0 mbgl (dependent upon ground conditions).

#### 3.2.3 Equipment

#### SIR 3000

The equipment used was the SIR (Subsurface Interface Radar) System-3000 manufactured by Geophysical Survey Systems Inc. See equipment specifications in **Appendix A**.

#### 3.2.4 Survey Design

All accessible areas were covered by the GPR equipment at 1m spacing. A bank within the central reservation at the Nanny Pit survey area reduced the effectiveness of the technique due to angle of penetration of the radar signal. At the Moor Inn pit site several areas contained vegetation which could not be covered by the GPR. All areas covered by the GPR survey are outlined in **Figure 2** for each of the sites. The location of the GPR survey lines were recorded using a high precision Leica GPS and Total Station and referenced to the Ordnance Survey OSGB36 National Grid system.

#### 3.2.5 Data Processing and Presentation

GPR data have been imported into the specialist processing software RADAN version 7. This allows the geophysicist to apply complex processing routines and algorithms, which help to improve the signal to noise ratio and highlight reflections of interest. Raw data have been processed as described in **Table 1**. Processed data are interrogated in section view. Locations of anomalous reflections indicative of voids and other obstructions can be 'picked' from the data set and exported to other software packages to be superimposed onto a site plan.



Example GPR radargrams collected at the site are presented in **Figure 4A**. The colour scale represents signal amplitude, with shades of blue representing negative amplitudes, and shades of red representing positive amplitudes. Raw data have been processed as described in **Table 1**.

Method	Justification
Distance calibration	Horizontal measurement is undertaken using a wheel odometer mounted to the antenna and is calibrated daily and saved on the GPR console. An on-site check over 10m was conducted and found to be accurate.
Depth calibration	A dielectric constant of 8.25 (typical of soil) has been assumed in order to give the most accurate indication of depth. The calculated depths are expected to be typically $\pm 20\%$ accuracy.
Zero-offset	To correct the signal to the actual ground surface level.
Gain control	To compensate for the signal attenuation with depth and enhance the signals from deeper reflectors to aid interpretation. Each profile was enhanced with the same gain parameters.
Filtering	High and low pass filters were set at frequencies of 200MHz and 800MHz for the 400MHz antenna and 100MHz and 400Mhz for the 200MHz antenna to remove noise from the data, and to isolate "legitimate" signals from reflections of the pulse from the instrument.

### Table 1: Summary of GPR processing methods

## 3.3 The Microgravity Technique

Microgravity surveys seek to detect areas of contrasting or anomalous density by collecting surface measurements of the Earth's gravitational field. Different subsurface materials have difference bulk densities. Mapping variations in mass around the instrument can identify anomalous areas worthy of further geophysical or intrusive investigation.

### 3.3.1 Theory

A gravity meter is a highly sensitive instrument that measures the acceleration due to gravity. Sensitive electronics are able to measure the changes in the extension of a 'zero length' spring due to the variations in mass around the instrument. When positioned above a dense material it records the acceleration (g) as a relative high (a positive gravity anomaly). When positioned above a low-density feature (e.g. an air filled cavity) a relative gravity low (or negative gravity anomaly) is recorded (Figure 3).

Gravity anomalies arising from natural or man-made subsurface features such as voids and cavities are superimposed on much larger variations due to height, latitude, and regional geological variations. In order to isolate the subtle signal of interest, careful



data acquisition and processing is required. In this instance, where the shaft is encountered, the microgravity technique should, in theory, be able to detect the corresponding negative gravity anomalies associated with such a feature.

To account for time-varying effects on gravity readings such as earth tides and instrument drift, a base station reading is recorded every hour during the survey so that the appropriate corrections can be made during the data processing stage. Three independent readings are typically collected at each station to reduce any potential errors.

Data recorded on site includes accurate position and height measurements for each recorded station. A Leica Total Station is used to survey each station location, providing an accuracy of  $\pm$  5mm for the height data across the site. Elevation data used in the processing of the microgravity is relative to Ordnance Datum.

### 3.3.2 Application to Site

Gravity anomalies arising from natural or man-made subsurface features such as voids and cavities are superimposed on much larger variations due to height, latitude, and regional geological variations. In order to isolate the subtle signal of interest, careful data acquisition and processing is required (see Section 3.5.5). In this instance, where voids are encountered, the micro-gravity technique should, in theory, be able to detect the corresponding negative gravity anomalies associated with such features.

#### 3.3.3 Equipment

The microgravity equipment used was the Scintrex CG-6 Gravimeter. Two gravimeters were used in this survey (Serial numbers 17070024). See Equipment specification in **Appendix A**.

### 3.4 Survey Design

Based on our understanding of the historical shaft information, the survey was designed as access allowed. The Nanny Pit survey covered at area of 35m by 17m centred on the proposed shaft location indicated by the client. The area consisted of the central reservation and the North and Southbound outside lanes of the A1. A total of 6 profiles were performed, with data points spaced 2m apart. Data were collected over a total of 93 individual station locations. At the Moor Inn pit the survey area was approximately 25m x 25m in size situated around the Bowes Incline Hotel with points collected at 2m spacing as accessed allowed. A total of 101 individual points were recorded. Figures 7A & B indicate the position of each microgravity reading position.

Data recorded on site includes accurate position and height measurements for each recorded station. A Leica Total Station was used to survey each station location, providing an accuracy of  $\pm$  5mm for the relative height data across the site.

To account for time-varying effects on gravity readings such as earth tides and instrument drift, a base station reading was recorded every hour during the survey so that the appropriate corrections can be made during the data processing stage.



At each observation point a minimum of four independent readings are taken, to reduce error, each with duration of 30 seconds. Data are immediately checked on the instrument, and measurements were repeated if the tilts exceeded 10 arc-seconds or if the standard deviation of the data exceeded 0.1 mGal.

## 3.5 Data Processing and Presentation

The microgravity data profiles are presented in **Figure 6A & B**. A number of corrections, discussed below, are applied to the observed gravity values to produce a final 'Bouguer anomaly' residual micro-gravity plot.

### 3.5.1.1 Drift Correction

Gravimeter readings change (drift) with time as a result of elastic creep in the springs, producing an apparent change in gravity at a given station. Earth tides also give rise to a change in gravity due to the gravitational pull of the moon, and to a lesser extent the sun. The drift in the gravity caused by the instrument and by tides can be determined and by repeating measurements at the stations at different times of the day. In this particular survey repeat measurements were taken every hour. Observed gravity values from intervening stations can then be corrected by subtracting the calculated drift from the observed gravity value.

#### 3.5.1.2 Latitude Correction

As the Earth is a self-equilibrating ellipsoid of revolution i.e. it is not a sphere, the gravity at the poles is less than at the equator. This means that as one travels north from the equator in the Northern Hemisphere the measured acceleration due to gravity decreases. A correction has been made to the observed gravity to account for latitude variations in gravity at a latitude of 54.4°N.

### 3.5.1.3 Free-Air Correction

The free-air correction (FAC) is the difference between gravity measured at sea level and at an elevation of h metres. The free-air correction is added to the observed gravity because it accounts for the decrease in gravity with height in free air as one moves away from the Earth's centre of mass. The free-air correction is calculated by:  $FAC = 0.3086 \times Height$  (mgal).

#### 3.5.1.4 Bouguer Correction

The Bouguer Correction (BC) accounts for the rock mass between the measuring station and an arbitrary reference height. The Bouguer correction calculates the extra gravitational pull exerted by a rock slab of thickness h (m) and mean density  $\rho$  and is calculated by: BC = 0.04192 x density  $\rho$  x height h (mGal). The Bouguer correction is subtracted from the observed gravity value for stations above sea level. A mean density of the shallow subsurface of 2,200 kg/m3 has been used in this calculation (sandstone).



#### 3.5.1.5 Residual Gravity Profile

After all corrections have been made to the observed gravity value a final Bouguer residual anomaly profile is produced. The residual gravity map has been corrected for all expected variations due to height and location (as described above) and therefore represents the variations in the density of the materials within the subsurface.

Negative gravity anomalies indicate that the mass of the area below the data point is relatively less than the surrounding areas due to a density contrast in the subsurface. Positive gravity anomalies indicate a relative increase in the mass of the subsurface.



## **4 DATA INTERPRETATION**

## 4.1 Data Quality

The gravity readings and standard deviations remained uniform throughout indicative of a good quality dataset. No data was collected in the banked area of the central reservation of the Nanny Pit survey area due to the steepness of the bank which meant the gravimeter could not be levelled.

The data for both the 200 MHz and 400 MHz antennas were of good quality across the sites returning coherent signals from approximately 3.5m and 2mbgl respectively. Data collection was limited on the bank on the central reservation of the Nanny Pit area and in areas of dense vegetation around the Moor Inn Pit survey area.

### 4.2 Results

The final micro-gravity data for the sites are presented in **Figure 7A & B** for the Nanny Pit and Moor Inn Pit sites respectively.

All GPR data has been presented in plan view format with associated depths of anomalies indicated all the results of the survey are shown in **Figure 6A & B** for the Nanny Pit and Moor Inn Pit sites respectively.

### 4.2.1 Nanny Pit

No significant visible gravity anomalies are present in the location of the Nanny Pit survey area (**Figure 7B**) which suggests if a shaft is present the signal is too small to be detected. This may be due to the backfill or remediation of a shaft or potentially that no voided shaft is present in the area covered by the survey.

Several GPR anomalies were observed in the dataset from the Nanny pit location (**Figure 6A**). An anomaly is detected in both the 400MHz and 200MHz datasets on the western section of the survey in two profile lines. This feature is approximately 3m by 1.5m has been classed as a higher confidence anomaly marked in gold on **Figure 8A** as it has been observed in multiple datasets. The grid coordinates for this feature are (425789.603, 558240.795). Most of the other features appear only in singular lines and did not span multiple profiles. These anomalies have been classified as of lower confidence of being associated with a buried mine shaft and have been marked in the final interpretation in **Figure 8A** in silver.

No features are observed directly adjacent to the location of the mineshaft provided by the client.

#### 4.2.2 Moor Inn Pit

The gravity data for the Moor Inn pit area survey area shown in **Figure 7B** displays three anomalous areas that may be indicative of mine workings. These features are all situated in the road outside the hotel and appear to be inline which each other with areas of approximately 2.5 to 4m in diameter. The most northerly of the three anomalies also correlates with anomalous reflections in the GPR datasets.



GPR anomalies observed as high amplitude reflections, as shown in the example data in **Figure 5** were detected in the beer garden area, the waste and recycling area and on the road in front of the hotel.

The Moor Inn pit survey area displays multiple higher confidence anomalies associated with either observation in multiple frequencies in the GPR datasets or association with gravity anomalies. All gravity anomalies observed have been marked as a higher confidence targets.

The locations of the higher confidence anomalies are shown in Table 2.

Location	X	Ŷ
Gravity Anomaly North	427835.045	556981.713
Gravity Anomaly Middle	427838.423	556977.247
Gravity Anomaly South	427840.074	556972.180
GPR Anomaly Beer Garden	427830.916	556975.408
GPR Anomaly Recycling Area	427838.498	556963.886

### Table 2: Location of Moor Inn Pit higher confidence geophysical anomalies



# **5** CONCLUSIONS

- On the instructions of Central Alliance ('the Client'), RSK Geophysics, a division of RSK Environment Ltd, carried out a geophysical site investigation to try determine the location of possible mineshafts along the A1 corridor.
- The survey areas are located in a central reservation on the A1 to the south of Smithy Lane bridge (the Nanny Pit Site) and around the Bowes Incline Hotel adjacent to the A1 carriageway (the Moor Inn Pit). An extract of the Ordnance Survey map showing the location of the sites is given in **Figure 1**.
- The survey techniques employed were that of a GPR (using a SIR 4000 system with 200MHz and 400MHz antennae) and microgravity survey (using 1no. CG6 gravimeter).
- The geophysical fieldwork was conducted between the 4<sup>th</sup>-12<sup>th</sup> June 2018.
- No detectable gravity anomalies were observed at the Nanny Pit site but several GPR anomalies were identified in the datasets which span across multiple profiles. These have been marked as higher confidence anomalies.
- Three gravity anomalies were detected at the Moor Inn pit site. These anomalies are located on the road outside the Bowes Incline hotel. The northern most anomaly is also associated with anomalies detected in the GPR datasets and have been marked as a higher confidence anomaly.
- All the information derived from the geophysical survey has been interpreted with anomalies marked as either higher or lower confidence depending on the nature and correlation of the anomaly. These results are shown on the final interpretation Figure 6, 7 and 8.
- It is recommended that further intrusive work is conducted to determine the nature of the anomalies detected in this survey.



# **FIGURES**

- Figure 1 Site Location Plan
- Figure 2 Survey Layout
- Figure 3 GPR Theory
- Figure 4 MicroGravity Theory
- Figure 5 Example GPR Data
- Figure 6A&B GPR Interpretation
- Figure 7A&B MicroGravity Data and Interpretation
- Figure 8A&B Combined Interpretation









Client: CENTRAL ALLIANCE	Figure: 4	Job: 192959
Site/Project:	SCALE	DATE
A1 B2CH	N/A	OCT 2018

## Example GPR Anomaly observed in 400Mhz antenna



Example GPR Anomaly observed in 400Mhz antenna



Direction

















# **APPENDIX A**

**Equipment Specification Sheets** 

Central Alliance A1 B2CH 192959-R01(01)

# **SCINTREX CG6**

### **CG-6 SPECIFICATIONS**

SENSOR TYPE	Fused quartz using electrostatic nulling	
READING RESOLUTION	0.1 microGal	
STANDARD DEVIATION	< 5 microGal	
OPERATING RANGE	World-wide (8,000 mGal without resetting)	
RESIDUAL DRIFT	< 20 microGal/day	
UNCOMPENSATED DRIFT	< 200 microGal/day	
RANGE OF AUTOMATIC TILT COMPENSATION	±200 arcseconds	
TARES	Typically < 5 microGal for shocks up to 20 g	
AUTOMATED CORRECTIONS	Tide, instrument tilt, temperature, noisy sample filter, seismic noise filter, drift	
DATA OUTPUT RATE	User selectable up to 10 Hz	
GPS ACCURACY	Standard < 3 m	
TOUCH-FREE OPERATION	Handheld Tablet with Bluetooth	
BATTERY CAPACITY	2 X 6.8 Ah (10.8 V) rechargeable lithium smart batteries. Full day operation at 25 °C (77 °F)	
POWER CONSUMPTION	5.2 Watts at 25 °C(77 °F)	
OPERATING TEMPERATURE	-40 °C to +45 °C (-40 °F to 113 °F); Optional high temperature version to +55 °C (131 °F)	
DIGITAL DATA OU TPUT	USB and Blue too th	
DIMENSIONS	21.5 cm(H) x21 cm x 24 cm (8.5 in x 8.2 in x 9.4 in)	
WEIGHT	5.2 kg(11.5lbs) including batteries	
STANDARD SYSTEM CONTAINS	<ul> <li>CG-6 Autograv<sup>™</sup> Gravity Meter</li> <li>CG-6 Tripod</li> <li>2 Re chargea ble Smart Batteries</li> <li>Battery Charger</li> <li>Tablet Computer w/GPS + accessories</li> <li>Lynx LG Land Gravity Software</li> <li>Power Supply and USB Cable</li> <li>TransitCase</li> <li>Shoulder Strap</li> <li>User Manual</li> <li>Spare Parts Kit</li> <li>Carry Bag</li> </ul>	
AVAILABLE OPTIONS AND ACCESSORIES	<ul> <li>High-Temperature (HT) Meter Optic</li> <li>Cold Weather Survey Accessories</li> <li>Surveyor's Backpack</li> <li>Spare Meter Batteries</li> <li>Spare Tablet Batteries</li> <li>Trident Gradient Tripod</li> <li>Spare Battery Caps</li> </ul>	





SCINTREX CG-6 GRAVIMETER



# **Leica Viva GNSS GS08plus receiver** Datasheet





#### Built for the Field

Designed for the extreme environments, light-weight and cable-free. The GS08plus receiver is the right choice for a wide range of tasks.

- Integrated 3.5G mobile broadband for high-speed connection in the field
- Optional UHF radio module for RTK data communication
- IP67 and operating temperature -30°C to +60°C
- Tactile, numeric or alpha-numeric rubber keypad
- 2 Megapixel camera (perfectly placed for taking pictures when in hand or mounted on pole)

## GNSS

Smart Worx Viva

#### Proven GNSS Technology

Built on years of knowledge and experience, the GS08plus receiver delivers the hallmarks of Leica GNSS – reliability and accuracy.

- SmartCheck Constantly evaluates and reverifies your RTK solution to ensure the most reliable RTK measurements
- SmartTrack best measurement data quality in all environments
- xRTK delivers more positions in difficult environments

#### Simply productive Surveying Software

- Survey, coding and linework
- With clear graphics, non-technological terminology and simplified workflows. SmartWorx Viva LT is incredibly easy to use.
- Full support of RTCM 3.1 transformation message
- Full support of RTCM 5.1 transformation message
- Wide range of apps for all surveying and staking tasks





## **Technical Specifications**

Ch D / CSN bol Control     Processite With Markows CL & D       Processite With I SS M With Advance CL & D     Processite With I SS M Web Advance WITH I SS M WEB Adv	Leica GS08plus SmartAntenna	
Binande genomiaMinician Windows (R. 0.0ResourceResource March (S. 2000)ResourceSear (S. 5) (600.4.6.6.0.000000000000000000000000000	CS10 / CS15 Field Controller	
BreaceBreac	Operating System	Microsoft Windows CE 6.0
Bisly8 / 2015/16/04.0400 point (SAG) points hands in sub distances, mainformatic, hands in SAG000000000000000000000000000000000000	Processor	Freescale iMX31 533 MHz ARM Core with 512 MB DDR SDRAM
NobositCSI blos. nature kapad / CSI blos. (see, spin nameric kapad / CSI blos.)AutoHegenber call spin nameric kapad / CSI blos. (see, spin nameric kapad / CSI blos.)AutoHegenber call spin nameric kapad / CSI blos. (see, spin nameric kapad / CSI blos.)Application SubrateLice Samathor. Wo IStandard SchwareLice SchwareStandard SchwareLice Schware <td>Display</td> <td>8.9 cm (3.5") 640 x 480 pixel (VGA) colour touch screen, sunlight-readable, backlight</td>	Display	8.9 cm (3.5") 640 x 480 pixel (VGA) colour touch screen, sunlight-readable, backlight
Bits argsingI a finame finits, Surg disk, CF-ard Tap (J 1 set), USB concet pet diAlloHigher and Bits and Grad and incriptionCareerHigher 2 Megane hot fices cameResistance USB and Surg Surg Surg Surg Surg Surg Surg Surg	Keyboard	CS10: 26 keys, numeric keypad / CS15: 65 keys, alpha-numeric keypad
AliofHegrid solid gaser and microphoneGoronHegrid Solid Support And Decision and and controlWieles consclutiveBertoont's 20 Gase 2, Wieles LM 802. LUle (solid), high speed broadband 3.55 GM 5.0 LMT5 (spliton), infinition and and controlApplication SoftwareExact SeartHook Wo IGSoftware SoftwareExact SeartHook Wo IGControlExact SeartHook Work Search Sear	Data storage	1 GB internal flash, SD-card slot, CF-card Type I / II slot, USB connector port
GenumIntegrine 2 Mergine 3 find facia animaMiceles connectivityLess 2 monthe 3 (Neise LAN 882) Life (option), high speed bandard 35 (CAN 84 (ANT) (option)Standard SchwareLess Sarraftware, War TStandard SchwareHarnet Edgener Meble, File Edginer, Ward Meble, Windows Med a Player, Canner Schware, Collins HeigeStandard SchwareLess Sarraftware, Ward Meble, Windows Med a Player, Canner Schware, Collins HeigeStandard Ross Ander Ross An	Audio	Integrated sealed speaker and microphone
Wieles conscisityBinstont? 20 files 2. Wieles 2. Micros 2. Micro 2. Micro 2. Micr	Camera	Integrated 2 Megapixel fixed focus camera
Application Software         Leis Samtifwa Wa IT           Standaf Software         Ender Software Ander Model Report Anderin Software, Model Report, Canners Software, Online Hole           Standaf Software         Lois Samtifware Tepperv Rehin, Fee Spierer, Ware Models, Windows Model Report, Canners Software, Online Hole           Standard Software         Lois Samtifware Tepperv Rehin, Fee Spierer, Ware Models, Windows Reheat Reginer, January Barry, Software Anders           Standard Software         Lois Samtifware Tepperv Rehin, Fee Software, Ware Models           Standard Software         Standard Software Software           Standard Software         Go Samtifac           Standard Software         Standard Software           Standard Software         Go Samtifac           Standar	Wireless connectivity	Bluetooth® 2.0 Class 2, Wireless LAN 802.11b/g (option), high speed broadband 3.5G GSM & UMTS (option), UHF radio module (option)
Standard Software     Internet Topicer Woble, Pie Diputer, Word Woble, Windows Wodla Rayer, Canera Software, Online Help       CMSS Bechnology     Locia Smartfrack technology       CMSS Bechnology     Locia Smartfrack technology       Out of unands     ID Cannets       Standard Software Montal     ID Cannets       Standard Montal     ID Cannets	Application Software	Leica SmartWorx Viva LT
GSB Sectrology       Lets Smart Tack technology:         ORS Sectrology       - Advanced measurements engine         Stability space sportum multipath: correlator for pseudorange measurements         No. of channels       120 channels         Stability space sportum multipath: correlator for pseudorange measurements         Stability connection       Balactor/P 20 Class 2.8 pin Lenne connection ESE prover port         RFK moving mode       Horizontal: 5 min + 0.5 ppm         Writok: 10 mm + 1 ppm       Writok: 10 mm + 1 ppm         Not proving mode       Horizontal: 7 min + 0.5 ppm         Writok: 10 mm + 0.5 ppm       Writok: 10 mm + 0.5 ppm         Stability       Better than 90.9 Kung Leida amint Chark technology         The for trabiator       Tprically 0.25 ecc         Rota connection       Better than 90.9 Kung Leida amint Chark technology         Rota connectin       Pprically 0.25 ecc	Standard Software	Internet Explorer Mobile, File Explorer, Word Mobile, Windows Media Player, Camera Software, Online Help
GMSE lectrology       Lois a mart Track technology         No. of thomosic       120 Anarola         Stellter signals tracking       200 Anarola         Construction       120 Anarola         Stellter signals tracking       200 Anarola         Construction       675 LL 1.2.1 (CA, P. C Gol)         Stellter signals tracking       Convertion         Stellter signals tracking       Convertion         Stellter signals tracking       Buendorff or stellt, RASAR, Buendorff communication for battery power LED status indicators         Stellter signals tracking       Buendorff or stellt, RASAR, Buendorff communication for battery power LED status indicators         Stellter signals tracking       Buendorff or stellt, RASAR, Buendorff communication for battery power LED status indicators         Stellter signals tracking       Buendorff or stellt, RASAR, Buendorff communication for battery power LED status indicators         Stellter trade of the status stellter status indicators       Buendorff or stellt, RASAR, Buendorff communication for battery power LED status indicators         RT mowng mode       Horizontal: J mm + 0.5 ppm         Nettracking       Beter than 90, 90 using loing Stant/Deck technology         Track for inflation       Tapically 0.02 sic         Braider inform       Tapically 0.02 sic         Braider inform       Status for status for status for status for status for status for	GS08plus SmartAntenna	
No. of damaks         120 damaks           Stellie signals tracking         CS: LL 2.12 (CA, P. Code) (CDNASS: LL, 21 (CA, P. Code) (CDNASS: CDNASS: CD	GNSS technology	Leica SmartTrack technology: • Advanced measurement engine • Jamming resistant measurements • High precision pulse aperture multipath correlator for pseudorange measurements
Sate Bile signals tracking       GPS: 11, 12, 12 (CA, P. Code)         GLONASS: LL, 10, CA, P. Parrow Gode)       Sates: MAS, EGANA, MAS         GLONASS: LL, 10, CA, P. Parrow Gode)       Sates: MAS, EGANA, MAS         Generatization ports       Bile detrobility: GLONAS, GLANA, MAS         Generatization ports       Bile detrobility: GLONAS, GLANA, MAS         Field controlls: connection       Bile detrobility: GLONAS, GLANA, MAS         Accuracy (ims) and Bellability:       Field controlls: connection         Accuracy (ims) and Bellability:       First and S. Spin         Command Connection       Hortzentls: Tom + 0.5 ppn         Vertical: 10 mm + 0.5 ppn       Compliant to DT122.8 standard         Part processing static mode       Hortzentls: Tom + 0.5 ppn         Vertical: 20 mm + 0.5 ppn       Compliant to DT122.8 standard         Reak field	No. of channels	120 channels
User interface         On / Of Key, Satellite tracking, Buetooth? Construction for 5 battery power LED status indicators           Ride controler connection         Bluetooth? 20 Class 2, 8 pin Leano combined USB / power port           Ride controler connection         by Bluetooth? 20 Class 2, 8 pin Leano combined USB / power port           Ride controler connection         by Bluetooth? or with GV232 Leano plug clabe           Accuracy (rms) and Relability¹         Fortzontal: 5 mm + 0.5 ppn           Compaint to 105 / 122.3 standard         Compaint to 105 / 122.3 standard           Rifk rowing mode         Horizontal: 10 mm + 1.5 ppn           Vertical: 20 mm + 1.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn           Vertical: 20 mm + 0.5 ppn         Vertical: 20 mm + 0.5 ppn <td>Satellite signals tracking</td> <td>GPS: L1, L2, L2C (C/A, P, C Code) GLONASS: L1, L2 (C/A, P narrow Code) SBAS: WAAS, EGNOS, GAGAN, MSAS</td>	Satellite signals tracking	GPS: L1, L2, L2C (C/A, P, C Code) GLONASS: L1, L2 (C/A, P narrow Code) SBAS: WAAS, EGNOS, GAGAN, MSAS
Communication ports         Bielecoth* 2.0 Class 2.8; pin Leno combined ISU power port           Field controller connection         By Bueloath* and KD237 Leno poing cable           Recursor (mrs) and Kalability.         Microstral: 5 mm + 0.5 ppm           Ref table interview         Microstral: 5 mm + 0.5 ppm           Vertica: 10 mm + 1.0 ppm         Vertica: 10 mm + 1.0 ppm           Ref table interview         Microstral: 5 mm + 0.5 ppm           Vertica: 10 mm + 1.0 ppm         Vertica: 10 mm + 1.0 ppm           Ref table interview         Netionalis: 10 mm + 1.0 ppm           Ref table interview         Netionalis: 10 mm + 1.0 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Netionalis: 10 mm + 0.5 ppm           Ref table interview         Neti	User interface	On / Off key. Satellite tracking, <i>Bluetooth®</i> communication & battery power LED status indicators
Field controller connection       by Bluetooth* or with GEV237 Leno plug coble         Accuracy (trus) and Reliability/         RRK static mode       brizontal: 5 mm + 0.5 ppm Confliatito 15017123-8 standard         RRK moving mode       brizontal: 10 mm + 1 ppm Vertical: 20 mm + 0.5 ppm         Post processing static mode       brizontal: 3 mm + 0.5 ppm         Post processing static mode       brizontal: 3 mm + 0.5 ppm         Reliability       Better thm 9.9 % using Leica SmartCheck technology         Time for intalisation       Typically 6 sec'         Realiability       Better thm 9.9 % using Leica SmartCheck technology         Realiability       Better thm 9.9 % using Leica SmartCheck technology         Realiability       Typically 0.02 sec         Realiability       Leica proprietary formats [Leica, Leica 4G], CMR+, RTCM2x, RTCM3x, full support of RTCM 3.1 transformation message         Position update rate       Lity zandard, Optional 5 Hz (0.2 sec)         Network positioning       VGS, RP, MWX, MX, nearest station         Network Specifications       Secompleter rover setup, including batteries and telescopic pole         Tomperature, operating       Sile 3 or C to +60°C, Compleus: -40°C to -65°C, compleus with S00022-11-special, ML STD 810G Method 502.5 1, ML STD	Communication ports	Bluetooth® 2.0 Class 2, 8-pin Lemo combined USB / power port
Accuracy (rms) and Reliability <sup>1</sup> Heitzontal: 5 mm + 0.5 ppm           RIK static mode         Compliant to ISO 1723-8 standard           RIK static mode         Vertical: 10 mm + 105 ppm           Vertical: 20 mm + 1 ppm         Vertical: 20 mm + 1 ppm           Pest processing static mode         Hotzontal: 3 mm + 0.5 ppm           Vertical: 20 mm + 1 ppm         Vertical: 20 mm + 1 ppm           Pest processing static mode         Hotzontal: 3 mm + 0.5 ppm           Vertical: 20 mm + 1 ppm         Vertical: 3 mm + 0.5 ppm           Vertical: 30 mm + 10 pp stuing Loica SmartCheck technology         Time for initialisation           Time for initialisation         Tipically 6 sec <sup>1</sup> Position Istency         Mpcally 0.02 sec           Relative Kimematic Specifications         Leica proprietary formats (Leica, Leica 4.0; ORP, RTGM2x, RTGM3x, full support of RTGM 3.1 transformation message           Rolation Kimematic Specifications         Vertical: 0 position 15 Hz (0.2 sec)           Werkork positioning         Vertical: Complete rover setup, including batteries and telescopic pole           Weight of pole setup         2.60 kg for complete rover setup, including batteries and telescopic pole           Temperature, perature, perature, storage         -40°C to +40°C, Compliance with ISO9022-10-8, ISO902-11-special, ML STD 810G Method 502.5 1           Humidity         100 %, compliance with ISO9022-10-8, ISO902-1	Field controller connection	By <i>Bluetooth®</i> or with GEV237 Lemo plug cable
RIK static mode     Horizontal: S ppm       RIK moving mode     Compliant to ISO17123: 8 standard       RIK moving mode     Horizontal: 10 mm + 10 ppm       Post processing static mode     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabutist: 20 mm + 10 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabultist: 20 mm + 0.5 ppm     Horizontal: 10 mm + 10 ppm       Retabutist: 20 mm + 0.5 ppm	Accuracy (rms) and Reliability <sup>1</sup>	
RTK moving mode       Horizontal: 10 mm + 1 ppm         Pest processing stalic mode       Horizontal: 3 mm + 0.5 ppm         Reliability       Better han 9.9.6 suing lucia SmartCheck technology         Time for initialisation       Typically 6 soc <sup>2</sup> Position latency       Typically 6 soc <sup>2</sup> Reliability       Better than 99.9 suing Lucia SmartCheck technology         Roli tine Kimenatic Specifications       Typically 6 soc <sup>2</sup> Roli tine Kimenatic Specifications       Leica proprietary formats (Leica, Leica 4G), CMR+, RTCM2.x, RTCM3.x, full support of RTCM 3.1 transformation message         Position update rate       1 Hz standard, Optional 5 Hz (0.2 soc)         Network positioning       VES, FKP, MAX, MAX, Nenerset station         RTK base station (option)       Transmit RTCM3 RTK data at 1 Hz (1 sec)         Physical Specifications       Temperature, operating         Ringe stupit       Colo kg for completer rover setup, including batteries and telescopic pole         Temperature, operating       Cs: -30°C to +60°C, CS080plus; -40°C to +65°C, compliance with 1500022-10-08, IS00022-11-special, ML STD 810G Method 50.2 sl, ML         Sealed against water, sand and dust       Port (Cs/) IP68 (GS080plus) according IEC60529 and ML STD 810G Method 50.2 sl, ML         Sealed against water, sand and dust       Port (SV) IP68 (GS080plus) according IEC60529 and ML STD 810G Method 514.6-Cat.24         Orops	RTK static mode	Horizontal: 5 mm + 0.5 ppm Vertical: 10 mm + 0.5 ppm Compliant to ISO17123-8 standard
Post processing static mode         Portical - 6 mm + 0.5 ppm           Reliability         Better tham 90, 96 using Leica SmartCheck technology           Time for intalisation         Typically 6 sec <sup>2</sup> Post intalisation         Typically 6 sec <sup>2</sup> Reliability         Department of the sec <sup>2</sup>	RTK moving mode	Horizontal: 10 mm + 1 ppm Vertical: 20 mm + 1 ppm
Reliabily         Bettern 490,9% using Leica SmartCheck technology           Time for initalisation         Typically 0 Sec <sup>2</sup> Position latercy         Typically 0 Q2 sec           Relation         Typically 0 Q2 sec           Relation Kinematic Specifications         Eleca proprietary formats (Leica, GG), CMR+, RICM2x, RICM3x, full support oRICM 3.1 transformation message           Position update rate         1 Hz standard, Optional 5 Hz 10.2 sec)           Network positioning         VRS, FKP, MAX, MAX, nearest station           RIC base station (option)         VRS, FKP, MAX, MAX, nearest station           Physical Specifications         CSC-30 <sup>7</sup> C to 460 <sup>7</sup> C, Compliance with ISO0022-10-08, ISO0022-10-19, RISO0022-10-19, RISO0022-10-10, RISO0022-10-1	Post processing static mode	Horizontal: 3 mm + 0.5 ppm Vertical: 6 mm + 0.5 ppm
Time for initialisation         Typically 6 sec <sup>2</sup> Position latency         Typically 0.02 sec           Real-time Kinematts Specifications         Ecla proprietary formats (Leica, Leica 4G), CMR+, RTCM2.x, RTCM3.x, full support of RTCM 3.1 transformation message           Position update rate         1 Hz standard, Optional 5 Hz [0.2 sec]           Network positioning         YRS, FKP, IMAX, MAX, nearest station           RTK base station (option)         Transmit RTCM3 RTK data at 1 Hz [1 sec]           Physical Specifications         CSC: -30°C to +60°C, CSOBplus: -40°C to +65°C, compliance with ISO9022-10-08, ISO9022-11-special, ML STD 810G Method 502.5 II, ML STD 810G Method 501.5 II           Temperature, operating         CSC: -30°C to +60°C, CSOBplus: -40°C to +65°C, compliance with ISO9022-11-special, ML STD 810G Method 502.5 II, ML STD 810G Method 501.5 II           Temperature, storage         -40°C to +80°C, compliance with ISO9022-11-special, ML STD 810G Method 50.5 I, ML STD 810G Method 50.5 I, ML STD 810G Method 50.5 SI, Protected against tworing rain and dust           Soled against water, sand and dust         IP67 (CS) / IP68 (CSS0Bplus: according IECGOS29 and ML STD 810G Method 51.6 I Protected against tworing rain and dust           Toppie over         Withstands 1 m drop onth and surface           Toppie over from a 2 m survey pole onto hand surface           Toppie over from a 2 m survey pole onto hand surface           Toppie over from a 2 m	Reliability	Better than 99,9 % using Leica SmartCheck technology
Position latency         Typically 0.02 sec           RetJet: Kiters         Evaluation of the second o	Time for initalisation	Typically 6 sec <sup>2</sup>
Relations Kinematic Specifications         Interprint Specifications           RTK data formats         Leca prointany formats (Lea, Leica 4ci), CMR+, RTCM3.x, RTCM3.x, full support of RTCM 3.1 transformation message           Position update rate         1 Hz standard, Optional 5 Hz (D.2 sec)           Network positioning         VRS, FKP, IMAX, MAX, nearest station           RTK base station (option)         Transmit RTCM3 RTK data at 1 Hz (1 sec)           Physical Specifications         Scio Ng for complete rover setup, including batteries and telescopic pole           Weight of pole setup         2.60 kg for complete rover setup, including batteries and telescopic pole           Temperature, operating         CS: -30°C to +60°C, GS08plus: -40°C to +65°C, compliance with IS09022-10-8, IS09022-11-special, MIL STD 810G Method 50.5.1 I           Temperature, storage         2.40°C to +60°C, compliance with IS09022-10-08, IS09022-11-special, MIL STD 810G Method 50.5.1 I           Humidity         100 %, compliance with IS09022-11-08, IS09022-11-special, MIL STD 810G Method 50.5.1 I           Sealed against water, sand and dust         Phor Ciss/1 (PR8 (GS08plus) according IEC60529 and MIL STD 810G Method 50.5.1, MIL STD 810G Method 51.2.5 I           Voraction         Withstands topple over form a 2 m survey pole onto hard surface           Topple over         Withstands topple over form a 2 m survey pole onto hard surface           Topple over         Nominal 12V DC, Range 10.5 - 28V DC           Netmal pov	Position latency	Typically 0.02 sec
RIK dafa formats       Leica propriedray formats (Leica A, El, CA, RE, RICM2.x, RICM3.x, full support of RICM 3.1 transformation message         Position update rate       1 Hz standard, Optional 5 Hz (D, 2 sec)         Network positioning       VRS, FKP, IMAX. MAX, nearest station         RIK base station (option)       TransfICM3 RIK data at 1 Hz (1 sec)         Physical Specifications	Real-time Kinematic Specifications	
Position update rate1 kz standard, Optional 5 Hz (0.2 sec)Network positioningKPS, RPR, IMAX, MAX, nearest stationRTK base station (option)Transmit RTMA Bat At 11 kg (1 sec)Physical SpecificationsSci Second STK data at 1 Hz (1 sec)Weight of pole setupSolo kg for complete rover setup, including batteries and telescopic poleTemperature, operatingSci Second Str (Second Str (S	RTK data formats	Leica proprietary formats (Leica, Leica 4G), CMR+, RTCM2.x, RTCM3.x, full support of RTCM 3.1 transformation message
Network positioning         VR5, KP6, MAX, nearest station           RTK base station (option)         Tansmit RT0M3 RTK data at 1 H2 (1 sec)           Physical Specifications         Solo for complete rover setup, including batteries and telescopic pole           Temperature, operating         Si-30°C to +60°C, CS08plus: -40°C to +65°C, compliance with IS09022-10-08, IS09022-11-special, MIL STD 810G Method 502.5 II, MIL STD 810G Method 502.5 II, MIL STD 810G Method 502.5 II, MIL STD 810G Method 502.5 II           Femperature, storage         -40°C to +80°C, compliance with IS09022-10-08, IS09022-11-special, MIL STD 810G Method 502.5 II           Numidity         00 %, compliance with IS09022-13-06, IS09022-12-04 and MIL STD 810G Method 502.5 II           Saled against water, sand and utst Protected against blowing rain and dutst Protected against blowing ra	Position update rate	1 Hz standard, Optional 5 Hz (0.2 sec)
RTK base station (option)       Transmit RTKM att at 1 Hz (1 sec)         Physical Specifications         Weight of pole setup       2.60 kg for completer over subply including batteries and telescopic pole         Temperature, operating       Si - 30°C to +60°C, GSD8plus: -40°C to +55°C, compliance with ISO9022-10-08, ISO9022-11-special, ML STD 810G Method 502.5 II, ML STD 810G Method 50.6 II, NO So So II (St So 310 ME STD 810	Network positioning	VRS, FKP, iMAX, MAX, nearest station
Physical Specifications           Weight of pole setup         2.60 kg for complete rover suph, including batteries and telescopic pole           Temperature, operating         CS: -30°C to +60°C, GS08plus: -40°C to +65°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 II, MIL STD 810G Method 501.5 II           Temperature, storage         -40°C to +80°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 I, MIL STD 810G Method 50.5 I           Humidity         100 %, compliance with ISO9022-13-06, ISO9022-10-04 and MIL STD 810G Method 507.5 I           Sealed against water, sand and dust         Protected against temporary submersion into water: Max. depth 1,0 m (CS) / 1,4 m (CS08plus)           Vibration         Withstands vibration during operating, compliance with ISO9022-36-05 and MIL STD 810G Method 514.6-Cat.24           Drops         Withstands tpmp orty hards subresion into water: Max. depth 1,0 m (CS) / 1,4 m (CS08plus)           Protected against blowing rain and dust         Protected against blowing rain and dust           Protected against blowing rain and dust         Protected against blowing rain and dust           Protected against blowing rain and dust         Protected against blowing rain and dust           Protected against blowing rain and dust         Protected against blowing rain and dust           Protected against blowing rain and dust         Pro	RTK base station (option)	Transmit RTCM3 RTK data at 1 Hz (1 sec)
Weight of pole setup       2.60 kg for complete rover setup, including batteries and telescopic pole         Temperature, operating       CS:030Plus: -40°C to +65°C, compliance with ISO9022-10-08, ISO9022-11-special, MLL STD 810G Method 501.5 II         Temperature, storage       -40°C to +80°C, compliance with ISO9022-10-08, ISO9022-11-special, MLL STD 810G Method 502.5 II, MLL STD 810G Method 501.5 II         Humidity       100 % compliance with ISO9022-10-08, ISO9022-11-special, MLL STD 810G Method 507.5 I         Saeled against water, sand and dust       IPS7 (SI) /IPS8 (ISO8plus) according IEC60529 and MLL STD 810G Method 506.5 I, MLL STD 810G Method 506.5 I, MLL STD 810G Method 512.5 I         Yorected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and dust         Protected against blowing rain and dust       IPO rotected against blowing rain and sufface         Borpo       Withstands topple over from a 2 m survey pole onto h	Physical Specifications	
Temperature, operatingSin Sof C to 460°C, SC080plus: -40°C to +65°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 II, MIL STD 810G Method 501.5 ITemperature, storage-40°C to +80°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 501.5 IHumidity100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 ISealed against water, sand and dust100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 IProtected against bioking rain and dustProtected against bioking rain and dustWithstands vibration during operating, compliance with ISO9022-36-05 and MIL STD 810G Method 51.6.6 INonperatureWithstands vibration during operating, compliance with S09022-36-05 and MIL STD 810G Method 51.6.6 INo loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mmPower Management40 g / 15 to 23 msec, compliance with MIL STD 810G Method 51.6.6 INo loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mmPower ManagementSomole Greechargeble Li-lon battery, 2.6 Ah / 7.4 V (1x in C508plus)Supply voltageNominal 12V DC, Range 10.5 - 28V DCInternal power supplyNonsol KSS S nity, 7 hours GMSS RityBattery charging2 hours with GKL211 charger or with GEV235 field controller power supplyBattery charging2 hours with GKL211 charger or with GEV2	Weight of pole setup	2.60 kg for complete rover setup, including batteries and telescopic pole
Temperature, storage-40°C to +80°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 I, MIL STD 810G Method 501.5 IHumidity100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 ISealed against water, sand and dust100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 ISealed against water, sand and dustProf (CS) / IP68 (GS08plus) according IEC60529 and MIL STD 810G Method 506.5 I, MIL STD 810G Method 512.5 I Protected against blowing rain and dust Protected against blowing rain and subscriptions Protected against blowing rain and subscriptions Protected against blowing rain and subscriptions Protected rains blowing rain and subscriptions Protected rains blowing rain and subscr	Temperature, operating	CS: –30°C to +60°C, GS08plus: -40°C to +65°C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 II, MIL STD 810G Method 501.5 II
Humidity100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MLL STD 810G Method 507.5 1Sealed against water, sand and dustIP67 (CS) / IP68 (GSO8plus) according IEC60529 and MLL STD 810G Method 50.6.5 1, MLL STD 810G Method 510.5 1 and MLL STD 810G Method 512.5 1 should be added and the stop stop and and dustVibrationWithstands Duoing rain and dustDropsWithstands vibration during operating, compliance with ISO9022-36-05 and MLL STD 810G Method 514.6-C4.24Tople overWithstands 1 m drop onto hard surfaceFunctional shockWithstands topple over from a 2 m survey pole onto hard surfacePower ManagementVibration during operating, compliance with MLL STD 810G Method 516.6 1 No isos of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mmPower ManagementNominal 12V DC, Range 10.5 - 28W DCSupply voltageNominal 12V DC, Range 10.5 - 28W DCOperation timeSonowite Krechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS08plus) 10 hours GNSS RTK <sup>3</sup> Battery charging2 hours with GKL211 charger or with GEV235 field controller power supply	Temperature, storage	-40°C to +80°C , compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 I, MIL STD 810G Method 501.5 I
Sealed against water, sand and dustIP67 (CS) / IP68 (GS08plus) according IEC60529 and MIL STD 810G Method 50.51, MIL STD 810G Method 512.51 and MIL STD 810G Method 512.51 Protected against blowing rain and dust Protected against blowing rain and dust Protected against blowing rain and dust Protected against blowing operating, compliance with IS09022-36-05 and MIL STD 810G Method 514.6-Cat.24VibrationWithstands vibration during operating, compliance with IS09022-36-05 and MIL STD 810G Method 514.6-Cat.24DropsWithstands 1 m drop onto hard surfaceTopple overWithstands topple over from a 2 m survey pole onto hard surfaceFunctional shock0 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.61 No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mmPower ManagementSupply voltageInternal power supply Operation timeNominal 12V DC, Range 10.5 - 28V DCInternal power supply Operation timeRemovable & rechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS and 1x in CS08plus) 10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging2 hours with GKL211 charger or with GEV235 field controller power supply	Humidity	100 %, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 I
Vibration       Witshands vibration during operating, compliance with ISO9022-36-05 and MLL STD 810G Method 514.6-C42.42         Drops       Witshands 1 m drop onto hard surface         Topple over       Witshands topple over from a 2 m survey pole onto hard surface         Functional shock       0.9 / 15 to 23 msce, compliance with MLL STD 810G Method 516.61         Power Management       Noninal 12V DC, Range 10.5 - 28W DC, Barder	Sealed against water, sand and dust	IP67 (CS) / IP68 (GS08plus) according IEC60529 and MIL STD 810G Method 506.5 I, MIL STD 810G Method 510.5 I and MIL STD 810G Method 512.5 I Protected against blowing rain and dust Protected against temporary submersion into water: Max. depth 1,0 m (CS) / 1,4 m (GS08plus)
Drops       Withstands 1 m drop onto hard surface         Topple over       Withstands topple over from a 2 m survey pole onto hard surface         Functional shock       40 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.6 l No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mm         Power Management       Supply voltage         Internal power supply Operation time       Nominal 12V DC, Range 10.5 - 28V DC         Battery charging       2 hours with GKL211 charger or with GEV235 field controller power supply	Vibration	Withstands vibration during operating, compliance with ISO9022-36-05 and MIL STD 810G Method 514.6-Cat.24
Topple over       Withstands topple over from a 2 m survey pole onto hard surface         Functional shock       40 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.6 l No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mm         Power Management       Nominal 12V DC, Range 10.5 - 28V DC         Internal power supply Operation time       Removable & rechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus) 10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging       2 hours with GKL211 charger or with GEV235 field controller power supply	Drops	Withstands 1 m drop onto hard surface
Functional shock     40 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.6 I No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mm       Power Management     Supply voltage       Supply voltage     Nominal 12V DC, Range 10.5 - 28V DC       Internal power supply Operation time     Removable & rechargable Li-Ion battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus) 10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging     2 hours with GKL211 charger or with GEV235 field controller power supply	Topple over	Withstands topple over from a 2 m survey pole onto hard surface
Power Management           Supply voltage         Nominal 12V DC, Range 10.5 – 28V DC           Internal power supply         Removable & rechargable Li-Ion battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus)           Operation time         10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging         2 hours with GKL211 charger or with GEV235 field controller power supply	Functional shock	40 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.6 I No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 100 mm
Supply voltage         Nominal 12V DC, Range 10.5 - 28V DC           Internal power supply         Removable & rechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus)           Operation time         10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging         2 hours with GKL211 charger or with GEV235 field controller power supply	Power Management	
Internal power supply     Removable & rechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus)       Operation time     10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup> Battery charging     2 hours with GKL211 charger or with GEV235 field controller power supply	Supply voltage	Nominal 12V DC, Range 10.5 – 28V DC
Battery charging 2 hours with GKL211 charger or with GEV235 field controller power supply	Internal power supply Operation time	Removable & rechargable Li-lon battery, 2.6 Ah / 7.4 V (1x in CS and 1x in GS08plus) 10 hours GNSS only, 7 hours GNSS RTK <sup>3</sup>
	Battery charging	2 hours with GKL211 charger or with GEV235 field controller power supply

<sup>1</sup> ineasurement precision, accuracy and reliability are dependent upon various factors including number of satellites, geometry, obstructions, observation time, ephemeris accuracy, ionospheric conditions, multipath etc. Figures quoted assume normal to favourable conditions. GPS and GLONASS can increase performance and accuracy by up to 30% relative to GPS only.
 <sup>2</sup> May vary due to atmospheric conditions, multipath, obstructions, signal geometry and number of tracked signals.
 <sup>3</sup> May vary with temperature, battery age and power of RTK of data link device.



# TOTAL STATION TPS 1200 SERIES



#### Models and options

	TC	TCR	TCRM	TCA	TCP	TCRA	TCRP
Angle measurement	•						
Distance measurement (IR-Mode)		•	•		•	•	•
PinPoint reflectorless dist. measurem. (RL-Mode)		•	•				•
Motorized				•	•		•
Automatic Target Recognition (ATR)				•	•		•
PowerSearch (PS)					•		•
Guide Light (EGL)	•	o	0		•		•
Remote Control Unit / RadioHandle	•	•	0	•	•	0	0
GUS74 Laser Guide				0		0	
SmartStation (ATX1230+ GNSS)	•	0	0	•	0	0	o
	• = Sta	indard	• = Optic	onal			

#### Angle measurement

à

		Type 1201+	Type 1202+	Type 1203+	Type 1205+
Accuracy (std.dev., ISO 17123-3)	Hz, V	1" (0.3 mgon)	2" (0.6 mgon)	3" (1 mgon)	5" (1.5 mgon)
	Display resolution:	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)
Method	absolute, continuous, dia	metrical			
Compensator	Working range:	4' (0.07 gon)	4" (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)
	Setting accuracy:	0.5" (0.2 mgon)	0.5" (0.2 mgon)	1.0" (0.3 mgon)	1.5" (0.5 mgon)
	Method:	centralized dual a	xis compensator		

#### Distance measurement (IR-Mode)

Range	Round prism (GPR1):	3000 m	
(average atmospheric conditions)	360° reflector (GRZ4):	1500 m	
	Mini prism (GMP101):	1200 m	
	Reflective tape (60 mm x 60mm)	250 m	
	Shortest measurable distance:	1.5 m	
Accuracy / Measurement time	Standard mode:	1 mm + 1.5 ppm / typ. 2.4 s	
(standard deviation, ISO 17123-4)	Fast mode:	3 mm + 1.5 ppm / typ. 0.8 s	
	Tracking mode:	3 mm + 1.5 ppm / typ. < 0.15 s	
	Display resolution:	0.1 mm	
Method	Special phase shift analyzer (coaxial, vi	sible red laser)	

#### PinPoint R400/R1000 reflectorless distance measurement (RL-Mode)

Range	PinPoint R400:	400 m / 200 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
(average atmospheric conditions)	PinPoint R1000:	1000 m / 500 m (Kodak Gray Card: 90 % reflective / 18 % reflective)
	Shortest measurable distance:	1.5 m
	Long Range to round prism (GPR1):	1000 m - 7500 m
Accuracy / Measurement time	Reflectorless < 500 m:	2 mm + 2 ppm / typ. 3 - 6 s, max. 12 s
(standard deviation, ISO 17123-4)	Reflectorless > 500 m:	4 mm + 2 ppm / typ. 3 - 6 s, max. 12 s
(object in shade, sky overcast)	Long Range:	5 mm + 2 ppm / typ. 2.5 s, max. 12 s
Laser dot size	At 30 m:	approx. 7 mm x 10 mm
	At 50 m:	approx. 8 mm x 20 mm
Method	PinPoint R400 / R1000:	System analyzer (coaxial, visible red laser)

#### Motorized

Maximum speed Rotating speed: 45° / s

LEICA TPS1205





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#### Automatic Target Recognition (ATR)

Range ATR mode / LOCK mode	Round prism (GPR1):	1000 m / 800 m
(average atmospheric conditions)	360° reflector (GRZ4, GRZ122):	600 m / 500 m
	Mini prism (GMP101):	500 m / 400 m
	Reflective tape (60 mm x 60 mm):	55 m (175 ft)
	Shortest measurable distance:	1.5 m / 5 m
Accuracy / Measure time	ATR angle accuracy Hz, V:	1 * (0.3 mgon)
(std. dev. ISO 17123-3)	Base positioning accuracy:	± 1mm
	Measure time for GPR1:	3 - 4s
Maximum speed (LOCK mode)	Tangential (standard mode):	5 m / s at 20 m, 25 m / s at 100 m
	Radial (tracking mode):	4m/s
Method	Digital image processing (laser beam)	

#### PowerSearch (PS)

Range	Round prism (GPR1):	300 m	
(average atmospheric conditions)	360° reflector (GRZ4, GRZ122):	300 m (perfectly aligned to instrument)	
	Mini prism (GMP101):	100 m	
	Shortest distance:	5 m	
Search time	Typical search time:	< 10s	
Maximum speed	Rotating speed:	45° / s	
Method	Digital signal processing (rotating lase	fan)	

### Guide Light (EGL)

Range			
(average atmospheric conditions)	Working range:	5 m - 150 m	
Accuracy	Positioning accuracy:	5 cm at 100 m	

#### General data

General data			
Telescope		Laser plummet	2
Magnification:	30 x	Centering accuracy:	1.5 mm at 1.5 m
Free objective aperture:	40 mm	Laser dot diameter:	2.5 mm at 1.5 m
Field of view:	1°30' (1.66 gon) / 2.7 m at 100 m	Endless drives	
Focusing range:	1.7 m to infinity	Number of drives:	1 horizontal / 1 vertical
Keyboard and Display		Battery (GEB221)	
Display:	1/4 VGA (320*240 pixels), graphic LCD, colour, illumination,	Type:	Lithium-Ion
	touch screen	Voltage:	7.4V
Keyboard:	34 keys (12 function keys, 12 alphanumeric keys), illumination	Capacity:	4.4 Ah
Angle display:	360° ' ", 360° decimal, 400 gon, 6400 mil, V%	Operating time:	typ. 5 - 8 h
Distance display:	meter, int. ft, int. ft/inch, US ft, US ft/inch	Weights	
Position:	face I standard / face II optional	Total station:	4.8 - 5.5 kg
Data storage		Battery (GEB221):	0.2 kg
Internal memory:	256 MB (optional)	Tribrach (GDF121):	0.8 kg
Memory card:	CompactFlash cards (256 MB)	Environmental specificatio	ns
Number of data records:	1750 / MB	Working temperature range:	-20° C to +50° C
Interfaces:	RS232, Bluetooth® Wireless-Technology (optional)	Storage temperature range:	-40° C to +70° C
Circular Level		Dust / water (IEC 60529):	IP54
Sensitivity:	6' / 2 mm	Humidity:	95%, non-condensing

#### Remote Control Unit (RX1250T/Tc)

Communication	via integrated radio modem	
Control unit	Display:	1/4 VGA (320*240 pixels), graphic LCD, touch screen, illumination
	Keyboard:	62 keys (12 function keys, 40 alphanumeric keys), illumination
	Interface:	R5232
Battery (GEB211)	Type:	Lithium-Ion
	Voltage:	7.4V
	Capacity:	2.2 Ah
	Operating time:	RX1250T: typ. 9 h, RX1250Tc: typ. 8 h
Weights	Control unit RX1250T/Tc:	0.8 kg
	Battery (GEB211):	0.1 kg
	Reflector pole adapter:	0.25 kg
Environmental specifications	Working temperature range:	RX1250T - 30°C to +65°C / RX1250Tc - 30°C to +50°C
	Storage temperature range:	-40° C to +80° C
	Protection against water, dust and sand	IP67
	(IEC 60529, MIL-STD-810F)	waterproof to 1 m temporary submersion, dust tight
# **GSSI SIR-3000 RADAR**

A portable, digital Subsurface Interface Radar System designed for a broad range of environmental, geotechnical, geological and engineering applications.



The SIR-3000 is a self-contained radar system. Data is displayed in real-time on a colour display, stored on an internal hard drive, and can be printed on an optional printer.

GSSI SIR Systems apply signal gain *prior* to digitization to provide the user with instant results and the highest system performance possible. Real-time digital filtering further enhances system performance and dynamic range. Optional survey wheel control for precise line locations.

Additional features of the SIR-3000 include removable compact flash data storage, USB

master and slave connections, RS232 port for GPS compatibility and ethernet connection for firmware updates. The system has a variety of data collection, processing, and display options.

The SIR-3000 is compatible with all GSSI antennae; frequencies range from 20MHz to 2.5GHz, thus facilitating a broad range of applications.

#### Features;

- Portable, field rugged design
- Easy to use automatic and manual controls
- Fully digital
- Advanced real-time processing
- Multiple file transfer

#### Specifications;

#### HARDWARE:

Processor:	Intel StrongArm RISC, 206MHz
Hard drive:	512MB (internal) & compact flash
	port (up to 2GB, user provided)
Input/output:	Antenna input (including survey
	wheel), 19VDC, Ethernet I/O,
	RS232 I/O (GPS port), compact
	flash drive, USB master and slave
Printer:	Optional thermal plotter for real-time
	or playback hard copies

#### ELECTRICAL:

Antennas:	Operates all GSSI antennae
Dipoles:	Unshielded: 15 - 120MHz
	Shielded: 100 - 1000MHz
	Monostatic: 80 - 1000MHz
	Bistatic: 15 - 300MHz
TEM Horns:	1 - 2.5GHz (bistatic, unshielded)

- Low power requirements operates from a standard camcorder battery
- 8.4" TFT display
- Environmentally sealed to withstand variations in temperature, pressure and humidity

#### **OPERATIONAL:**

Temperature:0 to +40 degrees CHumidity:0 - 100% (RH)Environmental:Radar control unit is<br/>environmentally sealed.

#### SOFTWARE:

Operating syste	em: Windows CE Edition
Data collection	modes: Continuous or Distance
Display:	User defined(scan/wiggle/O scope)
Range gain:	-20 to +80dB or user selected
Filters:	Automatic or user selected
Stacking:	Automatic or user selected
Scan rate:	Up to 220 scans per second
Sampling:	256 to 8192 samples per scan
Range:	5 to 8000ns

#### MECHANICAL:

Dimensions: Weight:

#### s: 315 x 220 x 105mm 4.1kg

## **GSSI SIR-3000 RADAR**



## APPENDIX F ROAD CORE REPORTS

# NORTHUMBERLAND

## COUNTY COUNCIL

Highways Laboratory Bassington Drive • Cramlington • Northumberland • NE23 8AJ Tel (01670) 737575 • Fax (01670) 732044 • Email highwayslaboratory@northumberland.gov.uk

## **ROAD TESTS - CORING LOG**

Client: Central Alliance, Wakefield, WF2 0XJ Engineer: Richard Hardwick Project: A1B2CH (A1 Birtley to Coal House)

Location: Various

Route Number:A1Section Length (m):N/ALocation of Chainage 00:N/A

Age at Test: N/K Date Tested: 21/06/2018 Tested By: John Wilson

Remarks: NOTE - Indication of Tar Bound Materials present in some cores.

Signed:	[ ] M. Newton, Laboratory Manager [ ] P. Fletcher. Senior Technician
	Report Date: 23/07/2018

Core Number: **101 (Shift 3 Core 1)** GPS Northing: **424429.1** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 67 Off Slip, Dedicated Lane Off Side Wheel Path GPS Easting: 558628.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 50	50	Surface Course	dense	Sound	Bituminous	10mm Limestone	No
2	50 - 112	62	HRA Binder Course	dense	Sound	Bituminous	20mm Limestone	No
3	112 - 193	81	Bound Base	dense	Cracked through	Tar Bound	28mm Various	Yes
4	193 - 323	130	Bound Base	Medium/Dense	Cracked through	Tar Bound	40mm Various	Yes
5	323+		Granular Base				>40mm Limestone	



Remarks: The core appears to have been taken in an area of new & old construction. The log shows the older side of the road (verge side) The other side (towards central reserve) is a newer bitumen bound construction. Layer 3 is 20mm Limestone Binder Course (112-195mm) & Layer 4 is 28mm Base Course (195-285mm).



# NORTHUMBERIAND

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Highways Division Laboratory

Bassington Drive, Cramlington, Northumberland, NE23 8AJ

Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 101 (Shift 3 Core 1)	Core Depth:	323mm
Material:	Granular Base Material	DCP Test Start Depth:	323mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2-48-1-057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

per biow.							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
323	351	28	351	5	5.6	1.7	48.9
351	359	8	359	60	0.1	3.4	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
P Fletcher, Senior Technician

Core Number: **102 (Shift 3 Core 2)** GPS Northing: **424624.4** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 67 Off Slip, Dedicated Lane Off Side Wheel Path GPS Easting: 558589.8

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	RINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 46	46	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	46 - 110	64	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	110 - 224	114	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
4	224 - 320	96	Bound Base	Medium/Dense	Stripped at base	Tar Bound	28mm whinstone	Yes
5	320+		Granular Base				>40mm Crushed Rock	



Remarks: Core recovered intact.





Highways Division Laboratory Bassington Drive, Cramlington, Northumberland, NE23 8AJ <u>Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk</u>

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 102 (Shift 3 Core 2)	Core Depth:	325mm
Material:	Granular Base Material	DCP Test Start Depth:	325mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson

**Dynamic Cone Penetration Graph** Number of Blows 10 0 20 30 40 50 60 70 0 50 С 0 100 n е 150 Ρ 200 e n 250 m 300 m 350 400 450

#### \*CBR = 10<sup>(2-48-1-057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
325	382	57	382	10	5.7	1.7	48.0
382	386	4	386	61	0.1	3.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager
( ) P Fletcher, Senior Technician

Core Number: 103 (Shift 3 Core 7) GPS Northing: 425115.3 Surface Condition: Sound Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558554.4

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 77	41	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	77 - 126	49	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	126 - 210	84	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
5	210 - 424	214	Concrete	Medium/Dense	Sound	Cement	40mm Limestone	No
7	424+		Granular Base				>40mm Crushed Rock	



Remarks: Debonded prior to extraction at 210mm depth, between layers 4 & 5.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 103 (Shift 3 Core 7)	Core Depth:	424mm
Material:	Granular Base Material	DCP Test Start Depth:	424mm
Source of N	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10P)</sup>	Where P = The penetration rate in mi	n per blow.
--	--------------------------------------	-------------

Depth		Layer	Total Total		mm per			
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*	
424	454	30	454	8	3.8	1.9	74.7	
454	472	18	472	63	0.3	3.0	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
P Fletcher, Senior Technician

Core Number: 104 (Shift 8 Core 2) GPS Northing: 425168.0 Surface Condition: Sound Position: Northbound Carriageway, Junction 67 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 558523.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 34	34	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	34 - 50	16	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	50 - 110	60	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	110 - 205	95	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
5	205 - 308	103	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
6	308 - 480	172	Concrete	Medium/Dense	Some stripping	Cement	40mm Various	No
7	480 - 650	170	Concrete	N/A	Stripped/Disintegrated	Cement	40mm Various	No



Remarks: The loose material deeper than 480mm was jamming the core barrel. Hand excavation posssible only until 650mm depth. Debonded prior to extraction at 308mm depth, between Layers 5 & 6.



Core Number: **108 (Shift 8 Core 4)** GPS Northing: **424721.9** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 67 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 558547.4

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	RINDER	AGGREGATE	TAR PRESENCE	
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 35	35	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No	
2	35 - 86	51	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No	
3	86 - 181	95	Binder Course	Dense	Sound	Bituminous	28mm Whinstone	No	
4	181 - 290	109	Bound Base	Dense	Sound	Tar Bound	40mm Limestone	Yes	
5	290 - 445	155	Concrete	Dense	Sound	Cement	40mm various	No	



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Debonding at 290mm depth, between layers 4 & 5 occurred in transit to laboratory.



Core Number: **109 (Shift 6 Core 10)** GPS Northing: **426891.3** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Track GPS Easting: 557396.7

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	28 - 55	27	HRA Surface Course	Dense	Sound	Bituminous	10mm Various	No
3	55 - 119	64	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Various	No
4	119 - 193	74	Bound Base	Dense	Sound	Tar Bound	28mm Slag	Yes
5	193+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.





Highways Division Laboratory Bassington Drive, Cramlington, Northumberland, NE23 8AJ

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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 109 (Shift 6 Core 10)	Core Depth:	193mm
Material:	Granular Base Material	DCP Test Start Depth:	193mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

the penetration rate in him per blow.							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
193	241	48	241	9	5.3	1.7	51.5
241	257	16	257	59	0.3	3.0	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
) P Fletcher, Senior Technician

Core Number: **110 (Shift 2 Core 7)** GPS Northing: **425026.3** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 67 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 558584.4

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	N DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 42	42	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	42 - 99	57	Binder Course	Dense	Sound	Bituminous	20mm limestone	No
3	99 - 202	103	Bound Base	Dense	Sound	Tar Bound	28mm limestone	Yes
4	202 - 280	78	Bound Base	Dense	Stripped at base	Tar Bound	20mm Whinstone	Yes
5	280 - 460	180	Concrete	Dense	Stripped at base	Cement	40mm Various	No
6	460+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 280mm Depth, between layers 4 & 5. Granular Base material could possibly be disintegrated concrete.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Client		Test Method:	DMRB IAN 73/06
Client :	Alliance House Wakefield	Report Date:	05/07/2018
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 110 (Shift 2 Core 7)	Core Depth:	460mm
Material:	Granular Base Material	DCP Test Start Depth:	460mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow.

		_	the penetration rate in him per blow.					
Depth		Layer	Total	Total	mm per	Log CBR	CBR*	
From	То	Thickness	Depth	No of Blows blow				
460	504	44	504	7	6.3	1.6	43.3	
504	516	12	516	142	0.1	3.6	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed: \_\_\_\_\_ ( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **111 (Shift 8 Core 3)** GPS Northing: **424812.1** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 67 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 558533.5

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE	
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 35	35	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No	
2	35 - 77	42	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No	
3	77 - 159	82	Binder Course	Dense	Sound	Bituminous	28mm Whinstone	No	
4	159 - 293	134	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes	
5	293 - 465	172	Concrete	Dense	Stripped/Broken	Cement	40mm Various	No	



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Debonded prior to extraction at 293mm depth, between layers 4 & 5.



Core Number: **112 (Shift 7 Core 18)** GPS Northing: **426347.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 557661.6

LAYER	DEPTH (mm) FROM - TO	THICKNESS (mm)	MATERIAL DESCRIPTION	TEXTURE	CONDITION	BINDER	AGGREGATE SIZE/TYPE	TAR PRESENCE INDICATED BY PAK TEST
1	0 - 41	41	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	41 - 106	65	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	106 - 269	163	Concrete	Dense	Sound	Cement	28mm Various	No
4	269+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 106mm depth, between layers 2 & 3.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	13/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 112 (Shift 7 Core 18)	Core Depth:	269mm
Material:	Granular Base Material	DCP Test Start Depth:	269mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



## \*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow.

			penetration rate in min per blow.					
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
269	296	27	296	5	5.4	1.7	50.8	
296	333	37	333	72	0.6	2.8	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
P Fletcher, Senior Technician

Core Number: **113 (Shift 4 Core 11)** GPS Northing: **427887.5** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 65 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 556918.5

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	RINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 111	75	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	111 - 130	19	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
4	130 - 260	130	Base Course	Medium/Open	Stripped at base	Bituminous	28mm various	No
5	260+		Granular Base				>40mm Various	



Remarks: Core recovered intact.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Client ·	Central Alliance	Test Method:	DMRB IAN 73/06
	Alliance House Wakefield	Report Date:	16/07/2018
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 113 (Shift 4 Core 11)	Core Depth:	260mm
Material:	Granular Base Material	DCP Test Start Depth:	260mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow.

	Devil						
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
260	285	25	285	8	3.1	2.0	90.6
285	315	30	315	144	0.2	3.2	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
) P Fletcher, Senior Technician

Core Number: **114 (Shift 4 Core 13)** GPS Northing: **428078.1** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 65 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 556868.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 32	32	Surface Course	Medium/Dense	Sound	Bituminous	10mm Crushed Rock	No
2	32 - 75	43	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	75 - 128	53	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
4	128 - 260	132	Base Course	Dense	Stripped at base	Bituminous	28mm Various	No
5	260+		Granular Base				>40mm Various	



Remarks: Core recovered intact. Debonding occurred in transit to laboratory.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	16/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 114 (Shift 4 Core 13)	Core Depth:	260mm
Material:	Granular Base Material	DCP Test Start Depth:	260mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2:48–1:05/*(0910P)</sup> Where P = The penetration rate in mm per b	low.
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D .	Dowth I I I I I I I I I I I I I I I I I I I						
De From	ptn To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
260	303	43	303	7	6.1	1.6	44.3
303	322	19	322	78	0.3	3.1	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( / Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **115 (Shift 6 Core 2)** GPS Northing: **428219.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 65 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 556513.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 5	5	<b>High Friction Surfacing</b>	Dense	Sound	Bituminous	1mm Bauxite	No
2	5 - 48	43	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	48 - 103	55	Binder Course	Dense	Sound	Bituminous	14mm Limestone	No
4	103 - 127	24	HRA Binder Course	Dense	Sound	Bituminous	20mm Various	No
5	127 - 211	84	HRA Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	211+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 115 (Shift 6 Core 2)	Core Depth:	211mm
Material:	Granular Base Material	DCP Test Start Depth:	211mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2-48-1-057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

penetration reternismi per blowi							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
211	281	70	281	10	7.0	1.6	38.6
281	308	27	308	56	0.6	2.7	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician
Core Number: **116** GPS Northing: **428013.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 65 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 556872.8

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 30	30	Surface Course	Medium/Dense	Sound	Bituminous	10mm Crushed Rock	No
2	30 - 76	46	Binder Course	Dense	Sound	Bituminous	20mm Various	No
3	76 - 136	60	HRA Surface Course	Dense	Sound	Bituminous	10mm Limestone	No
4	136 - 268	132	Base Course	Medium/Dense	Stripped at base	Bituminous	40mm Various	No
5	268+		Granular Base				>40mm Various	





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
<b>.</b>		Test Method:	DMRB IAN 73/06
Client :		Demont Date	
	Wakefield	Report Date:	16/07/2018
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 116 (Shift 4 Core 12)	Core Depth:	268mm
Material:	Granular Base Material	DCP Test Start Depth:	268mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson

**Dynamic Cone Penetration Graph** Number of Blows 0 10 20 30 40 50 60 70 80 90 0 50 С 0 n 100 е 150 F е 200 n 250 m m 300 350 400

\*CBR = 10<sup>(2-48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

_							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
268	338	70	338	11	6.4	1.6	42.7
338	360	22	360	82	0.3	3.0	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
P Fletcher, Senior Technician

Core Number: **117 (Shift 6 Core 9)** GPS Northing: **427019.2** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 557346.5

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 24	24	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	24 - 53	29	HRA Surface Course	Dense	Sound	Bituminous	10mm Various	No
3	53 - 116	63	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Various	No
4	116 - 204	88	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
7	204+		Granular Base				>40mm Limestone	





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 117 (Shift 6 Core 9)	Core Depth:	204mm
Material:	Granular Base Material	DCP Test Start Depth:	204mm
Source of N	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
204	235	31	235	5	6.2	1.6	43.9
235	288	53	288	56	1.0	2.5	>100
288	296	8	296	116	0.1	3.4	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

( ) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Signed:

Core Number: **118 (Shift 4 Core 10)** GPS Northing: **426976.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 66 On Slip, Lane 1, Centre\* GPS Easting: 557431.4

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE CONDITION BI	BINDER	SIZE/TYPE	INDICATED BY PAK TEST	
1	0 - 34	34	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	34 - 57	23	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	57 - 68	11	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
4	68 - 140	72	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
5	140 - 217	77	Bound Base	Medium/Dense	Sound	Tar Bound	28mm Limestone	Yes
6	217+		Granular Base				>40mm Limestone	



\*Core moved from Off Side Wheel Path to Centre for safety reasons.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Wakefield	Report Date:	16/07/2018
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 118 (Shift 4 Core 10)	Core Depth:	217mm
Material:	Granular Base Material	DCP Test Start Depth:	217mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057* log10)</sup>	Where P = The penetration	n rate in mm per blow.
--	---------------------------	------------------------

Depth		Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
217	228	11	228	3	3.7	1.9	76.5
228	234	6	234	74	0.1	3.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( /) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **119 (Shift 2 Core 6)** GPS Northing: **426363.9** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 66 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 557718.2

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 42	42	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	42 - 98	56	Binder Course	Dense	Sound	Bituminous	20mm limestone	No
3	98 - 179	81	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	179 - 252	73	Base Course	Dense	Stripped at base	Bituminous	20mm Various	No
5	252+		Granular Base				>40mm Limestone	



CORE REFERENCE:

Core 119 (Shift 2 Core 6)

## **General Core Location**



**Core Immediately After Extraction** 



Looking Into Core Hole





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
	Control Alliance	Test Method:	DMRB IAN 73/06
Client :	Central Alliance Alliance House Wakefield	Report Date:	05/07/2018
	WF2 0XJ	Date Sampled:	05/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 119 (Shift 2 Core 6)	Core Depth:	252mm
Material:	Granular Base Material	DCP Test Start Depth:	252mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow.

	where r = the penetration rate in him per blow.						
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	Total mm per of Blows blow		CBR*
252	301	49	301	11	4.5	1.8	62.3
301	333	32	333	42	1.0	2.5	>100
333	343	10	343	162	0.1	3.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
P Fletcher, Senior Technician

Core Number: **120 (Shift 7 Core 17)** GPS Northing: **426417.7** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 557603.6

LAYER	DEPTH (mm) FROM - TO	THICKNESS (mm)	MATERIAL DESCRIPTION	TEXTURE	CONDITION	BINDER	AGGREGATE SIZE/TYPE	TAR PRESENCE INDICATED BY PAK TEST
1	0 - 45	45	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	45 - 104	59	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	104 - 268	164	Concrete	Dense	Sound	Cement	28mm Various	No
4	268+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 104mm depth, between layers 2 & 3.





# COUNTY COUNCIL

Highways Division Laboratory Bassington Drive, Cramlington, Northumberland, NE23 8AJ <u>Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk</u>

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	13/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 120 (Shift 7 Core 17)	Core Depth:	268mm
Material:	Granular Base Material	DCP Test Start Depth:	268mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10P)</sup>	Where P = The	penetration rate in mm per blow.
CDR = 10	where P = The	penetration rate in mm per blow

De	Depth Lavor Tatal						
From	То	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
268	319	51	319	44	1.2	2.4	>100
319	360	41	360	164	0.3	3.0	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **121 (shift 2 Core 8)** GPS Northing: **425146.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 67 On Slip, Lane 2, Off Side Wheel Path GPS Easting: 558571.4

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 37	37	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	37 - 86	49	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
3	86 - 173	87	Bound Base	Medium/Dense	Sound	Tar Bound	28mm Limestone	Yes
4	173 - 275	102	Bound Base	Medium/Dense	Stripped at base	Tar Bound	40mm Limestone	Yes
5	275 - 428	153	Concrete	Medium/Dense	Stripped at base	Cement	40mm Various	No
6	428+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 86mm, 173mm & 275mm depth. Between layers 2 & 3, 3 & 4 and 4 & 5. Granular Base material could possibly be disintegrated concrete.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 121 (Shift 2 Core 8)	Core Depth:	428mm
Material:	Granular Base Material	DCP Test Start Depth:	428mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

the penetrate in this penetrate in this per blow.							
De From	pth To	Layer Thickness	Total Depth	Total mm per No of Blows blow		Log CBR	CBR*
428	463	35	463	10	3.5	1.9	80.3
463	499	36	499	55	0.8	2.6	>100
499	500	1	500	100	0.0	4.2	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **122 (Shift 4 Core 9)** GPS Northing: **424755.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 67 Off Slip, Lane 1, Off Side Wheel Path GPS Easting: 558588.9

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	URE CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE			SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 32	32	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	32 - 61	29	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	61 - 113	52	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm limestone	No
4	113 - 224	111	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
5	224 - 340	116	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Core recovered intact. No DCP test possible.



Core Number: **123 (Shift 7 Core 15)** GPS Northing: **424678.2** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Track GPS Easting: 558565.8

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE			AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 43	43	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	43 - 73	37	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	73 - 175	105	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	175+		Membrane					



Remarks: Core taken on possible structure, no DCP tests possible. Debonding occurred at 43mm depth, between layers 1 & 2 during extraction.



Core Number: **124 (Shift 3 Core 10)** GPS Northing: **426406.4** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557666.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE		DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 32	32	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	32 - 104	72	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
3	104 - 192	88	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	192 - 276	84	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	276 - 357	81	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	357+		Granular Base				>40mm Limestone	





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Client :	Central Alliance	Test Method:	DMRB IAN 73/06
client .	Alliance House Wakefield	Report Date:	05/07/2018
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 124 (Shift 3 Core 10)	Core Depth:	357mm
Material:	Granular Base Material	DCP Test Start Depth:	357mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

Depth From To		Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
357	392	35	392	6	5.8	1.7	46.8	
392	438	46	438	92	0.5	2.8	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **125 (Shift 7 Core 8)** GPS Northing: **425592.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558410.3

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 40	40	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	40 - 98	58	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	98 - 162	64	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	162 - 239	77	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	239 - 361	122	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	361+		Granular Base				>40mm Limestone	





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 125 (Shift 7 Core 8)	Core Depth:	361mm
Motorial	Granular Paco Material	DCD Task Shark Darakh	261
wateridi:		DCP Test start Depth:	20111111
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10P)</sup>	Where P = The	penetration	rate in mm per blov	N.
	-			

Depth		Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
361	391	30	391	6	5.0	1.7	55.1
391	436	45	436	93	0.5	2.8	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **126 (Shift 7 Core 4)** GPS Northing: **426406.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557666.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 44	44	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	44 - 102	58	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	102 - 185	83	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	185 - 268	83	Base Corse	Dense	Sound	Bituminous	28mm Limestone	No
5	268 - 372	104	Base Corse	Dense	Sound	Bituminous	40mm Limestone	No
6	372+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 185mm depth, between layers 3 & 4. Debonding at 268mm depth, between layers 4 & 5 occurred in transit to laboratory.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
	,		
Location:	Core 126 (Shift 7 Core 4)	Core Depth:	372mm
Material:	Granular Base Material	DCP Test Start Depth:	372mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Totai No of Blows	mm per blow	Log CBR	CBR*	
372	442	70	442	28	2.5	2.1	>100	
442	502	60	502	93	0.9	2.5	>100	
502	515	13	515	163	0.2	3.3	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( /) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **127 (Shift 7 Core 2)** GPS Northing: **426222.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557752.8

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 40	40	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	40 - 99	59	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	99 - 187	88	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
4	187 - 340	153	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	340+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact. Debonding at 187mm, between layers 3 & 4 occurred in transit to laboratory.





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**Highways Division Laboratory** 

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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	19/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 127 (Shift 7 Core 2)	Core Depth:	340mm
Material:	Granular Base Material	DCP Test Start Depth:	340mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

Depth		Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
340	365	25	365	3	8.3	1.5	32.1
365	470	105	470	81	1.3	2.3	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

📢 Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **128 (Shift 7 Core 16)** GPS Northing: **426518.5** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 557507.9

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION				SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 47	47	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	47 - 105	58	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	105 - 186	81	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	186 - 282	96	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	282+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 186mm depth, between layers 3 & 4.


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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	13/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 128 (Shift 7 Core 16)	Core Depth:	282mm
Material:	Granular Base Material	DCP Test Start Depth:	282mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR =  $10^{(2.48-1.057*\log 10P)}$  Where P = The penetration rate in mm per blow.

per set and per set an							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
282	310	28	310	4	7.0	1.6	38.6
310	331	21	331	56	0.4	2.9	>100

(✓) Martin Newton, Laboratory Manager
( ) P Fletcher, Senior Technician

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Core Number: **129 (Shift 4 Core 1)** GPS Northing: **426970.5** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557403.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 22	22	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	22 - 55	33	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	55 - 118	71	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	118 - 189	71	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
5	189 - 275	86	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
6	275 - 360	85	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
7	360+		Granular Base				>40mm Limestone	



Remarks: On verge side of core from 22 - 118mm depth there is a layer of surface course. Core recovered intact.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 129 (Shift 4 Core 1)	Core Depth:	360mm
Material:	Granular Base Material	DCP Test Start Depth:	360mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



$+CBR = 10^{-100}$ Host $+CBR = 10^{-100}$ where P = The penetration rate in mm per b	<sup>-1-057* (og10P)</sup> Where P = The penetration rate in mm per blow.
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De	pth	Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
360	402	42	402	11	3.8	1.9	73.3
402	448	46	448	41	1.5	2.3	>100
448	471	23	471	101	0.4	2.9	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( /) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **130 (Shift 3 Core 16)** GPS Northing: **426751.3** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557447.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 18	18	Surface Course	Dense	Sound	Bituminous	10mm crushed Rock	No
2	18 - 112	94	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	112 - 187	75	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	187 - 255	68	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
5	255 - 345	90	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
6	345+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 187 & 255mm depth, between layers 3 & 4 and 4 & 5.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 130 (Shift 3 Core 16)	Core Depth:	345mm
Material:	Granular Base Material	DCP Test Start Depth:	345mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

the penetration face in this per blow.							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
345	378	33	378	6	5.5	1.7	49.8
378	407	29	407	47	0.7	2.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **131 (Shift 3 Core 13)** GPS Northing: **426600.2** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557566.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 20	20	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	20 - 112	92	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	112 - 169	57	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	169 - 251	82	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	251 - 379	128	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
6	379+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 169mm depth, between layers 3 & 4.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 131 (Shift 3 Core 13)	Core Depth:	379mm
Material:	Granular Base Material	DCP Test Start Depth:	379mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057* log10P)</sup>	Where P = The penetra	ation rate in mm per blow.
---	-----------------------	----------------------------

	Doubh						
From	ptn To	Layer Thickness	Total Depth	epth No of Blows blow		Log CBR	CBR*
379	457	78	457	14	5.6	1.7	49.1
457	468	11	468	54	0.3	3.1	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **133 (Shift 2 Core 3)** GPS Northing: **426012.4** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557997.0

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 18	18	Surface Course	Dense	Sound	Bituminous	6mm Crushed Rock	No
2	18 - 82	64	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	82 - 101	19	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	101 - 181	80	Base Course	Medium/Dense	Sound	Bituminous	28mm Limestone	No
5	181 - 278	97	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	278 - 377	99	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
7	377+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 181mm & 278mm depth, between layers 4 & 5 and 5 & 6.



Core 133 (Shift 2 Core 3)

# **General Core Location**



**Core Immediately After Extraction** 



Looking Into Core Hole



# NORTHUMBERIAND

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Highways Division Laboratory

Bassington Drive, Cramlington, Northumberland, NE23 8AJ

Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	05/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 133 (Shift 2 Core 3)	Core Depth:	377mm
Material:	Granular Base Material	DCP Test Start Depth:	377mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2-48-1-057\* log10P)</sup> Where P = The penetration rate in mm per blow.

				e penetration rate in mini per blow.				
Depth From To Th		Layer Thickness	Total Total Depth No of Blow		mm per blow	Log CBR	CBR*	
377	414	37	414	8	4.6	1.8	59.8	
414	451	37	451	49	0.9	2.5	>100	
451	458	7	458	174	0.1	3.8	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager
( ) P Fletcher, Senior Technician

Core Number: **134 (Shift 3 Core 9)** GPS Northing: **425807.0** Surface Condition: **Sound**  Position: Southbound Carriageway, Channel GPS Easting: 558255.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 23	23	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	23 - 94	71	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	94 - 188	94	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	188 - 283	95	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	283 - 368	85	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
6	368+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact. Debonding at 188mm depth, between layers 3 & 4 occurred in transit to laboratory.



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Highways Division Laboratory

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Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 134 (Shift 3 Core 9)	Core Depth:	368mm
Material:	Granular Base Material	DCP Test Start Depth:	368mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2+48-1+057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

			where r = me penetration rate in min per blow.					
Depth		Layer Total		Total mm per			CDD*	
From	То	Thickness	Depth	No of Blows blow		LUG CDK	CBK*	
368	393	25	393	5	5.0	1.7	55.1	
393	410	17	410	72	0.3	3.1	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **135 (Shift 2 core 5)** GPS Northing: **426271.9** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 66 Off Slip, Channel GPS Easting: 557767.2

	DEPTH (mm) THICKNESS MATERIAL TEXTURE CONDITION		AGGREGATE	TAR PRESENCE				
LATER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 43	43	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	43 - 111	68	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	111 - 238	127	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	238+		Granular Base					



Remarks: Core location moved 200mm towards edge line due to original location being partly on the verge.

CORE REFERENCE: Core 135 (Shift 2 Core 5) **General Core Location Core Immediately After Extraction** Looking Into Core Hole

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Highways Division Laboratory Bassington Drive, Cramlington, Northumberland, NE23 8AJ <u>Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk</u>

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	05/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 135 (Shift 2 Core 5)	Core Depth:	252mm
Material:	Granular Base Material	DCP Test Start Depth:	252mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

		-		re penetration rate in min per blow.				
Depth From To		Layer Thickness	Total Total Depth No of Blows		mm per blow	Log CBR	CBR*	
252	330	78	330	10	7.8	1.5	34.4	
330	350	20	350	30	1.0	2.5	>100	
350	355	5	355	160	0.0	4.0	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( /) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **136 (Shift 4 Core 8)** GPS Northing: **428182.1** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 556705.3

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE CONDITION BIN	BINDER	AGGREGATE	TAR PRESENCE	
	FROM - TO	(mm)	DESCRIPTION				SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 43	43	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	43 - 67	24	HRA Surface Course	Dense	Sound	Bituminous	10mm Limestone	No
3	67 - 126	59	HRA Binder Course	Dense	Sound	Bituminous	20mm Various	No
4	126 - 253	127	Binder Course	Dense	Stripped at base	Bituminous	28mm Various	No
5	253 - 350	97	Base Course	Dense	Some stripping	Bituminous	40mm Various	No
6	350 - 475	125	Concrete	Dense	Stripped at base	Cement	40mm Various	No



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Debonded prior to extraction at 253mm, between layers 4 & 5. No DCP test possible.



Core Number: **137 (Shift 3 Core 5)** GPS Northing: **424942.5** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path (Junction 67 Bridge Deck) GPS Easting: 558559.5

LAYER	DEPTH (mm) FROM - TO	THICKNESS (mm)	MATERIAL DESCRIPTION	TEXTURE	CONDITION	BINDER	AGGREGATE SIZE/TYPE	TAR PRESENCE INDICATED BY PAK TEST
1	0 - 55	55	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	55 - 106	51	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
3	106		Membrane					



Remarks: Core taken on structure. No DCP test possible. Bottom of core damaged while being extracted.



Core Number: **138 (Shift 7 Core 13)** GPS Northing: **424943.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: **558542.3** 

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION				SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 40	40	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	40 - 85	45	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	85+							



Remarks: Core taken on structure, no DCP test possible. Damage to core occurred during extraction by technician.



Core Number: **139(Shift 3 Core 17)** GPS Northing: **426806.2** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557471.3

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE CONDITION	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION		CONDITION		SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 46	46	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	46 - 102	56	Binder Course	Dense	Sound	Bituminous	20mm limestone	No
3	102 - 162	60	Binder Course	Dense	Sound	Bituminous	20mm limestone	No
4	162+		Membrane					



Remarks: Core taken on structure. Debonding at 46mm depth, between layers 1 & 2 occurred during extraction. No DCP test possible.



Core Number: **140 (Shift 3 Core 15)** GPS Northing: **426689.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557524.9

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION	TEXTURE			SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	36 - 92	56	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Whinstone	No
3	92 - 103	11	HRA Sand Carpet	Dense	Sound	Bituminous		No
4	103+		Membrane					



Remarks: Core taken on structure. No DCP test possible.



Core Number: 141 (Shift 3 Core 12) GPS Northing: 426528 Surface Condition: Sound Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557599.3

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION				SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 52	52	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
5	52 - 103	51	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Various	No
6	103 - 115	12	HRA Sand Carpet	Dense	Sound	Bituminous		No
7	115+		Membrane					



Remarks: Core taken on structure. No DCP test possible.



Core Number: 142 (Shift 2 Core 9)

Position: Northbound Carriageway, Lane 2, Off Side Wheel Path

GPS Northing: 427143.7 GPS East

GPS Easting: 557305.6

Surface Condition: Some Transverse & Longitudinal Cracking

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION	TEXTURE			SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Broken	Bituminous	10mm Crushed Rock	No
2	28 - 65	37	Binder Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	65 - 183	118	Binder Course	Medium/dense	Sound	Bituminous	20mm Limestone	No
4	183 - 318	135	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	318+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 28mm depth, between layers 1 & 2. No DCP test carried out due to possible structure below.



Core Number: **143 (Shift 3 Core 4)** GPS Northing: **424888.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path (Junction 67 Bridge Deck) GPS Easting: 558562.6

LAYER	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION				SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 35	35	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	35 - 102	67	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	102 - 142	40	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	142+		Membrane					



Remarks: Core taken on structure. No DCP test possible.



Core Number: 144 (Shift 4 Core 2) GPS Northing: 427151.6 Surface Condition: Sound Position: Southbound Carriageway, Junction 66 On Slip/Lane 1, Near Side Wheel Path\* GPS Easting: 557321.4

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEXTORE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	28 - 49	21	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	49 - 59	10	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
4	59 - 112	53	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
5	112 - 191	79	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
6	191 - 273	82	Concrete	Medium/Dense	Some Stripping	Cement	28mm Various	No
7	273 - 462	189	Concrete	Dense	Sound	Cement	40mm Various	No



\* Core position moved from lane 2 to lane 1 due to Traffic Management limitations.

Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Core debonded prior to extraction at 191 & 273mm depth, between layers 5 & 6 and 6 & 7. No DCP test possible.


Core Number: **145 (Shift 6 Core 14)** GPS Northing: **426797.2** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557453.2

ΙΔYFR	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE CONDITION B			AGGREGATE	TAR PRESENCE
	FROM - TO (mm) DESCRIPTION TEXTORE CONDITION BINDE		DINDER	SIZE/TYPE	INDICATED BY PAK TEST			
1	0 - 44	44	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	44 - 96	52	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	96 - 185	89	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	185+		Membrane					



Remarks: Core taken on a structure, no DCP test possible.



Core Number: **146 (Shift 6 Core 15)** GPS Northing: **426677.9** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557505.3

	DEPTH (mm)	THICKNESS	MATERIAL				AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 53	53	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	53 - 97	44	HRA Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	97 - 105	8	HRA Sand Carpet	Dense	Sound	Bituminous		No
4	105+		Membrane					



Remarks: Core taken on a structure, no DCP test possible.



Core Number: **147 (Shift 6 Core 17)** GPS Northing: **426527.3** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557574.4

LAYER DEPTH (mm) FROM - TO	DEPTH (mm)	THICKNESS	MATERIAL				AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	36 - 107	71	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Limestone	No
3	107 - 112	5	HRA Sand Carpet	Dense	Sound	Bituminous		No
4	112+		Membrane					



Remarks: Core taken on a structure, no DCP test possible.



Core Number: **148 (Shift 7 Core 11)** GPS Northing: **425020.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: **558539.6** 

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE			AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 47	47	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	47 - 78	31	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	78+		Membrane					



Remarks: Core taken on structure, no DCP test possible.



Core Number: **149 (Shift 6 Core 1)** GPS Northing: **428165.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 65 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 556463.9

	DEPTH (mm)	EPTH (mm) THICKNESS MATERIAL TEXTURE CONDITION BINDER			AGGREGATE	TAR PRESENCE		
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 4	4	High Friction Surfacing	Dense	Sound	Bituminous	1mm Bauxite	No
2	4 - 47	43	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	47 - 73	26	Binder Course	Dense	Sound	Bituminous	14mm Limestone	No
4	73 - 130	57	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
5	130 - 193	63	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
6	193+		Granular Base				>40mm Limestone	



Remarks: Core recovered Intact.





Highways Division Laboratory

Bassington Drive, Cramlington, Northumberland, NE23 8AJ

Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Client :	Central Alliance	Test Method:	DMRB IAN 73/06
chent .	Alliance House Wakefield	Report Date:	17/07/2018
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 149 (Shift 6 Core 1)	Core Depth:	193mm
Material:	Granular Base Material	DCP Test Start Depth:	193mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2.48-1.057\*10910P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
193	293	100	293	27	3.7	1.9	75.7
293	298	5	298	77	0.1	3.5	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

(/) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **150 (Shift 6 Core 11)** GPS Northing: **428054.3** Surface Condition: **Sound**  Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 556772.0

	DEPTH (mm)	THICKNESS	IESS MATERIAL TEXTURE CONDITION BINDER		AGGREGATE	TAR PRESENCE		
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 27	27	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	27 - 56	29	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	56 - 162	106	HRA Binder Course	Dense	Sound	Bituminous	20mm Slag	No
4	162 - 247	85	HRA Binder Course	Dense	Sound	Bituminous	20mm Various	No
5	247 - 332	85	Binder Course	Dense	Stripped at base	Bituminous	20mm Limestone	No
6	332+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 162mm depth, between layers 3 & 4. Other debonding at 247mm depth between layers 4 & 5 occurred in transit to laboratory.





Highways Division Laboratory Bassington Drive, Cramlington, Northumberland, NE23 8AJ <u>Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk</u>

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 150 (Shift 6 Core 11)	Core Depth:	332mm
Material:	Granular Base Material	DCP Test Start Depth:	332mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

			per blow.					
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
332	349	17	349	9	1.9	2.2	>100	
349	354	5	354	49	0.1	3.4	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager ) P Fletcher, Senior Technician

Core Number: **151 (Shift 6 Core 5)** GPS Northing: **427714** Surface Condition: **Sound**  Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 556975.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO (mm) DESCRIP		DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 29	29	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	29 - 58	29	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	58 - 133	75	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	133 - 220	87	Base Course	Dense	Sound	Bituminous	28mm Various	No
5	220 - 265	45	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
6	265 - 352	87	HRA Binder Corse	Dense	Sound	Bituminous	20mm Various	No
7	352 - 400	48	HRA Binder Corse	N/A	Stripped/Disintegrated	Bituminous	20mm Various	No
8	400 - 553	153	HRA Base Course	Dense	Sound	Bituminous	40mm Various	No
9	553+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 220 and 400mm, between layers 4 & 5 and 7 & 8. Layer 7 disintegrated prior to extraction. Granular Base material possibly disintegrated concrete.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 151 (Shift 6 Core 5)	Core Depth:	553mm
Material:	Granular Base Material	DCP Test Start Depth:	553mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow

				e penetration rate in min per blow.				
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
553	583	30	583	3	10.0	1.4	26.5	
583	626	43	626	89	0.5	2.8	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **152 (Shift 6 Core 7)** GPS Northing: **427367.1** Surface Condition: **Sound**  Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 557174.7

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	RINDER	AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 44	44	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	44 - 86	42	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	86 - 162	76	HRA Binder Course	Dense	Sound	Bituminous	20mm Various	No
4	162 - 218	56	Bound Base	Dense	Sound	Tar Bound	28mm Slag	Yes
5	218 - 287	69	Bound Base	Dense	Sound	Tar Bound	28mm Slag	Yes
6	287 - 370	83	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
7	370 - 527	157	Concrete	Medium/Dense	Stripped at base	Cement	40mm Various	No
8	527+		Granular Base				>40mm Colliery Shale	



Remarks: Debonded prior to extraction at 370mm depth, between layers 6 & 7.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01	
	Control Allinea	Test Method:	DMRB IAN 73/06	
Client :	Alliance House Wakefield	Report Date:	18/07/2018	
	WF2 0XJ	Date Sampled:	11/06/2018	
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson	
Location:	Core 152 (Shift 6 Core 7)	Core Depth:	527mm	
Material:	Granular Base Material	DCP Test Start Depth:	527mm	
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson	



\*CBR =  $10^{(2.48-1.057 \times \log 10P)}$  Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
527	867	340	867	36	9.4	1.4	28.1

Comments: Unable to reach desired depth due to no extra rods being available.



Core Number: **153 (Shift 6 Core 12)** GPS Northing: **427015.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557364.2

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	DINIDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 50	50	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	50 - 98	48	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	98 - 200	102	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	200 - 311	111	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
5	311+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Clinet.	6	Test Method:	DMRB IAN 73/06
Client :	Alliance House Wakefield	Report Date:	18/07/2018
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 153 (Shift 6 Core 12)	Core Depth:	311mm
Material:	Granular Base Material	DCP Test Start Depth:	311mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2-48-1-057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

the period					ruce in mini	Der Diow.	
De	pth	Layer	Total	Total	mm per		CBD*
From	То	Thickness	Depth	No of Blows	blow	LOG CDIN	CDN
311	336	25	336	4	6.3	1.6	43.5
336	388	52	388	141	0.4	2.9	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( / Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **154 (Shift 6 Core 16)** GPS Northing: **426647.0** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557519.2

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 40	40	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	40 - 103	63	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	103 - 176	73	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	176 - 285	109	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	285 - 364	79	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	364+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 176mm depth, between layers 3 & 4.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 154 (Shift 6 Core 16)	Core Depth:	364mm
Material:	Granular Base Material	DCP Test Start Depth:	364mm
Source of N	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

De	D						
From	ptn To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
364	394	30	394	4	7.5	1.6	35.9
394	461	67	461	141	0.5	2.8	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **155 (Shift 7 Core 1)** GPS Northing: **426293.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 On Slip, Lane 1, Near Side Wheel Path GPS Easting: 557705.4

LAYER	DEPTH (mm) FROM - TO	THICKNESS (mm)	MATERIAL DESCRIPTION	TEXTURE	CONDITION	BINDER	AGGREGATE SIZE/TYPE	TAR PRESENCE INDICATED BY PAK TEST
1	0 - 42	42	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	42 - 115	73	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	115 - 280	165	Concrete	Dense	Sound	Cement	28mm Various	No
4	280+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	19/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 155 (Shift 7 Core 1)	Core Depth:	280mm
Material:	Granular Base Material	DCP Test Start Depth:	280mm
Source of N	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2-48-1-057\* log10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
280	369	89	369	39	2.3	2.1	>100
369	425	56	425	104	0.9	2.5	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **156 (Shift 7 Core 5)** GPS Northing: **425994.7** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557970.0

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 37	37	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	37 - 107	70	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	107 - 186	79	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	186 - 273	87	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	273 - 378	105	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	378+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 186 & 273mm depths, between layers 3 & 4 and 4 & 5.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 156 (Shift 7 Core 5)	Core Depth:	378mm
Material:	Granular Base Material	DCP Test Start Depth:	378mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CRR = 10(2.48-1.057*.og10P)	Where P - The popetration rate in man	
CDN - 10	where $P = 1$ he penetration rate in mm pe	er blow.

-							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
378	414	36	414	6	6.0	1.7	45.4
414	454	40	454	53	0.9	2.6	>100
454	463	9	463	123	0.1	3.4	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

(/) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **157 (Shift 7 Core 7)** GPS Northing: **425741.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558278.9

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 34	34	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	34 - 94	60	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	94 - 171	77	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	171 - 246	75	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	246 - 340	94	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	340+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 157 (Shift 7 Core 7)	Core Depth:	340mm
Material:	Granular Base Material	DCP Test Start Depth:	340mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2.48-1.057 + Log10P)</sup> Where P = The penetration rate in mm per blow.

De	ماهم						
From	ptn To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
340	387	47	387	9	5.2	1.7	52.6
387	404	17	404	99	99 0.2		>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed: \_\_\_\_\_\_() Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **158 (Shift 7 Core 9)** GPS Northing: **425415.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558503.3

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 45	45	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	45 - 58	13	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	58 - 118	60	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	118 - 215	97	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
5	215 - 320	105	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
6	320+		Granular Base				>40mm Limestone	



Remarks: Debonding at 118mm depth, between layers 3 & 4 occurred in transit to laboratory.




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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 158 (Shift 7 Core 9)	Core Depth:	320mm
Material:	Granular Base Material	DCP Test Start Depth:	320mm
Source of M	aterial: N/K	J Anderson/J Wilson	



\*CBR = 10<sup>(2-48-1-057\* log10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
320	390	70	390	9	7.8	1.5	34.5	
390	451	61	451	101	0.7	2.7	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
 P Fletcher, Senior Technician

Core Number: **159 (Shift 7 Core 10)** GPS Northing: **425042.5** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: **558539.3** 

LAYER	DEPTH (mm) FROM - TO	THICKNESS (mm)	MATERIAL DESCRIPTION	TEXTURE	CONDITION	BINDER	AGGREGATE SIZE/TYPE	TAR PRESENCE
1	0 - 38	38	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	38 - 95	57	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
3	95+		Membrane					



Remarks: Core taken on structure, no DCP test possible.



Core Number: **159A (Shift 7 Core 12)** GPS Northing: **425049** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path. Approx. 5m East of Core 159 GPS Easting: 558542

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 42	42	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	42 - 87	45	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	87 - 116	29	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
4	116 - 147	31	HRA Surface Course	Dense	Sound	Bituminous	14mm Limestone	No
5	147 - 200	53	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
6	200 - 290	90	Base Course	Dense	Sound	Bituminous	28mm Limestone	No



Remarks: Core requested by engineer on site, to determine extent of concrete structure. Concrete found at 290mm depth, drilling stopped after discussion with engineer. Possible structure below, no DCP test carried out.



Core Number: 160 (Shift 8 Core 6) GPS Northing: 424621.2 Surface Condition: Sound Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558574.3

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 32	32	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	32 - 84	52	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	84 - 195	111	Base Course	Dense	Sound	Bituminous	28mm Whinstone	No
4	195 - 220	25	Bound Base	Medium/Dense	Sound	Tar Bound	28mm Whinstone	Yes
5	220 - 336	116	Bound Base	Dense	Stripped at base	Tar Bound	28mm Limestone	Yes



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate.



Core Number: **161 (Shift 8 Core 5)** GPS Northing: **424424.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: **558611.0** 

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 97	61	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	97 - 364	267	Concrete	Dense	Sound	Cement	20mm various	No
4	364+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 97mm depth, between layers 2 & 3.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	20/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	13/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 161 (Shift 8 Core 5)	Core Depth:	364mm
Material:	Granular Base Material	DCP Test Start Depth:	364mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

Depth		Layer	r Total		mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
364	477	113	477	17	6.6	1.6	40.8
477	484	7	484	47	0.2	3.1	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ) P Fletcher, Senior Technician

Core Number: 162 (Shift 6 Core 3) GPS Northing: 428182.1 Surface Condition: Sound Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 556705.3

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEXTORE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 47	11	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	47 - 120	73	HRA Binder Course	Medium/Dense	Sound	Bituminous	20mm Slag	No
4	120 - 190	70	HRA Base Course	Dense	Sound	Bituminous	40mm Various	No
5	190 - 258	68	HRA Base Course	Dense	Sound	Bituminous	40mm Various	No
6	258 - 340	82	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
7	340+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 120 & 258mm depths, between Layer 3 & 4 and 5 & 6.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Wakefield	Report Date:	18/07/2018
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 162 (Shift 6 Core 3)	Core Depth:	340mm
Material:	Granular Base Material	DCP Test Start Depth:	340mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10P)</sup>	Where P = The	penetration ra	ate in mm	per blow.
--	---------------	----------------	-----------	-----------

Depth		Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
340	365	25	365	5	5.0	1.7	55.1
365	376	11	376	45	0.3	3.1	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: 163 (Shift 6 Core 4) GPS Northing: 427886.1 Surface Condition: Sound Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 556876.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION	RINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 30	30	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	30 - 59	29	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	59 - 118	59	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Slag	No
4	118 - 180	62	Bound Base	Dense	Sound	Tar Bound	20mm Various	Yes
5	180 - 335	155	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
6	335+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 118mm depth, between layers 3 & 4.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 163 (Shift 6 Core 4)	Core Depth:	335mm
Material:	Granular Base Material	DCP Test Start Depth:	335mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow.

De	onth	Lawor	Total	Tatal			
From	То	Thickness	Depth	No of Blows	mm per blow	Log CBR	CBR*
335	378	43	378	10	4.3	1.8	64.6
378	431	53	431	110	0.5	2.8	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

. ( /) Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **164 (Shift 6 Core 6)** GPS Northing: **427539.6** Surface Condition: **Sound**  Position: Northbound Carriageway, Dedicated/Filter Lane, Near Side Wheel Path GPS Easting: 557076.3

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	28 - 57	29	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	57 - 134	77	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Various	No
4	134 - 202	68	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	202 - 299	97	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
6	299 - 397	98	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
7	397 - 563	166	Concrete	Dense	Some stripping	Cement	40mm Various	No
8	563+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 202 and 397mm depth, between layers 4 & 5 and 6 & 7. Granular Base material could possibly be disintegrated concrete.



## NORTHUMBERLAND

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Highways Division Laboratory

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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	11/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 164 (Shift 6 Core 6)	Core Depth:	563mm
Material:	Granular Base Material	DCP Test Start Depth:	563mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10F</sup>	<sup>)</sup> Where P = The	penetration	rate in mm per blow.
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the penetration rate in min per blow.							
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
563	620	57	620	9	6.3	1.6	42.9
620	662	42	662	54	0.9	2.5	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( 🖌 Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

Core Number: **165 (Shift 6 Core 8)** GPS Northing: **427194.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 66 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 557278.8

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	DINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 35	35	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	35 - 82	47	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	82 - 127	45	HRA Binder Course	Medium/Dense	Sound	Bituminous	20mm Various	No
4	127 - 194	67	Bound Base	Dense	Sound	Tar Bound	28mm Various	Yes
5	194+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
		Data Samuladi	11/06/2010
	WF2 0XJ	Date Sampled:	11/00/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 165 (Shift 6 Core 8)	Core Depth:	194mm
Material:	Granular Base Material	DCP Test Start Depth:	194mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2:48-1:05)</sup> * <sup>(00)</sup> Where P = The penetration rate in mm per blo
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De	pth	Layer	Layer Total Total mm per				
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
194	250	56	250	5	11.2	1.4	23.5
250	280	30	280	31	1.2	2.4	>100
280	285	5	285	76	0.1	3.5	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **166 (Shift 6 Core 13)** GPS Northing: **426829.4** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557439.7

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 45	9	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	45 - 100	55	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	100 - 169	69	Binder Course	Dense	Sound	Bituminous	20mm Various	No
5	169 - 260	91	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	260 - 372	112	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
7	372+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 166 (Shift 6 Core 13)	Core Depth:	372mm
Material:	Granular Base Material	DCP Test Start Depth:	372mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

0.	at h						
From	То	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
372	457	85	457	29	2.9	2.0	96.9
457	537	80	537	92	1.3	2.4	>100
537	603	66	603	167	0.9	2.5	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

(√ Martin Newton, Laboratory Manager
 ( ) P Fletcher, Senior Technician

Core Number: **167 (Shift 6 Core 18)** GPS Northing: **426464.9** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557605.6

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 38	38	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	38 - 79	41	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	79 - 165	86	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	165 - 262	97	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	262 - 357	95	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
7	357+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 165mm depth, between layers 3 & 4.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	18/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
<b>C</b> ite .	Ad Distante Cool Hause		
Site :	AT Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 167 (Shift 6 Core 18)	Core Depth:	357mm
Material:	Granular Base Material	DCP Test Start Depth:	357mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\* log10P)</sup> Where P = The penetration rate in mm per blow.

De	onth	Lawor	Total Total mm					
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*	
357	442	85	442	14	6.1	1.7	44.9	
442	483	41	483	79	0.6	2.7	>100	

#### Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
 P Fletcher, Senior Technician

Core Number: 168 (Shift 7 Core 3) GPS Northing: 426133.7 Surface Condition: Sound Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557831.5

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 33	33	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
2	33 - 75	42	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	75 - 192	117	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	192 - 304	112	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	304 - 411	107	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
6	411+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 304mm depth, between layers 4 & 5.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	19/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 168 (Shift 7 Core 3)	Core Depth:	411mm
Material:	Granular Base Material	DCP Test Start Depth:	411mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2-48-1-057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

Depth		Layer	Total	Total	mm per		000*
From	То	Thickness	Depth	No of Blows	blow	LOG CBR	CRK.
411	455	44	455	26	1.7	2.2	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **169 (Shift 7 Core 6)** GPS Northing: **425866.7** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: **558130.3** 

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 47	47	HRA Surface course	Dense	Sound	Bituminous	10mm Whinstone	No
2	47 - 110	63	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	110 - 192	82	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	192 - 290	98	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	290 - 368	78	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	368+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 192 & 290mm depths, between layers 3 & 4 and 4 & 5.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance Alliance House Wakefield	Report Date:	20/07/2018
	WF2 0XJ	Date Sampled:	12/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 169 (Shift 7 Core 6)	Core Depth:	368mm
Material:	Granular Base Material	DCP Test Start Depth:	368mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2+48-1+057\* log10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
368	463	95	463	17	5.6	1.7	49.0	
463	468	5	468	78	0.1	3.6	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **170 (Shift 8 Core 1)** GPS Northing: **425247.1** Surface Condition: **Sound**  Position: Northbound Carriageway, Junction 67 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 558528.0

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 27	27	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	27 - 41	14	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
3	41 - 95	54	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	95 - 182	87	Bound Base	Medium/Dense	Sound	Tar Bound	40mm Limestone	Yes
5	182 - 310	128	Bound Base	Medium/Dense	Sound	Tar Bound	40mm Limestone	Yes



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Debonding at 95mm depth, between layers 3 & 4 occurred in transit to laboratory.


Core Number: **171 (Shift 7 Core 14)** GPS Northing: **424821.2** Surface Condition: **Sound**  Position: Northbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558556.7

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTIDE	CONDITION		AGGREGATE	TAR PRESENCE
LATER	FROM - TO	(mm)	DESCRIPTION	TEATORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 25	25	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	25 - 84	59	Binder Course	Dense	Sound	Bituminous	20mm Various	No
3	84 - 210	126	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	210+		Membrane					



Remarks: Core taken on structure, no DCP test possible. Damage to core occurred during extraction by technician.



Core Number: **172 (Shift 3 Core 3)** GPS Northing: **424823.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558567.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 38	38	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	38 - 99	61	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	99 - 207	108	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	207 - 291	84	Concrete	Dense	Sound	Cement	20mm Limestone	No
5	291 - 416	125	Concrete	Dense	Sound	Cement	28mm Limestone	No
6	416+		Granular Base				>40mm Crushed Rock	



Remarks: Debonded prior to extraction at 207mm & 291mm, between layers 3 & 4 and 4 & 5.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 172 (Shift 3 Core 3)	Core Depth:	416mm
Material:	Granular Base Material	DCP Test Start Depth:	416mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*(og10P)</sup> Where P = The penetration rate in mm per blow.

De	oth	Laver	Total	Total			
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
416	435	19	435	3	6.3	1.6	42.9
435	484	49	484	35	1.5	2.3	>100
484	497	13	497	125	0.1	3.4	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **173 (Shift 2 Core 2)** GPS Northing: **425885.2** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558156.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 26	26	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	26 - 96	70	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	96 - 173	77	Base Course	Medium/Dense	Sound	Bituminous	28mm Limestone	No
4	173 - 268	95	Base Course	Medium/Dense	Sound	Bituminous	28mm Limestone	No
5	268 - 366	98	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	366+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 173mm & 263mm depth, between layers 3 & 4 and 4 & 5.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	05/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 173 (Shift 2 Core 2)	Core Depth:	366mm
Material:	Granular Base Material	DCP Test Start Depth:	366mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow.

		-	there i = the penetration rate in this per blow.					
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
366	386	20	386	5	4.0	1.8	69.8	
386	476	90	476	110	0.9	2.6	>100	
476	481	5	481	160	0.1	3.5	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager
 P Fletcher, Senior Technician

Core Number: **174 (Shift 2 Core 4)** GPS Northing: **426148.4** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 66 Off Slip, Lane 1, Near Side Wheel Path GPS Easting: 557856.5

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 48	48	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	48 - 112	64	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	112 - 215	103	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	215 - 298	83	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	298 - 382	84	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
6	382+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact. Debonding occurred in transit to laboratory.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	05/06/2018
Site ·	A1 Birtlay to Cool House	Consultation of the second	
Site :	At Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 174 (Shift 2 Core 4)	Core Depth:	382mm
Material:	Granular Base Material	DCP Test Start Depth:	382mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow.

-								
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
382	460	78	460	14	5.6	1.7	49.1	
460	563	103	563	64	2.1	2.1	>100	
563	574	11	574	124	0.2	3.3	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **175 (Shift 3 Core 11)** GPS Northing: **426473.5** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, near Side Wheel Path GPS Easting: 557626.8

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 18	18	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	18 - 106	88	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	106 - 178	72	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	178 - 266	88	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	266 - 367	101	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
7	367+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 175 (Shift 3 Core 11)	Core Depth:	367mm
Material:	Granular Base Material	DCP Test Start Depth:	367mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = 10<sup>(2.48-1.057\*log10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
367	449	82	449	14	5.9	1.7	46.6
449	493	44	493	84	0.6	2.7	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **176 (Shift 3 Core 17)** GPS Northing: **426835.9** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557457.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	DINIDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 26	26	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	26 - 52	26	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	52 - 102	50	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	102 - 182	80	Base Course	Dense	Sound	Bituminous	40mm Limestone	No
5	182+		Membrane					



Remarks: Core taken on structure. No DCP test possible.



Core Number: **177 (Shift 4 Core 3)** GPS Northing: **427202.5** Surface Condition: **Sound**  Position: Southbound Carriageway, Junction 66 On Slip/Lane 1, Centre GPS Easting: 557298.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	28 - 56	28	Surface Course	Medium/Dense	Sound	Bituminous	10mm Crushed Rock	No
3	56 - 94	38	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	94 - 205	111	Bound Base	Dense	Sound	Tar Bound	28mm various	Yes
5	205 - 395	180	Concrete	Medium/Dense	Sound	Cement	40mm Various	No
6	395 - 463	68	Concrete	Medium/Dense	Some Stripping	Cement	20mm Various	No



Remarks: Drilled to 750mm but were unable to recover core. The material in the hole was still bonded and too hard to hand excavate. Debonded prior to excavation at 205 & 395mm depth, between layers 4 & 5 and 5 & 6. No DCP test possible.



Core Number: **178** GPS Northing: **427537.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557105.9

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 34	34	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	34 - 66	32	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	66 - 81	15	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
4	81 - 118	37	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
5	118 - 177	59	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
6	177 - 298	121	Bound Base	Dense	Sound	Tar Bound	40mm Various	Yes
7	298 - 362	64	Bound Base	Medium/Dense	Sound	Tar Bound	40mm Various	Yes
8	362 - 560	198	Concrete	Medium/Open	Stripped at base	Cement	40mm Various	No
9	560+		Granular Base				>40mm Colliery Shale	



Remarks: Debonded prior to extraction at 177mm & 362mm depth, between layers 5 & 6 and 7 & 8.





## COUNTY COUNCIL

Highways Division Laboratory

Bassington Drive, Cramlington, Northumberland, NE23 8AJ

Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
<b></b>			
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 178 (Shift 4 Core 4)	Core Depth:	560mm
2000000		core Deptil.	5001111
Material:	Granular Base Material	DCP Test Start Depth:	560mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

					· · · · · · · · · · · · · · · · · · ·	JCI 01044.	
Depth From To		Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
560	873	313	873	29	10.8	1.4	24.4

Comments: Unable to reach desired depth due to no further rods being available.

Signed:

(√) Martin Newton, Laboratory Manager
 ( ) P Fletcher, Senior Technician

Core Number: **179 (Shift 4 Core 6)** GPS Northing: **427882.3** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 556908.0

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION	PINIDED	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 68	32	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	68 - 122	54	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Limestone	No
4	122 - 181	59	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	28mm Limestone	No
5	181 - 262	81	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	28mm Limestone	No
6	262 - 370	108	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	40mm limestone	No
7	370 - 655	285	Concrete	Dense	Sound	Cement	>40mm Various	No
8	655+		Granular Base				>40mm Colliery Shale	



Remarks: Debonded prior to extraction at 361mm depth, between layers 6 & 7.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 179 (Shift 4 Core 6)	Core Depth:	628mm
Material:	Granular Base Material	DCP Test Start Depth:	628mm
Source of Ma	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
628	878	250	878	29	8.6	1.5	31.0

Comments: Unable to reach desired depth due to no further rods being available.



Core Number: **180 (Shift 3 Core 6)** GPS Northing: **425045.0** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 558557.0

	DEPTH (mm)	THICKNESS	MATERIAL	TEXTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 25	25	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	25 - 72	47	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	72 - 95	23	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	95 - 119	24	<b>HRA Binder Course</b>	Dense	Sound	Bituminous	20mm Whinstone	No
5	119 - 192	73	Binder Course	Dense	Sound	Bituminous	28mm Limestone	No
6	192 - 272	80	Binder Course	Dense	Sound	Bituminous	28mm Limestone	No
7	272 - 500	228	Concrete	Dense	Sound	Cement	40mm limestone	No
8	500+		Granular Base				>40mm Crushed Rock	



Remarks: Debonded prior to extraction at 272mm depth, between layers 6 & 7.



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	06/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 180 (Shift 3 Core 6)	Core Depth:	500mm
Material:	Granular Base Material	DCP Test Start Depth:	500mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2.48-1.057*log10P)</sup>	Where P = The p	penetration rate	in mm per blow.

Depth		Layer	Total	Total	mm per		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
500	541	41	541	20	2.1	2.2	>100
541	575	34	575	120	0.3	3.0	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( ) Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

Core Number: **181 (Shift 3 Core 8)** GPS Northing: **425420.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Channel (Adjacent Allerdene Railway Underbridge) GPS Easting: 558523.3

LAVER	DEPTH (mm)	THICKNESS	MATERIAL	TEXTURE		BINDER	AGGREGATE	TAR PRESENCE
	FROM - TO	(mm)	DESCRIPTION	TEXTORE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Medium/Dense	Sound	Bituminous	10mm Whinstone	No
2	36 - 152	116	HRA Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	152 - 275	123	Base Course	Dense	Stripped at base	Bituminous	40mm Slag	No
4	275+		Membrane					



Remarks: Core taken on possible structure. No DCP test possible. Bottom of core damaged while being extracted.



Core Number: **182 (Shift 2 Core 1)** GPS Northing: **425749.6** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 3, Off Side Wheel Path GPS Easting: 558297.7

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	CONDITION BINDER SIZE/TYPE		INDICATED BY PAK TEST
1	0 - 45	45	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	45 - 104	59	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	104 - 183	79	Base Course	Medium/Dense	Sound	Bituminous	28mm Limestone	No
4	183 - 296	113	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	296 - 372	76	Base Course	Medium/Dense	Sound	Bituminous	28mm Limestone	No
6	372+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact. Debonding at 183mm depth, between layers 3 & 4 occurred in transit to laboratory.





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Report:	Dynamic Cone Penetrometer	Lab ref:	R0534/01
	DMRB IAN 73/06	Tost Mothod	
Client :	Central Alliance	rest Method:	DIVIRBIAN 73/06
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	05/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 182 (Shift 2 Core 1)	Core Depth:	372mm
Material:	Granular Base Material	DCP Test Start Depth:	372mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



*CBR = 10 <sup>(2-48-1-057*(og10P)</sup> Where P = The penetration rate in mm per blo
---

Depth		Laver	Total	Total	mm ner		
From	То	Thickness	Depth	No of Blows	blow	Log CBR	CBR*
372	402	30	402	6	5.0	1.7	55.1
402	457	55	457	62	1.0	2.5	>100
457	461	4	461	112	0.1	3.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( A) Martin Newton, Laboratory Manager
 ( ) P Fletcher, Senior Technician

5

Core Number: 183 (Shift 5 Core 1) GPS Northing: 426299.2 Surface Condition: Sound Position: Southbound Carriageway, Lane 3, Off Side Wheel Path GPS Easting: 557721.7

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	36 - 95	59	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
3	95 - 190	95	Base Course	Dense	Sound	Bituminous	28mm limestone	No
4	190 - 318	128	Base Course	Dense	Sound	Bituminous	28mm limestone	No
5	318 - 350	32	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
6	350+		Granular Base				>40mm Limestone	



Remarks: Core recovered intact.



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**Highways Division Laboratory** 

Bassington Drive, Cramlington, Northumberland, NE23 8AJ

Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
<b></b>		Test Method:	DMRB IAN 73/06
Client :	Central Alliance Alliance House	Roport Date:	16/07/2010
	Wakefield	Report Date.	10/07/2018
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 183 (Shift 5 Core 1)	Core Depth:	350mm
Material:	Granular Base Material	DCP Test Start Depth:	350mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson

Source of Material: N/K



#### \*CDD - 10(2.48-1.057\*10910P) 14/1- --- D ----

CDIT = 10			there i = the penetration rate in mm per blow.				
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*
350	383	33	383	7	4.7	1.8	58.6
383	387	4	387	57	0.1	3.6	>100

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:
## REPORT ID NO: R0534/01

Core Number: **184 (Shift 3 Core 14)** GPS Northing: **426654.4** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Near Side Wheel Path GPS Easting: 557540.8

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 20	20	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	20 - 109	89	Binder Course	Medium/Dense	Sound	Bituminous	20mm Limestone	No
3	109 - 190	81	Base course	Dense	Sound	Bituminous	28mm Limestone	No
4	190 - 262	72	Base course	Dense	Sound	Bituminous	28mm Limestone	No
5	262 - 365	103	Base course	Dense	Sound	Bituminous	40mm Limestone	No
7	365+		Granular Base				>40mm Limestone	



Remarks: Debonded prior to extraction at 190mm depth, between layers 3 & 4.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	05/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 184 (Shift 3 Core 14)	Core Depth:	365mm
Material:	Granular Base Material	DCP Test Start Depth:	365mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow.

		_	The penetration rate in him per blow.					
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
365	423	58	423	10	5.8	1.7	47.1	
423	450	27	450	82	0.4	2.9	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

Signed:

( Martin Newton, Laboratory Manager () P Fletcher, Senior Technician

### **REPORT ID NO: R0534/01**

Core Number: **185 (Shift 5 Core 2)** GPS Northing: **427018.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 2, Off Side Wheel Path GPS Easting: 557376.0

LAYER DEPTH (mm) THIC	THICKNESS	MATERIAL	TENTUDE	CONDITION		AGGREGATE	TAR PRESENCE	
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 35	35	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	35 - 89	54	Binder Course	Dense	Sound	Bituminous	20mm Whinstone	No
3	89 - 200	111	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
4	200 - 340	140	Base Course	Dense	Sound	Bituminous	28mm Limestone	No
5	340 - 502	162	Concrete	Dense	Sound	Cement	40mm Various	No
6	502+		Granular Base				>40mm Colliery Shale	



Remarks: Debonded prior to extraction at 340mm depth, between layers 4 & 5. Other debonding at 35mm depth, between layers 1 & 2 occurred in transit to laboratory.



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Highways Division Laboratory

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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance		
	Alliance House	Report Date:	16/07/2018
	Wakefield		
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 185 (Shift 5 Core 2)	Core Depth:	502mm
Material:	Granular Base Material	DCP Test Start Depth:	502mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2.48-1.057\*tog10P)</sup> Where P = The penetration rate in mm per blow.

De From	pth To	Layer Thickness	Total	Total	mm per	Log CBR	CBR*
502	743	241	743	41	5.9	1.7	46.4

Comments: Unable to reach desired depth due to no extra rods being available.

Signed:

( / Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

### **REPORT ID NO: R0534/01**

Core Number: **186 (Shift 5 Core 3)** GPS Northing: **427372.1** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 3, Off Side Wheel Path GPS Easting: 557189.6

	DEPTH (mm)	THICKNESS	MATERIAL	TEVTUDE	CONDITION		AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 28	28	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	28 - 55	27	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
3	55 - 112	57	Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	112 - 185	73	Bound Base	Dense	Sound	Tar Bound	28mm Limestone	Yes
5	185 - 275	90	Bound Base	Medium/Open	Sound	Tar Bound	28mm Slag	Yes
6	275 - 345	70	Bound Base	Dense	Sound	Tar Bound	20mm Various	Yes
7	345 - 460	115	Concrete	Medium/Dense	Stripped at base	Cement	40mm Various	No
8	460+		Granular Base				>40mm Various	



Remarks: Debonded prior to extraction at 345mm depth, between layers 6 & 7. Other debonding at 112mm depth, between layers 3 & 4 occurred in transit to laboratory.



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Tel (01670) 737575 - Fax (01670) 832044 - Email highwayslaboratory@northumberland.gov.uk

Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance Alliance House Wakefield	Report Date:	16/07/2018
	WF2 0XJ	Date Sampled:	08/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 186 (Shift 5 Core 3)	Core Depth:	460mm
Material:	Granular Base Material	DCP Test Start Depth:	460mm
Source of M	laterial: N/K	Test Conducted by:	J Anderson/J Wilson



#### \*CBR = $10^{(2.48-1.057*\log 10P)}$ Where P = The penetration rate in mm per blow.

			there i = the penetration rate in him per blow.					
De From	pth To	Layer Thickness	Total Depth	Total No of Blows	mm per blow	Log CBR	CBR*	
460	508	48	508	14	3.4	1.9	82.1	
508	543	35	543	84	0.5	2.8	>100	

Comments: Unable to reach desired depth due to the nature of the material. No extra rods were used.

## REPORT ID NO: R0534/01

Core Number: **187 (Shift 4 Core 5)** GPS Northing: **427723.0** Surface Condition: **Sound**  Position: Southbound Carriageway, Lane 1, Off Side Wheel Path GPS Easting: 556997.3

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 36	36	Surface Course	Dense	Sound	Bituminous	10mm Crushed Rock	No
2	36 - 68	32	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	68 - 122	54	HRA Binder Course	Dense	Sound	Bituminous	20mm Limestone	No
4	122 - 181	59	HRA Binder Course	Dense	Sound	Bituminous	28mm Limestone	No
5	181 - 262	81	HRA Binder Course	Dense	Sound	Bituminous	28mm Limestone	No
6	262 - 370	108	HRA Binder Course	Dense	Sound	Bituminous	40mm Limestone	No
7	370 - 655	285	Concrete	Medium/Dense	Sound	Bituminous	>40mm Various	No
8	655+		Granular Base				>40mm Colliery Shale	



Remarks: Debonded prior to extraction at 370mm depth, between layers 6 & 7.





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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
Client :	Central Alliance	Test Method:	DMRB IAN 73/06
	Alliance House Wakefield	Report Date:	05/07/2018
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 187 (Shift 4 Core 5)	Core Depth:	655mm
Material:	Granular Base Material	DCP Test Start Depth:	655mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR = 10<sup>(2-48-1-057\*log10P)</sup> Where P = The penetration rate in mm per blow.

Depth From To		Layer Thickness	Layer Total Total Thickness Depth No of Blows		mm per blow		CBR*	
655	879	224	879	20	11.2	1.4	23.5	

Comments: Unable to reach desired depth due to no further rods being available.

Signed:

( Martin Newton, Laboratory Manager ( ) P Fletcher, Senior Technician

## **REPORT ID NO: R0534/01**

Core Number: **188 (Shift 4 Core 7)** GPS Northing: **428071.7** Surface Condition: **Sound**  Position: Southbound Carriageway, Hard Shoulder, Near Side Wheel Path GPS Easting: 556800.1

	DEPTH (mm)	THICKNESS	MATERIAL	TENTUDE	CONDITION	BINDER	AGGREGATE	TAR PRESENCE
LAYER	FROM - TO	(mm)	DESCRIPTION	TEXTURE	CONDITION	BINDER	SIZE/TYPE	INDICATED BY PAK TEST
1	0 - 40	40	HRA Surface Course	Dense	Sound	Bituminous	14mm Whinstone	No
2	40 - 58	18	HRA Surface Course	Dense	Sound	Bituminous	10mm Whinstone	No
3	58 - 175	117	HRA Binder Course	Medium/Open	Sound	Bituminous	20mm Various	No
4	175 - 365	190	Base Course	Medium/Dense	Sound	Bituminous	28mm Various	No
5	365 - 590	225	Concrete	Dense	Sound	Cement	>40mm Various	No
6	590+		Granular Base				>40mm Colliery Shale	



Remarks: **Debonded prior to extraction at 365mm depth, between layers 4 & 5.** 



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Report:	Dynamic Cone Penetrometer DMRB IAN 73/06	Lab ref:	R0534/01
		Test Method:	DMRB IAN 73/06
Client :	Central Alliance	Panart Data	05/07/2019
	Wakefield	Report Date:	05/07/2018
	WF2 0XJ	Date Sampled:	07/06/2018
Site :	A1 Birtley to Coal House	Sampled by:	J.Anderson
Location:	Core 188 (Shift 4 Core 7)	Core Depth:	590mm
Material:	Granular Base Material	DCP Test Start Depth:	590mm
Source of M	aterial: N/K	Test Conducted by:	J Anderson/J Wilson



\*CBR =  $10^{(2-48-1-057 \times \log 10P)}$  Where P = The penetration rate in mm per blow.

De	pth	Layer	Total	Total	mm per	1	00.04
From	То	Thickness	Depth	No of Blows	blow	LOG CBK	CBK*
590	890	300	890	34	8.8	1.5	30.2

Comments: Unable to reach desired depth due to no further rods being available.

Signed:

(√) Martin Newton, Laboratory Manager
 ( ) P Fletcher, Senior Technician

# APPENDIX G GROUNDWATER MONITORING RESULTS





Client:				Job No:				Instrume	ents Used:					
Project Name:				Date:				Make / N	lodel :					
Weather:				Monitore	ed By:			Serial Nu	mber:					
					머ㅁ									
W\$17/15	$\geq$	$\square$	$\geq$	$\geq$										
WS17/16														
												1		
BH17/05														
BH17-14														
BH17-15											1.67	9.74		
BH17-17											6.00	19.40		
BH17-18A											6.89	26.80		
BH17-20											7.30	14.60		
BH17-24									$\sim$		DRY	17.35		
BH17-25	$\sim$										23.63	28.85		
BH17-75											1.55	3.00		

CTITAG (2) (111011111) (111011111) (1110112) (11101110) (2) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (11101110) (1110110) (1110110) (1110110) (1110110) (1110110) (1110110) (1110110) (11100) (11100) (1100) (1100) (1100) (1100) (1100) (1100) (11100) (11





Client:				Job No:				Instrume	ents Used:						
Project Name:				Date:				Make / M	lodel :						
Weather:				Monitore	d By:			Serial Nu	imber:						
														mart	
								шица							
														1	
W\$17/15		$\geq$	$\langle$	$\geq$			$\geq$			$\langle$					
WS17/16		$\sim$													
														i l	
BH17/05		$\geq$													
BH17-14		$\geq$													
BH17-15				$\backslash$								1.73	9.74		
BH17-17		$\geq$										6.20	19.40		
BH17-18A		$\geq$										6.55	26.80		
BH17-20												7.10	14.60		
BH17-24												DRY	17.35		
BH17-25		$\geq$	$\geq$				$\searrow$			$\sim$		23.50	28.90		
BH17-27B										$\sim$		DRY	10.80		
BH17-75												1.40	3.00		





Client:					Job No:						Instrume	ents Used:							
Project Name:					Date:						Make / N	lodel :							
Weather:					Monitore	d By:					Serial Nu	mber:							
					<b>D</b>					r									
											_								
																			1
W\$17/15		$\sim$								$\sim$	$\sim$								
W\$17/16		$\sim$				$\sim$				$\sim$		$\sim$						$\sim$	
	-		-	-	-		-	-	-				-	-	-				
BH17/05		$\sim$								$\sim$									
BH17-14	$\sim$	$\sim$			$\sim$	$\sim$	$\sim$								$\sim$			$\sim$	
BH17-15																1.85	9.80	$\sim$	
BH17-17																6.10	19.40	$\sim$	
BH17-18A	$\sim$	$\sim$			$\sim$	$\sim$									$\sim$	7.53	26.78	$\sim$	
BH17-20	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$			$\sim$		$\sim$	$\sim$	7.10	14.64	$\sim$	
BH17-24																DRY	17.35	$\sim$	
BH17-25		$\sim$														23.34	28.90		
BH17-27B																DRY	10.80	$\sim$	
BH17-54										$\sim$	$\sim$					0.63	3.75	$\sim$	
BH17-75										$\sim$	$\sim$					1.44	3.00	$\sim$	





Client:				Job No:				Instrume	ents Used:					
Project Name:				Date:				Make / N	lodel :					
Weather:				Monitore	ed By:			Serial Nu	mber:					
				다										
														1
														1
W\$17/15														
WS17/16														
BH17/05														
BH17-14														
BH17-15							$\sim$				$\sim$	2.09	9.70	
BH17-17												5.96	19.30	l
BH17-18A												8.03	26.70	1
BH17-20		$\backslash$						$\backslash$				7.10	14.60	1
BH17-22												18.88	26.60	
BH17-24												DRY	17.35	1
BH17-25		$\geq$			$\sim$	$\sim$		$\geq$			$\sim$	23.64	28.75	
BH17-27B	$\geq$		$\geq$									DRY	10.73	
BH17-54	$\sim$											1.08	3.68	
BH17-75												1.42	2.90	





Client:					Job No:				Instrume	ents Used:						
Project Name:					Date:		3/11/11		Make / N	lodel :						
Weather:					Monitore	d By:			Serial Nu	imber:						
											mana					
W\$17/15																
W\$17/16																
BH17/05		$\geq$	$\geq$				$\geq$	$\square$	$\square$			$\sim$				
BH17-14			$\square$										$\langle$			
BH17-15			$\backslash$	$\sim$								$\sim$		2.13	9.66	
BH17-17														6.00	19.30	
BH17-18A														8.10	26.70	
BH17-20							$\backslash$	$\langle$	$\backslash$					7.04	14.58	
BH17-22														18.93	26.62	
BH17-24														DRY	17.38	
BH17-25				$\backslash$			$\backslash$	$\backslash$	$\backslash$					23.59	28.73	
BH17-27B														DRY	10.75	
BH17-37														DRY	3.70	
BH17-54														1.29	3.65	
BH17-75														1.52	2.93	





Client:					Job No:						Instrume	ents Used:							
Project Name:					Date:						Make / N	lodel :							
Weather:					Monitore	d By:					Serial Nu	imber:							
				היית חריים															
											படிப்ப								
W\$17/15	$\sim$												$\sim$	$\sim$					
WS17/16				$\sim$					$\sim$		$\sim$		$\langle$	$\sim$				$\sim$	
BH17/05	$\sim$	$\sim$	$\sim$	$\leq$	$\leq$	$\sim$	$\sim$	$\sim$				$\sim$		$\sim$				$\sim$	
BH17-14	$\sim$			$\sim$	$\sim$	$\sim$		$\sim$	$\sim$		$\sim$	$\sim$		$\leq$				$\sim$	
BH17-15	$\sim$	$\sim$	$\sim$	$\sim$	$\leq$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$		$\leq$	$\sim$	3.02	9.68	$\sim$	
BH17-17	$\sim$	$\sim$	$\sim$	$\leq$	$\leq$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$		$\sim$		5.93	19.27	$\sim$	
BH17-18A	$\sim$	$\sim$	$\sim$	$\sim$	$\leq$	$\sim$		$\sim$			$\sim$	$\sim$		$\sim$		8.03	26.71	$\sim$	
BH17-20	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$	$\sim$		$\sim$		7.56	14.66	$\sim$	
BH17-22	$\sim$	$\sim$	$\sim$	$\leq$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$		$\leq$		18.94	26.65	$\sim$	
BH17-24	$\sim$	$\sim$	$\sim$	$\leq$	$\leq$	$\sim$	$\sim$	$\sim$				$\sim$		$\sim$		DRY	17.42	$\sim$	
BH17-25	$\sim$	$\sim$	$\sim$	$\leq$	$\leq$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$		$\leq$	$\sim$	23.64	28.73	$\sim$	
BH17-27B	$\sim$	$\sim$	$\sim$	$\leq$	$\leq$	$\sim$	$\sim$	$\sim$	$\sim$			$\sim$		$\sim$		DRY	10.70	$\sim$	
BH17-37						$\sim$		$\sim$		$\sim$			$\sim$	$\leq$		DRY	3.82	$\sim$	ļ
BH17-50	$\sim$			$\sim$										$\sim$		4.38	5.90	$\sim$	ļ
BH17-54				$\sim$	$\sim$											1.10	3.65		ļ
BH17-75																1.63	2.85		

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Client:			Job No:				Instrume	ents Used:				
Project Name:			Date:				Make / M	lodel :				
Weather:			Monitore	d By:			Serial Nu	mber:				
			다			ruuu						
W\$17/15	$\langle$				$\langle$	$\langle$						
W\$17/16												
BH17/05	$\sim$											
BH17-14												
BH17-15										2.96	9.65	
BH17-17	$\langle$	$\sim$	$\langle$							5.75	19.25	
BH17-18A										8.08	26.70	
BH17-20										7.70	14.65	
BH17-22										18.90	26.63	
BH17-24						$\sim$				DRY	17.40	
BH17-25	$\sim$	$\sim$								23.55	28.75	
BH17-27B	$\sim$			$\sim$				$\sim$		DRY	10.70	
BH17-37	$\sim$			$\sim$	$\sim$	$\sim$		$\sim$		DRY	3.83	
BH17-50	$\geq$			$\sim$	$\sim$	$\sim$				4.65	5.90	
BH17-54						$\sim$		$\sim$		1.26	3.65	
BH17-75	$\sim$									1.77	2.80	

כבור תת תחת עבור (כמוכות עב) 63 (קת ת נוכנו) (63 (קת עבור בז) כבו כבורת) (כת ער עד תות עבור) (לת באת ת ער עבוב

ברב התחת התחדרות הביו להתבנה הבתה הכורה (ברבות הברב) ברבות להתבור הביו הכורה הבת הביו הביו לב had cal





Client:				Job No:						Instrume	ents Used:							
Project Name:				Date:						Make / M	Nodel :							
Weather:				Monitore	ed By:					Serial Nu	imber:							
					۵C													
									ruuu									
								mee									mart	
																		l
W\$17/15	$\langle$		$\langle$		$\geq$		$\geq$			$\geq$			$\backslash$	$\backslash$				
WS17/16																		
BH17/05	$\sim$																	
BH17-14																		l
BH17-15		$\sim$	$\square$		$\sim$		$\sim$								2.95	9.66		
BH17-17	$\langle$	$\sim$			$\sim$		$\sim$				$\sim$		$\sim$	$\geq$	5.50	19.25		
BH17-18A															8.29	26.70		
BH17-20															7.73	14.46		
BH17-22			$\sim$	$\sim$	$\sim$		$\sim$								19.14	26.50		
BH17-24	$\sim$														DRY	17.42		
BH17-25	$\sim$														23.32	28.80		
BH17-27B	$\sim$														DRY	10.72		
BH17-37	$\sim$					$\sim$		$\sim$							DRY	3.80		
BH17-50	$\sim$														4.33	5.93		
BH17-54												$\sim$			1.30	3.63		
BH17-75	$\sim$														1.82	2.82		

כבור תת תחת עבור (כמוכות עב) 63 (קת ת נוכנו) (63 (קת עבור בז) כבו כבורת) (כת ער עד תות עבור) (לת באת ת ער עבוב

ברב התחת התחדרות הביו להתבנה הבתה הכורה (ברבות הברב) ברבות להתבור הביו הכורה הבת הביו הביו לב had cal



Client:	SLJV					Job No:		3043				Instrume	ents Used:		Geotechnic	al Instrume	nts			
Project Name:	A1 B2CH					Date:		25/06/201	8			Make / M	lodel :		GA2000 PL	US				
Weather:	Sunny					Monitore	ed By:	GS				Serial Nu	mber:							
Exploratory	Pe	ak <sup>1</sup>	Time to			Ste	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric		a	Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	- reach	CH <sub>4</sub>	CO <sub>2</sub>	0 <sub>2</sub>	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteri	Depth	Depth	Level	Demerica
	(0(1)	(0(	concentrati	(0(	(0(1))	(0(1)	(	(	(	(1.4)	flow	(1.11.)	· (	( h )	screening	SUC	(and hard)	( h)	(	Remarks
	(% VOI)	(% VOI)	on (secs)	(% VOI)	(% VOI)	(% VOI)	(ppm)	(ppm)	(ppm)	(L/nr)	(secs)	(L/nr)	(mb)	(mbar)	value	Situation	(m bgi)	(m bgi)	(MAOD)	l
																				l
W\$17/15		$\geq$		$\geq$	$\sim$	$\square$	$\geq$	$\geq$		$\sim$							2.05	4.00		
WS17/16		$\sim$		$\sim$	$\geq$	$\sim$		$\square$		$\sim$	$\langle$						2.13	4		
BH17/05		$\sim$		$\sim$											$\sim$		3.69	4.10	$\sim$	
BH17-14																	5.97	14.15		
BH17-15		$\sim$		$\sim$	$\geq$	$\sim$		$\square$		$\sim$	$\langle$						3.15	9.66		
BH17-17		$\sim$		$\sim$			$\geq$	$\sim$	$\square$								5.86	19.25		
BH17-18A		$\sim$		$\sim$											$\sim$		8.54	26.68	$\sim$	
BH17-20																	7.75	14.45		l
BH17-22				$\sim$	$\geq$	$\geq$	$\geq$	$\geq$	$\geq$	$\sim$	$\geq$		$\langle$				19.25	26.50		
BH17-24													$\sim$				DRY	17.42		
BH17-25																	23.28	28.78		
BH17-27B																	DRY	10.75		
BH17-37		$\sim$		$\sim$	$\geq$	$\square$		$\square$		$\sim$	$\geq$						DRY	3.80		
BH17-50		$\sim$		$\sim$			$\geq$	$\sim$	$\square$								4.67	5.90		
BH17-54		$\geq$	$\sim$	$\geq$							$\geq$	$\sim$	$\geq$		$\geq$		1.33	3.63		
BH17-75																	2.00	2.82		
BH17-77																	DRY	2.25		

The peak reading is the maximum recorded level during a monitoring event.
 The steady reading is the level which remained constant after approximately 1 minute.
 Recorded values are calculated from the Ambient Gas readings (live zero)



Client:	SLJV					Job No:		3043				Instrume	ents Used:		Geotechnic	al Instrume	nts			
Project Name:	A1 B2CH					Date:		03/07/201	8			Make / M	lodel :		GA2000 PL	US				
Weather:	Sunny					Monitore	ed By:	RJ				Serial Nu	mber:							
Exploratory	Pe	ak <sup>1</sup>	Time to			Stea	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric	_	a	Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	reach	CH₄	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteri	Depth	Depth	Level	Domorko
	(0/	(0(	concentrati	(0/	(0(	(0(	(	(	(	(1 /h-n)	flow	(1.//ww)	(mala)	(mhau)	value	suc	(	(m h al)	(*** (00))	Remarks
	(% 00)	(% 00)	on (secs)	(% 00)	(% 00)	(% 00)	(ppiii)	(ppin)	(ppm)	(L/III)	(secs)	(L/III)	(IIID)	(IIIDal)	Value	Situation	(III bgi)	(III bgi)	(IIIAOD)	
W\$17/15		$\sim$										$\leq$			$\sim$	$\sim$	2.07	3.96		
W\$17/16		$\sim$		$\sim$			$\sim$								$\sim$	$\sim$	2.21	3.99		
BH17/05	$\sim$	$\leq$			$\sim$			$\leq$			$\sim$	$\sim$	$\sim$		$\leq$		3.74	4.08		ļ
BH17-14	$\sim$	$\sim$			$\sim$					$\leq$	$\sim$				$\sim$	$\leq$	6.05	14.16		
BH17-15		$\sim$								$\leq$					$\sim$	$\sim$	3.18	9.66		
BH17-17		$\sim$													$\sim$	$\sim$	5.68	19.25		
BH17-18A		$\leq$	$\sim$		$\sim$			$\leq$			$\sim$	$\sim$	$\sim$		$\leq$		8.49	26.68		ļ
BH17-20	$\sim$	$\sim$			$\sim$						$\sim$		$\sim$		$\sim$	$\sim$	7.86	14.45		
BH17-22																	19.37	26.50		
BH17-24																	DRY	17.42		
BH17-25																	23.72	28.78		
BH17-27B																	DRY	10.75		
BH17-37		$\sim$														$\sim$	DRY	3.80		
BH17-50															$\sim$	$\leq$	4.75	5.88		
BH17-54												$\leq$			$\sim$	$\sim$	1.28	3.63		
BH17-75		$\sim$														$\sim$	2.09	2.82		
BH17-77																	DRY	2.25		1

The peak reading is the maximum recorded level during a monitoring event.
 The steady reading is the level which remained constant after approximately 1 minute.
 Recorded values are calculated from the Ambient Gas readings (live zero)

Client:			Job No:					Instrume	ents Used:				
Project Name:			Date:					Make / N	lodel :				
Weather:			Monitore	d By:				Serial Nu	mber:				
				d 🗆									
			<b>D</b>										
						ЩœС	ב <b>תבת</b> ם התתוחתה	Щ⊡					
										$\sim$			
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										$\sim$			
										$\sim$			
										$\sim$			



Client:	WSP					Job No:		3043				Instrume	ents Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		18/05/201	8			Make / M	lodel :		GA2000 PL	US				
Weather:	Dry					Monitore	d By:	RA				Serial Nu	mber:							
Exploratory	Pea	ak 1				Stea	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to reach	CH <sub>4</sub>	CO <sub>2</sub>	02	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteristic	Depth	Depth	Level	
	(% vol)	(% vol)	steady concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	situation	(m bgl)	(m bgl)	(mAOD)	Remarks
BH17/75	0.1	0	60	0.1	6.6	5.9	0	0		0		0	-3.57	1020			1.50	2.90		
WS17-13		$\setminus$															1.48	4.00		
WS17-14										$\searrow$							1.60	4.00		





Client:	SLJV					Job No:		3043				Instrumer	nts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		21/05/2018	}			Make / Mo	odel :		GA2000 PL	US				
Weather:	Dry and su	nny				Monitore	d By:	RA				Serial Nun	nber:							
Exploratory	Pea	ak <sup>1</sup>				Stea	ady <sup>2</sup>			Flow Rate	True to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to reach	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Charactoristic	Depth	Depth	Level	1
	(% vol)	(% vol)	steady concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	situation	(m bgl)	(m bgl)	(mAOD)	Remarks
WS17-16							$\langle$										1.78	3.93		
W\$17-15							$\langle$										1.42	4.02		
BH17-14							$\langle$										5.90	14.22		
BH17-15																	1.90	9.65		
BH17-17							$\langle$										6.00	19.30		
BH17-20							$\langle$				$\langle$						6.85	14.50		
BH17-27B							$\sim$										DRY	10.70		
BH17-25							$\sim$										23.55	28.75		
BH17-24							$\sim$		$\sim$			$\sim$					DRY	17.40		
BH17-22							$\sim$										18.90	26.63		
BH17-75	0.1	0		0.1	6.6	6.7	0	0		0		0	-3.47	1015			1.58	2.90		
BH17-54		$\sim$					$\sim$		$\sim$			$\sim$					1.26	3.65		
BH17-37		$\sim$					$\sim$		$\sim$								DRY	3.70		
BH17-05		$\sim$					$\sim$		$\sim$								3.76	4.13		

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

3 Recorded values are calculated from the Ambient Gas readings (live zero)

Client:				Job No:				Instrume	ents Used:				
Project Name:				Date:				Make / N	lodel :				
Weather:				Monitored	d By:			Serial Nu	imber:				
					₫□□								
			Ш	Ъ.	┎╻╴								
							ЩΩ⊡						
		$\backslash$			$\sim$	 	$\langle$			$\nearrow$			
					$\nearrow$								
					$\nearrow$		$\langle$						
		$\sim$					$\sim$						
		$\sim$			$\sim$		$\nearrow$						
		$\nearrow$			$\nearrow$		$\nearrow$						



Client:	WSP,	Sisk Lagan	1			Job No:		3043				Instrum	ents Used:						
Project Nar	<b>ne:</b> A1B2	СН				Date:		01/06/	/2018			Make / N	Model :						
Weather:	Dry					Monitor	ed By:	RJ				Serial Nu	umber:						
	Pe	ak 1	Time to			St	eady 2			Flow	Time to	Flow	Dolativo	Atmoonhoria			Wator	Page	Watar
Exploratory Hole No.	CH4	CO2	reach steady concentrati on (secs)	CH4	CO2	02	3 H2S	3 CO	PID	Rate Peak	reach steady flow (secs)	Rate Steady	pressure (mb)	Pressure (mbar)	Gas screening value	Characteri stic situation	Depth	Depth	(mAOD)
	(% vol)	(% vol)		(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/nr)		(L/nr)							
BH17/08																	15.32	50.00	
BH17/09																	10.20	50.00	
BH17/41																	DRY	12.00	
BH17/44																	DRY	5.25	
BH17/45																	DRY	22.40	
BH17/60																	2.09	10.00	
BH17/64																	DRY	10.00	
BH17/68																	3.89	5.20	
BH17/76																	Not complet	50	
BH17/77																	DRY	2.20	
WS17/22																	DRY	4.00	
WS17/23																	DRY	4.00	
BH17/02B																	DRY	5.50	
BH17/33																	12.79	14.89	
BH17/42																	DRY	15.00	
BH17/49																	DRY	12.00	
BH17/69																	12.79	14.89	
BH17/73																	DRY	6.00	

Client:				Job No:				Instrume	ents Used:				
Project Name:				Date:				Make / M	Nodel :				
Weather:				Monitored	d By:			Serial Nu	imber:				
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Client:				Job No:				Instrume	ents Used:				
Project Name:				Date:				Make / N	lodel :				
Weather:				Monitored	d By:			Serial Nu	imber:				
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Client:			Job No:				Instrume	ents Used:				
Project Name:			Date:				Make / N	lodel :				
Weather:			Monitore	d By:			Serial Nu	imber:				
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		Ш	다	$\Box_{\!\!\!}\Box_{\!\!}\Box_{\!\!}^{\square}$								
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Client:	SLJV					Job No:		3043				Instrumen	ts Used:		Geotechnic	cal Instrumen
Project Name:	A1 B2CH					Date:		24/07/201	8			Make / Mo	del :		GA2000 PL	US
Weather:	Sunny					Monitore	ed By:	ALB				Serial Num	ıber:			
Exploratory	Pea	ak <sup>1</sup>				Stea	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric		
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to reach	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteris
	(% vol)	(% vol)	steady concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	situation
WS17-15																
WS17-16																
BH17-05																
BH17-14																
BH17-15																
BH17-17							$\searrow$						$\sim$			
BH17-18A																
BH17-20																
BH17-22																
BH17-24																
BH17-25																
BH17-27B																
BH17-37																
BH17-50							$\searrow$						$\sim$			
BH17-54																
BH17-75																
BH17-77																

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

3 Recorded values are calculated from the Ambient Gas readings (live zero)



#### Water Base Water Depth Depth Level tic Remarks (m bgl) (m bgl) (mAOD) 1.95 4.00 ~ 2.05 4.00 \_ 3.92 4.25 ~ 4.43 13.87 2.40 9.75 -5.51 19.38 \_ 2.31 26.75 \_ 6.95 14.90 ~ 18.25 2.45 -DRY 17.55 ~ 24.50 28.80 ~ DRY 10.75 \_ DRY 4.05 -2.25 5.85 1.75 3.50 -2.50 2.95 DRY 2.21



																				020
Client:	SLJV					Job No:		3043				Instrumen	ts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		07/08/2018	3			Make / Mo	del :		GA2000 PL	JS				
Weather:	Dry					Monitore	d By:	RA				Serial Nun	ıber:							
Exploratory	Pea	ak <sup>1</sup>				Stea	ady <sup>2</sup>			Flow Rate		Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	Time to	Steady	pressure	Pressure	Gas	a	Depth	Depth	Level	
	(% vol)	Peak         Time to reach         CH <sub>4</sub> CO <sub>2</sub> (% vol)         (% vol)         (% vol)         (% vol)           (% vol)         (% vol)         (% vol)         (% vol)           0.1         0         60         0.1				(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	situation	(m bgl)	(m bgl)	(mAOD)	Remarks
BH17-75	0.1	0	60	0.1	7.7	6.5	0	0		0		0	-3.41	1016	$\sim$		1.77	2.80	$\langle$	
BH17-05																	3.80	4.15		
BH17-14																	5.60	14.20		
BH17-15													$\langle$		$\geq$		2.96	9.65		
WS17-15																	1.50	4.00		N*, Horse field
WS17-16																	1.85	3.90		S*, Horse field
BH17-17													$\langle$				5.75	19.25		
BH17-20		$\geq$	$\searrow$	$\searrow$	$\searrow$	$\searrow$		$\sim$	$\searrow$	$\searrow$	$\searrow$	$\geq$	$\geq$		$\searrow$		7.70		$\geq$	
																				CENTRAL ALLIANCE GEO
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Client:	SLJV					Job No:		3043				Instrumen	ts Used:		Geotechnic	al Instrume	nts			
Project Name:	A1 B2CH					Date:		08/08/2018	3			Make / Mo	del :		GA2000 PL	US + VW P	iezometer			
Weather:	Sunny					Monitore	d By:	GS + AL				Serial Num	nber:							
Exploratory	Pe	ak <sup>1</sup>				Stead	ly <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to	CH <sub>4</sub>	CO <sub>2</sub>	02	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteri	Depth	Depth	Level	
	(% vol)	(% vol)	reach steady concentratio n (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	stic situation	(m bgl)	(m bgl)	(mAOD)	Remarks
WS17-15																	2.05	3.98	$\sim$	
W\$17-16							$\setminus$										1.95	4.10		
BH17-05																	3.92	4.25		
BH17-14																	4.43	13.97		
BH17-15																	2.41	9.75		
BH17-17																	5.51	19.28		
BH17-18A						$\sim$	$\langle$								$\sim$		2.12	26.75	$\sim$	
BH17-20						$\leq$	$\langle$			$\sim$	$\sim$				$\sim$		6.95	14.90	$\sim$	
BH17-22						$\leq$	$\langle$										2.45	18.25	$\sim$	
BH17-24							$\sim$										DRY	17.48		
BH17-25						$\leq$	$\sim$		$\sim$						$\sim$		24.50	28.89	$\sim$	
BH17-27B							$\sim$										DRY	10.75		
BH17-37							$\sim$			$\sim$	$\sim$		$\sim$		$\sim$	$\sim$	DRY	3.95	$\sim$	
BH17-41							$\sim$										10.40	11.93		
BH17-50							$\frown$		$\sim$	$\sim$	$\sim$				$\sim$		2.25	5.85	$\sim$	
BH17-54		$\square$					$\frown$		$\sim$	$\sim$	$\sim$		$\sim$		$\sim$	$\sim$	1.75	3.50		
BH17-72	$\square$				$\square$												DRY	4.70		
BH17-75					$\square$								$\sim$				2.50	2.95		
BH17-77							$\sim$										DRY	2.28		

### VIBRATING WIRE PIEZOMETER

Borehole	Н	В	TIME	DAY
BH17-23	3084.6	9514.8	0.5	08/08/2018

### Background Atmospheric pressure:

Day

Day

	Day	Day	Day	First day	Second day	Day	Day	Day
	-3	-2	-1	onsite	onsite	+1	+2	+3
Atmospheric Pressure (millibar)								
Trend								

Atmospheric pressure obtained from:

http://www.metoffice.gov.uk/weather/uk/uk\_latest\_pressure.html

Ambient Gas Levels:

		CH₄	CO <sub>2</sub>	02	H₂S	CO	PID	Atmos
		(%)	(%)	(%)	(%)	(%)	ppm	(mbar)
1	Before Monitoring							
	After Monitoring							
2	Before Monitoring							
	After Monitoring							

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

Client:	SLJV					Job No:		3043				Instrumer	nts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		13/08/2018				Make / Mo	odel :		GA2000 PL	US + VW Piezor	neter			
Weather:	Sunny					Monitore	d By:	ALB				Serial Nur	nber:							
Exploratory	Pea	ık <sup>1</sup>	Time to reach			Ste	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	time to reach	CH₄	CO <sub>2</sub>	02	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteristic	Depth	Depth	Level	Dementer
	(% vol)	(% vol)	concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	value	situation	(m bgl)	(m bgl)	(mAOD)	Remarks
WS17-15		$\nearrow$					$\setminus$										2.05	4.00		
WS17-16		$\sim$					$\setminus$										1.90	4.10		
BH17-05		$\sim$					$\setminus$		$\searrow$		$\searrow$						3.95	4.25		
BH17-14		$\sim$					$\sim$										4.48	14.00		
BH17-15		$\sim$															2.45	9.75		
BH17-17		$\leq$				$\sim$	$\langle$					$\sim$	$\sim$				5.55	19.30	$\sim$	
BH17-18A		$\sim$				$\sim$			$\sim$		$\sim$		$\sim$				2.13	26.75		
BH17-20		$\leq$				$\sim$	$\sim$		$\sim$		$\sim$	$\sim$			$\sim$		7.01	14.90	$\sim$	
BH17-22		$\leq$				$\sim$	$\langle$		$\leq$		$\leq$	$\sim$					2.55	18.25	$\sim$	
BH17-24		$\leq$					$\sim$		$\sim$		$\sim$						DRY	17.50	$\langle$	
BH17-25		$\angle$					$\sim$										24.53	28.89	$\sim$	
BH17-27B		$\angle$					$\sim$										DRY	10.75	$\sim$	
BH17-37		$\leq$					$\sim$		$\sim$		$\sim$						DRY	3.95	$\langle$	
BH17-41		$\leq$					$\sim$		$\sim$		$\sim$						10.40	11.93	$\sim$	
BH17-50		$\leq$				$\sim$			$\sim$		$\sim$						2.33	5.85	$\sim$	
BH17-54		$\leq$				$\sim$	$\langle$		$\sim$		$\sim$		$\sim$		$\sim$		1.89	3.49	$\sim$	
BH17-72		$\sim$			$\square$				$\sim$		$\sim$	$\sim$			$\sim$		DRY	4.70	$\sim$	
BH17-75		$\sim$			$\square$		$\sim$		$\square$	$\sim$	$\sim$	$\sim$					2.52	2.95	$\sim$	
BH17-77		$\sim$					$\sim$										DRY	2.28		

### VIBRATING WIRE PIEZOMETER

Borehole	Н	В	TIME	DAY
BH17-23	3085	9517.2	11:50:00	13/08/2018

#### Background Atmospheric pressure:

	Day	Day	Day	First day	Second day	Day	Day	Day
	-3	-2	-1	onsite	onsite	+1	+2	+3
Atmospheric Pressure (millibar)								
Trend								

Atmospheric pressure obtained from:

### http://www.metoffice.gov.uk/weather/uk/uk latest pressure.html

#### Ambient Gas Levels:

	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S	CO	PID	Atmos
	(%)	(%)	(%)	(%)	(%)	ppm	(mbar)
Before Monitoring							
After Monitoring							
Before Monitoring							
After Monitoring							

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

3 Recorded values are calculated from the Ambient Gas readings (live zero)

Day 2

Day 1

<b>(</b> )
CENTRAL ALLIANCE

Client:	SLJV					Job No:		3043				Instrument	ts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		23/08/201	8			Make / Mo	del :		GA2000 PL	US + VW Piezon	neter			
Weather:	Sunny					Monitore	d By:	RJ				Serial Num	ber:							
Exploratory	Pea	ak <sup>1</sup>	Time to reach			Stea	idy <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric	Gas	Charactoristic	Water	Base	Water	
Hole No.	$CH_4$	CO <sub>2</sub>	steady	CH <sub>4</sub>	CO <sub>2</sub>	02	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	steady flow	Steady	pressure	Pressure	screening	situation	Depth	Depth	Level	Remarks
	(% vol)	(% vol)	concentratio n (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	(secs)	(L/hr)	(mb)	(mbar)	value	Situation	(m bgl)	(m bgl)	(mAOD)	
W\$17-15																	2.12	3.98		
WS17-16																	1.86	4.30		
BH17-05																	3.89	4.21		
BH17-14																	4.38	13.97		
BH17-15							$\sim$										2.49	9.81		
BH17-17							$\sim$										5.62	19.27		
BH17-18A		$\sim$					$\sim$										2.16	26.81		
BH17-20		$\sim$					$\sim$										7.05	14.92		
BH17-22	$\sim$	$\sim$				$\leq$	$\sim$										2.59	18.29		
BH17-24		$\sim$					$\sim$										DRY	17.61		
BH17-25	$\sim$	$\sim$				$\leq$	$\sim$										24.48	28.82		
BH17-27B		$\sim$					$\sim$										DRY	10.69		
BH17-37	$\sim$	$\sim$				$\leq$	$\sim$										DRY	3.97		
BH17-41		$\sim$					$\sim$										10.42	11.96		
BH17-50		$\sim$					$\sim$										2.37	5.91		
BH17-54							$\sim$										1.93	3.52		
BH17-72		$\sim$					$\nearrow$										DRY	4.73		
BH17-75		$\nearrow$					$\nearrow$										2.56	2.98		
BH17-77																	DRY	2.32		



Client:	WSP					Job No:		3043				Instruments	Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		29/08/201	8			Make / Mode	el :		GA2000 PL	US				
Weather:	Dry					Monitore	d By:	RJ				Serial Numb	er:							
Exploratory	Pea	ak <sup>1</sup>				Stea	ady <sup>2</sup>			Flow Rate	Timo to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to	CH <sub>4</sub>	CO <sub>2</sub>	02	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas		Depth	Depth	Level	
	(% vol)	(% vol)	reach steady concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	Characteristic situation	(m bgl)	(m bgl)	(mAOD)	Remarks
BH17-50					$\square$				$\square$								2.61	6.00		
BH17-54		$\sim$															1.93	2.87		
BH17-27		$\sim$															25.40	26.41		
BH17-24		$\sim$									$\sim$						DRY	17.51		
BH17-22		$\sim$					$\sim$				$\sim$						1.82	19.73		
BH17-75		$\leq$					$\leq$				$\leq$						2.31	2.93		
BH17-18		$\sim$					$\sim$				$\sim$						0.61	26.51		
BH17-20		$\sim$			$\sim$		$\sim$				$\sim$						6.78	14.53	$\sim$	
BH17-17		$\sim$			$\sim$		$\sim$				$\sim$						5.19	18.93	$\sim$	
BH17-14		$\sim$			$\sim$		$\sim$				$\sim$						4.14	13.66	$\sim$	
WS17-16																	1.92	3.87		
W\$17-15																	2.12	3.71		
BH17-05A																	3.72	4.10		
BH17-77																	DRY	2.31		
BH17-07																	DRY	1.92		
WS17-21																	2.73	3.68		
BH17-41																	9.49	11.51		
BH17-37																	DRY	3.76		



Client:	SLJV					Job No:		3043				Instrumen	ts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		13/09/201	8			Make / Mo	del :		GA2000 PL	US				
Weather:	Sunny					Monitore	d By:	RJ				Serial Num	nber:							
Exploratory	Pe	ak 1				Stea	ady <sup>2</sup>			Flow Rate		Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	Time to	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	lime to	Steady	pressure	Pressure	6.22		Depth	Depth	Level	
	(% vol)	(% vol)	reach steady concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs)	(L/hr)	(mb)	(mbar)	screening value	Characteristic situation	(m bgl)	(m bgl)	(mAOD)	Remarks
WS17-15							$\langle$				$\sim$						2.12	3.96		
WS17-16		$\sim$					$\sim$				$\sim$						2.10	3.99		
WS17-21				$\sim$													2.81	4.00		
WS17-22			$\leq$	$\sim$	$\sim$		$\langle$						$\sim$				DRY	4.00		
WS17-23																	DRY	4.00		
BH17-05A																	3.86	4.08		
BH17-07																	DRY	1.98		
BH17-08																	14.99	50.00		
BH17-14											$\sim$						4.31	13.93		
BH17-15																	2.62	9.66		
BH17-17																	5.33	19.30		
BH17-18A																	0.49	26.63		
BH17-20																	6.66	14.45		
BH17-22																	2.00	18.24		
BH17-24															$\searrow$		DRY	17.42		
BH17-25																	22.19	28.69		
BH17-27																	25.22	26.47		
BH17-37																	DRY	3.80		
BH17-41																	9.82	11.96		
BH17-50																	2.54	5.64		
BH17-54																	1.90	2.93		
BH17-60																	2.34	10.00		
BH17-72																	DRY	4.72		
BH17-75																	2.62	2.82		
BH17-77																	DRY	2.25		



Client:	WSP					Job No:		3043				Instrume	nts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		19/09/2018	3			Make / M	odel :		GA2000 PL	US				
Weather:	Dry					Monitore	d By:	RJ				Serial Nur	nber:							
Exploratory	Pea	ak <sup>1</sup>	Time to			Stea	ady <sup>2</sup>			Flow Rate	Time to reach	Flow Rate	Relative	Atmospheric	Gas	Characteristic	Water	Base	Water	Demode
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	steady	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	steady	Steady	pressure	Pressure	screening	situation	Depth	Depth	Level	Remarks
	(% vol)	(% vol)	concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	flow (secs)	(L/hr)	(mb)	(mbar)	value		(m bgl)	(m bgl)	(mAOD)	
BH17-50		$\setminus$															2.59	5.62		
BH17-54		$\sim$															1.95	2.87		
BH17-27		$\sim$															25.76	26.40		
BH17-24		$\sim$															DRY	17.51		
BH17-22		$\sim$															1.74	19.59		
BH17-75		$\sim$															2.26	2.85		
BH17-18					$\square$												0.59	26.49		
BH17-20		$\leq$			$\square$		$\sim$						$\sim$				6.54	14.48		
BH17-17		$\sim$															5.24	19.29		
BH17-14																	4.16	13.54		
W\$17-16																	1.96	3./8		
WS17-15																	1.9/	3.52		
BH17-05A		$\sim$															3.68	4.00		
BH1/-//		$\sim$																2.33		
BH17-07																		1.98		
WS1/-21																	2./3	3.57		
BH1/-41																	9.51	11.49		
BH1/-3/																		3.68		
BHI/-/Z																	DKI	4.68		





																				GEO
Client:	WSP					Job No:		3043				Instrume	nts Used:		Geotechnic	al Instruments				
Project Name:	A1 B2CH					Date:		25/09/201	.8			Make / M	odel :		GA2000 PL	US				
Weather:	Dry					Monitore	d By:	RJ				Serial Nu	mber:							
Exploratory	Pe	ak 1	<b>-</b>			Stea	ady <sup>2</sup>			Flow Rate	Time to	Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	reach	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	Gas	Characteristic	Depth	Depth	Level	
			steady								steady				screening	situation				Remarks
	(% vol)	(% vol)	concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	(secs)	(L/hr)	(mb)	(mbar)	value		(m bgl)	(m bgl)	(mAOD)	
BH17-50	0	0.1	60	0	0.1	20.6	0	0		0	60	0	1021		$\searrow$		2.64	5.55	$\sim$	
BH17-54	0	0.4	60	0	0.3	19.8	0	0		0	60	0	1021				2.10	2.85		
BH17-27							$\langle$										25.69	26.47		
BH17-24							$\langle$										DRY	17.58		
BH17-22																	1.51	19.56		
BH17-75	0	4.2	60	0	4.2	15.5	0	0		0.1	60	0	1028				1.78	2.96		
BH17-18																	0.32	26.63		
BH17-20																	6.72	14.90		DIVER
BH17-17																	4.98	19.33		
BH17-14							$\langle$			$\sim$							4.10	13.90		
BH17-15								$\geq$		$\geq$	$\geq$						2.43	9.75		BUNG ADDED
WS17-16																	1.89	4.08		
WS17-15							$\sim$										1.98	3.98		
BH17-05A							$\sim$										3.80	4.20		DIVER
BH17-77							$\sim$										DRY	2.30		
BH17-07							$\sim$										DRY	2.00		
WS17-21							$\sim$										2.70	3.10		
BH17-41																	9.42	11.86		
BH17-37							$\sim$										DRY	4.00		BUNG FITTED
BH17-72																	DRY	4.72		TAP AND DIVER



								GRO	DUND GA	S MONIT	ORING	RECORD SH	EET						CI	ENTRAL ALLIANCE
Client:	WSP					Job No:		3043				Instrument	s Used:		Geotechnic	cal Instrume	nts			GEO
Project Name:	A1 B2CH					Date:		02/10/201	8			Make / Mod	el :		GA2000 PL	US				
Weather:	Dry					Monit	ored By:	RJ/NH				Serial Numb	oer:							
Exploratory	Pe	ak <sup>1</sup>				Ste	adv <sup>2</sup>	1		Flow Rate		Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No	CH		Timo to	CH	CO2	0,	H <sub>2</sub> S <sup>3</sup>	CO 3	PID	Peak	Time to	Steady	pressure	Pressure	Cas	Characteri	Denth	Denth	Level	
	0.14	002	reach	04	002	•2	1125		110		steady	Steady	pressure	Tressure	screening	stic	Depar	Depai	Level	Remarks
	(% vol)	(% vol)	steady concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	flow (secs)	(L/hr)	(mb)	(mbar)	value	situation	(m bgl)	(m bgl)	(mAOD)	
BH17-54						$\sim$											1.98	2.86		
BH17-50																	2.71	5.55		
BH17-41	0	3.9			3.8	19.6								1.11			9.56	11.91		
BH17-72																	DRY	4.60		
BH17-37		$\sim$															DRY	4.00		
BH17-05A		$\sim$															3.79	4.20		
BH17-77																	DRY	2.30	$\sim$	
BH17-07						0.35								1010			DRY	2.00		
WS17-21	0	0.2			0.2	0.25					0.1			1012			2.73	4.11		
BH17-18		$\sim$															2.09	18.25		
BH17-20		$\sim$	$\sim$		$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$						6.9Z	14.80		
WS17-16		$\sim$				$\sim$				$\sim$							2.18	13.72		
W\$17-15						$\sim$											2.34	3.98		+
BH17-14					$\sim$			$\sim$									4.42	13.90		
BH17-15	0	1.1		0	1	2					0.1			1011			2.68	9.84		1
BH17-27																	25.62	26.50		1
BH17-22																	2.64	18.24		
BH17-24						1 > 1				1 > 1							DRY	17.54		
BH17-75																	2.03	2.94		<u> </u>

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

3 Recorded values are calculated from the Ambient Gas readings (live zero)

Ambient Gas Levels:

		CH <sub>4</sub>	CO <sub>2</sub>	0 <sub>2</sub>	H₂S	CO	PID	
		(%)	(%)	(%)	(%)	(%)	ppm	(
Day 1	Before Monitoring	0.0	0.0	21.1	-	0.0	-	
	After Monitoring	0.0	0.0	21.1	-	0.0	-	

Atmos
mbar)
1011
1012

								GROUN	D GAS M	ONITOR	ING REC	ORD SHE	ET							
Client:	WSP					Job No:		3043				Instrume	ents Used:		Geotechni	cal Instrume	nts			
Project Name:	A1 B2CH					Date:		08/10/201	8			Make / M	lodel :		GA2000 PI	US				
Weather:	Dry					Monite	ored By:	RJ				Serial Nu	mber:						(	CENTRAL ALLIANCE
Exploratory	Pe	ak <sup>1</sup>	reach			Ste	ady <sup>2</sup>			Flow Rate	e Time to	Flow Rate	Relative	Atmospheric	Gas	Characteri	Water	Base	Water	
Hole No.	CH <sub>4</sub>	CO <sub>2</sub>	steady	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	reach	Steady	pressure	Pressure	screening	stic	Depth	Depth	Level	Remarks
	(% vol)	(% vol)	concentrat ion (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	steady flow (secs	) (L/hr)	(mb)	(mbar)	value	situation	(m bgl)	(m bgl)	(mAOD)	)
BH17-54																	2.11	2.82		1
BH17-50																	2.89	5.54		
BH17-41		0.30		0.00	0.00	20.30	0.00			0.10				1001.00			9.70	11.86		
BH17-72																	DRY	4.60		1
BH17-37																	DRY	4.00		
BH17-05A																	3.89	4.20		
BH17-77																	DRY	2.26		
BH17-07																	DRY	2.00		
BH17-75		4.50		0.00	4.40	14.00	0.00			0.20				1009.00			2.20	2.93		
W\$17-21		0.30		0.00	0.30	20.80	0.00		$\square$	0.10				1009.00			2.70	4.10		
BH17-18				$\square$			$\square$		$\square$								2.00	26.65		
BH17-20															$\square$		6.99	14.79		
BH17-17									$\square$						$\square$		3.41	13.90		
BH17-14																	4.36	13.91		
BH17-15	$\rightarrow$	1.30		0.00	1.00	20.10	0.00		$\square$	0.00	$\square$			1111.00			2.80	9.83		
WS17-16	$ \rightarrow $								$\square$								2.19	4.10		
WS17-15																	2.48	3.98		

PID

ppm

Atmos

(mbar)

1001

1111

Atmospheric pressure obtained from:

Before Monitoring

http://www.metoffice.gov.uk/weather/uk/uk latest pressure.html

CO

(%)

 $H_2S$ 

(%)

### **Ambient Gas Levels:**

	Day	1
--	-----	---

After Monitoring 0.0 20.4

 $CH_4$ 

(%)

CO<sub>2</sub>

(%)

0.0

02

(%)

20.4

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.



								GRO	UND GA	S MONITO	ORING RECO	ORD SHEE	т							
Client:	WSP					Job No:		3043				Instrume	nts Used:		Geotechnica	l Instruments				
Project Name:	A1 B2CH					Date:		15/10/201	8			Make / M	odel :		GA2000 PLU	IS				CENTRAL ALLIANCE
Weather:	Overcast, v	wet				Monite	ored By:	NH				Serial Nur	nber:							GEO
Exploratory	Pe	ak <sup>1</sup>	Time to reach			Ste	ady <sup>2</sup>			Flow Rate	Time to reach	Flow Rate	Relative	Atmospheric	Gas		Water	Base	Water	
Hole No.	CH₄	CO <sub>2</sub>	steady	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S <sup>3</sup>	CO <sup>3</sup>	PID	Peak	steady flow	Steady	pressure	Pressure	screening	Characteristic	Depth	Depth	Level	Remarks
	(% vol)	(% vol)	concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	(secs)	(L/hr)	(mb)	(mbar)	value	situation	(m bgl)	(m bgl)	(mAOD)	
BH17-50																	2.05	2.86		
BH17-54																	2.79	5.57		
BH17-41		0.30		0.00	0.00	20.20	0.00			0.10				1001.00			9.57	11.85		
BH17-72																	DRY	4.60		
BH17-37		$\square$															DRY	3.88		
BH17-05A						$\square$											3.74	4.26		
BH17-77							$\leq$										DRY	2.28		
BH17-07							$\sim$										DRY	2.10	$\sim$	
BH17-75		4.60		0.00	4.50	15.00	0.00			0.20				1009.00			2.35	2.96		
WS17-21		0.30		0.00	0.20	20.60	0.00			0.10				1009.00			2.81	4.06		
BH17-18																	1.6/	26.5/		
BH17-20																	7.15	14.85		
BH1/-1/							$ \frown$			$ \sim$							3.54	13.86		
DH17-14		1 21		0.00	1 20	20.20	0.00		$\sim$	0.00				1111.00			3.99	0.70		
BH17-13		1.51		0.00	1.20	20.30	0.00			0.00				1111.00			2.00	7./Z		
BH17-24									$\sim$	$\sim$								17.54		
BH17-25							$\sim$	$\sim$	$\sim$	$\sim$					$\sim$		21.01	28.08		
BH17-27									$\sim$								25.62	26.50		
WS17-16	$\sim$	$\sim$		$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$	$\sim$		$\sim$			$\sim$		2.93	4.13		
W\$17-15																	2.57	3.87		

Atmospheric pressure obtained from:

http://www.metoffice.gov.uk/weather/uk/uk\_latest\_pressure.html

### Ambient Gas Levels:

Day 1

	CH <sub>4</sub>	CO <sub>2</sub>	02	H <sub>2</sub> S	CO	PID	Atmos
	(%)	(%)	(%)	(%)	(%)	ppm	(mbar)
Before Monitoring							
After Monitoring							

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

										GROUND G	AS MONITORI	NG RECORD	SHEET							
Client:	WSP					Job No:		3043				Instrumen	ts Used:		Geotechnical In	struments				
Project Nan	A1 B2CH					Date:		22/10/201	8			Make / Mo	del :		GA2000 PLUS				CENT	FRAL ALLIANCE
Weather:	Dry, Sunr	ıy				Monito	ored By:	NH				Serial Num	ber:						0211	GEO
Exploratory	Pea	ık <sup>1</sup>				Stea	idy <sup>2</sup>			Flow Rate		Flow Rate	Relative	Atmospheric			Water	Base	Water	
Hole No.	CH4	CO <sub>2</sub>	Time to reach	CH <sub>4</sub>	CO <sub>2</sub>	0 <sub>2</sub>	$H_2S^{-3}$	CO <sup>3</sup>	PID	Peak	Time to reach steady flow	Steady	pressure	Pressure	Gas screening	Characteristic	Depth	Depth	Level	Remarks
	(% vol)	(% vol)	concentration (secs)	(% vol)	(% vol)	(% vol)	(ppm)	(ppm)	(ppm)	(L/hr)	(secs)	(L/hr)	(mb)	(mbar)	Value	Situation	(m bgl)	(m bgl)	(mAOD)	
BH17-50	$\succ$			$\sim$	$\succ$		$\sim$	$\sim$	$\succ$	$\sim$			$\geq$				2.85	5.58		
BH17-54	$\sim$		$\sim$	$\sim$	$\checkmark$		$\sim$	$\sim$	$\sim$								2.10	2.88	$\sim$	
BH17-41	$\square$	1.10	$\sim$	0.00	1.00	18.10	0.00		$\square$	0.10				1025.00			9.85	11.96		
BH17-72		$\nearrow$	$\sim$	$\sim$	$\square$		$\nearrow$		$\square$	$\square$				$\sim$			DRY	4.69		
BH17-37			$\sim$	$\sim$			$\sim$										DRY	3.92		
BH17-05A		$\checkmark$			$\checkmark$				$\searrow$								3.85	4.37		
BH17-77	$\square$	$\geq$	$\geq$	$\leq$	$\square$			$\square$	$\square$				$\square$				DRY	2.31	$\leq$	
BH17-07		$\geq$	$\langle$	$\sim$	$\square$	$\sim$	$\sim$	$\sim$	$\leq$				$\square$				DRY	2.14	$\angle$	
BH17-75		4.00		0.00	4.00	16.50	0.00	465.00		0.10		$\sim$		1032.00			2.26	2.87	$\leq$	
WS17-21	$\vdash$	0.40	$\sim$	0.00	0.30	19.70	0.00		$\vdash$	0.10				1025.00			2.76	4.08	$\leq$	
BH17-18	$\vdash$	$\succ$	$\sim$	$\sim$	$\vdash$	$\sim$	$\sim$	$\sim$	$\vdash$	$\sim$							1.60	26./4	$ \sim$	
BH17-20	$\vdash$	$\leftarrow$	$\sim$	$\sim$	$\vdash$	$\sim$	$\sim$	$\leftarrow$	$\leftarrow$	$ \sim$							7.23	14.71	$\sim$	
DH17-17	$\vdash$	$\leftarrow$			$\vdash$				$\leftarrow$								3.52	13.75		
BH17-14					$\checkmark$	$\sim$		$\checkmark$		$\square$			$\sim$				$\checkmark$	$\checkmark$		Ione working/horses hazard
BH17-15	$\vdash$	1.30		0.00	1.20	19.90	0.00	465.00	$\vdash$	0.10			-0.20	1031.00			2.86	9.72		long working /horgon horsed
VVS1/-16	$\vdash$	$\vdash$	$\sim$		$\vdash$	$\vdash$		$\vdash$	$\vdash$								$\vdash$	$\leftarrow$	$\leftarrow$	lone working/horses hazard
vv317-15																				ione working/10/ses fidzaru

Atmospheric pressure obtained from:

http://www.metoffice.gov.uk/weather/uk/uk\_latest\_pressure.html

Ambient Gas Levels:

	CH <sub>4</sub>	CO <sub>2</sub>	O <sub>2</sub>	$H_2S$	СО	PID	Atmos
	(%)	(%)	(%)	(%)	(%)	ppm	(mbar)
Before Monitoring							
After Monitoring							

Day 1

1 The peak reading is the maximum recorded level during a monitoring event.

2 The steady reading is the level which remained constant after approximately 1 minute.

### APPENDIX H(1) GEOTECHNICAL SOFT GROUND LABORATORY TESTING



## LABORATORY REPORT



4043

### Contract Number: PSL 18/0361

- Report Date: 26 February 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse

Date Received:	23/1/2018
Date Commenced:	23/1/2018
Date Completed:	26/2/2018

### Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director)

C Marshall

L Knight (Senior Technician)

C Marshall (Laboratory Manager) R Berriman (Quality Manager)

> A Fry (Senior Technician)

> > Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-18	10	D	2.00		Brown very silty CLAY.
BH17-18	16	UT	3.50	3.95	Soft brown slightly sandy very silty CLAY.
BH17-18	22	UT	6.00	6.45	Soft brown CLAY.
BH17-18	30	D	9.50		Brown slightly sandy very silty CLAY.
BH17-18	43	UT	15.00	15.45	Soft to firm brown slightly sandy very silty CLAY.
BH17-18	63	UT	24.00	24.45	Firm brown CLAY.
BH17-18	69	D	27.00		Brown very silty CLAY.

			Contract No:
(≯≮)-		A1 Birtlay to Coolbours	PSL 18/0361
		A T Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-18	10	D	2.00		27			80	30	50	100	Very high plasticity CV.
BH17-18	16	UT	3.50	3.95	35			66	28	38	100	High plasticity CH.
BH17-18	22	UT	6.00	6.45	36			66	29	37	100	High plasticity CH.
BH17-18	30	D	9.50		35			69	27	42	100	High plasticity CH.
BH17-18	43	UT	15.00	15.45	36			70	27	43	100	High plasticity CH.
BH17-18	63	UT	24.00	24.45	28			68	29	39	100	High plasticity CH.
BH17-18	69	D	27.00		26			82	34	48	100	Very high plasticity CV.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 머 40 30 20 10 M $\mathbf{MH}$ M٧ ME MĹ 0 10 20 30 40 50 60 70 80 90 100 110 120 130 0 Liquid Limit (LL%). Contract No: PSL 18/0361 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043

# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-18

U

Top Depth (m): 3.50

Sample Number:

Base Depth (m): 3.95

Sample Type:

Initial Conditions	Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	37	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	1.85	0	50	0.500	10.629	Method used to	
Dry Density (Mg/m3):	1.35	50	250	0.285	1.584	determine CV:	T90
Voids Ratio:	0.961	250	450	0.174	1.212	Nominal temperature	
Degree of saturation:	101.6	450	250	0.036	-	during test 'C:	20
Height (mm):	19.794	250	50	0.157	-	Remarks:	
Diameter (mm)	74.993	50	250	0.113	1.491	See summary of soil descrip	otions
Particle Density (Mg/m3):	2.65	250	450	0.108	1.320		
Assumed	2.05						







# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-18

U

### Top Depth (m): 15.00

Sample Number:

Base Depth (m): 15.45

Sample Type:

Initial Conditions	Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	35	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	1.87	0	200	0.329	2.346	Method used to	
Dry Density (Mg/m3):	1.39	200	400	0.150	1.066	determine CV:	T90
Voids Ratio:	0.903	400	800	0.094	0.891	Nominal temperature	
Degree of saturation:	101.4	800	400	0.027	2.146	during test ' C:	20
Height (mm):	19.958	400	200	0.079	0.731	Remarks:	
Diameter (mm)	74.95	200	400	0.055	1.164	See summary of soil descrip	otions
Particle Density (Mg/m3):	2.65	400	800	0.048	1.020		
Assumed	2.05						









сů)			Contract No:
$( \downarrow \downarrow)$		A 1 Pirtley to Coolbourg	PSL 18/0361
		A I DIFILEY to Coalhouse	Client Ref:
4043	Professional Soils Laboratory		3043



dia _			Contract No:
		A1 Birtlay to Coolbours	PSL18/0361
		AT BIRTEY to Coarnouse	Client Ref:
4043	Professional Soils Laboratory		3043



#### Certificate Number 18-02043

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-02043
- Client Reference PSL18/0361
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 3 Soil samples.
  - Date Received 27-Jan-18
  - Date Started 27-Jan-18
- Date Completed 01-Feb-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick Contracts Manager



01-Feb-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-02043 *Client Ref* PSL18/0361 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1289738	1289739	1289740
		S	ample ID	BH17-18	BH17-18	BH17-18
			Depth	2.50-2.95	4.50-4.95	12.50
			Other ID	13	18	37
		Sam	ple Type	D	D	D
		Samp	ling Date	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s
Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	12	23	13
Inorganics						
рН	DETSC 2008#			8.1	8.0	8.1
Chloride Aqueous Extract	DETSC 2055	1	mg/l	9.1	16	26
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	4.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120	280	190
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.13	0.11
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.08	0.15	0.13



## Information in Support of the Analytical Results

*Our Ref* 18-02043 *Client Ref* PSL18/0361 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			Inappropriate container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1289738	BH17-18 2.50-2.95 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1289739	BH17-18 4.50-4.95 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1289740	BH17-18 12.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

lnorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/0362

- Report Date: 14 February 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

For the attention of: Paul Chaplin

Contract Title: A1 Birtley to Coalhouse

Date Received:	23/1/2018
Date Commenced:	23/1/2018
Date Completed:	13/2/2018

Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)

A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-15	5	В	0.70	1.20	Grey mottled brown very gravelly very sandy CLAY.
BH17-15	7	UT	1.50	1.95	Firm brown mottled grey slightly sandy CLAY.
BH17-15	8	D	2.00		Brown CLAY.
BH17-15	11	D	3.00		Brown slightly sandy CLAY.
BH17-15	12	UT	3.50	3.95	Brown slightly sandy CLAY.
BH17-15	13	D	4.00		Brown slightly sandy CLAY.
BH17-15	16	D	5.00		Brown slightly sandy CLAY.
BH17-15	17	UT	5.50	5.95	Soft brown sandy CLAY.
BH17-15	18	D	6.00		Brown sandy CLAY.
BH17-15	21	D	7.00		Brown sandy CLAY.
BH17-15	22	UT	7.50	7.95	Brown sandy CLAY.
BH17-15	23	D	8.00		Brown sandy CLAY.
BH17-15	26	В	9.00		Brown sandy CLAY.
BH17-15	27	UT	9.50	9.95	Brown sandy CLAY.
BH17-15	41	D	17.00		Brown slightly sandy CLAY.
BH17-15	51	D	23.50		Brown sandy CLAY.
BH17-15	76	D	38.50		Brown sandy CLAY.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-15	7	UT	1.50	1.95	28			69	30	39	100	High plasticity CH.
BH17-15	8	D	2.00		34			73	30	43	100	Very high plasticity CV.
BH17-15	11	D	3.00		27			62	28	34	100	High plasticity CH.
BH17-15	13	D	4.00		27			62	29	33	100	High plasticity CH.
BH17-15	16	D	5.00		33			61	28	33	100	High plasticity CH.
BH17-15	17	UT	5.50	5.95	29			56	26	30	100	High plasticity CH.
BH17-15	18	D	6.00		28			53	25	28	100	High plasticity CH.
BH17-15	21	D	7.00		31			55	25	30	100	High plasticity CH.
BH17-15	22	UT	7.50	7.95	29			48	24	24	100	Intermediate plasticity CI.
BH17-15	23	D	8.00		27			46	24	22	100	Intermediate plasticity CI.
BH17-15	26	В	9.00		30			57	25	32	100	High plasticity CH.
BH17-15	27	UT	9.50	9.95	31			56	24	32	100	High plasticity CH.
BH17-15	41	D	17.00		36			72	30	42	100	Very high plasticity CV.
BH17-15	51	D	23.50		30			56	24	32	100	High plasticity CH.
BH17-15	76	D	38.50		30			57	26	31	100	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



# PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



PSL005

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# DETERMINATION OF THE RESISTIVITY OF SOIL

BS 1377 : Part 3: 1990, Clause 10.3

Hole Number:	BH17-15	Top Depth (m):	3.50
Sample Number:	12	Base Depth (m):	3.95
Sample Type:	UT	Sample Date:	

Sample Description:

See summary of soil descriptions

Length of test specimen (mm)	455			
Diameter of test specimen (mm)	102			
Method of Remoulding:	Undisturbed			
Bulk Density	1.89			
Moisture Content (%)	29			
Dry Density (Mg/m3)	1.46			
Steel Probe Diameter (mm)	5			
Steel Probe Penetration (mm)	60			
Steel Probe Spacing (mm)	20			
Electrical Resistivity @ 20C =	9.035 Ohms.cm			

## DETERMINATION OF THE REDOX POTENTIAL OF SOIL

BS 1377 : Part 3: 1990, Clause 11

pH of sample:	
Reading A (mV)	
Reading B (mV)	
Temperature of specimen at time of test (°C)	
Testing Method.	
Redox Potential (mV)	



# DETERMINATION OF THE RESISTIVITY OF SOIL

BS 1377 : Part 3: 1990, Clause 10.3

Hole Number:	BH17-15	Top Depth (m):	7.50
Sample Number:	22	Base Depth (m):	7.95
Sample Type:	UT	Sample Date:	

Sample Description:

See summary of soil descriptions

Length of test specimen (mm)	455			
Diameter of test specimen (mm)	102			
Method of Remoulding:	Undisturbed			
Bulk Density	1.92			
Moisture Content (%)	29			
Dry Density (Mg/m3)	1.49			
Steel Probe Diameter (mm)	5			
Steel Probe Penetration (mm)	60			
Steel Probe Spacing (mm)	20			
Electrical Resistivity @ 20C =	5.693 Ohms.cm			

## DETERMINATION OF THE REDOX POTENTIAL OF SOIL

BS 1377 : Part 3: 1990, Clause 11

pH of sample:	
Reading A (mV)	
Reading B (mV)	
Temperature of specimen at time of test (°C)	
Testing Method.	
Redox Potential (mV)	



# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH17-15 Top Depth (m): 7.50

Base Depth (m) : 7.95

Sample Type:

Sample Number:

U

22

Initial Conditions	Pressure	Range	Mv	Cv	Specimen location			
Moisture Content (%):	29	kP	a	m2/MN	m2/yr	within tube:	Тор	
Bulk Density (Mg/m3):	1.98	0	150	0.417	5.656	Method used to		
Dry Density (Mg/m3):	1.54	150	350	0.149	4.189	determine CV: T90		
Voids Ratio:	0.723	350	550	0.105	3.649	Nominal temperature		
Degree of saturation:	105.3	550	350	0.028	22.174	during test 'C: 20		
Height (mm):	19.918	350	150	0.050	13.620	Remarks:		
Diameter (mm)	75.053	150	350	0.057	13.124	See summary of soil descriptions		
Particle Density (Mg/m3):		350	550	0.034	15.704			
Assumed 2.65								







# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH17-15 Top Depth (m): 9.50

Base Depth (m) :

9.95

Sample Number:

U Sample Type:

27

Initial Conditions	Pressure	Range	Mv	Cv	Specimen location			
Moisture Content (%):	31	kP	a	m2/MN	m2/yr	within tube: To		
Bulk Density (Mg/m3):	1.96	0	200	0.393	9.502	Method used to		
Dry Density (Mg/m3):	1.50	200	400	0.130	6.701	determine CV: T90		
Voids Ratio:	0.770	400	600	0.095	4.579	Nominal temperature		
Degree of saturation:	105.6	600	400	0.026	19.222	during test 'C: 20		
Height (mm):	20.04	400	200	0.023	9.931	Remarks:		
Diameter (mm) 75.073		200	400	0.030	12.830	See summary of soil descriptions		
Particle Density (Mg/m3):		400	600	0.029	9.026			
Assumed 2.65								









Diameter (mm):		102.0	Height (mm):		207.0	Test:	UU Single Stage		Remarks:
Specimen	Moisture	Bulk	Dry	Cell	Corr. Max.	Shear	Failure	Mode	Undisturbed Sample
	Content	Density	Density	Pressure	Deviator	Strength	Strain	of	Sample taken from top of tube
	(%)	(Mg/m3)	(Mg/m3)	(kPa)	Stress	Cu	(%)	Failure	Rate of strain = 2 %/min
					(kPa)	(kPa)			Latex Membrane used 0.2 mm thick,
				$\theta_3$	$(\theta_1 - \theta_3)_f$	$^{1}/_{2}(\theta_{1}-\theta_{3})_{f}$			Correction applied 0.36
1	28	2.03	1.59	30	121	61	7.9	Brittle	See summary of soil descriptions

			Contract No:
$( \downarrow \downarrow)$		A 1 Pirtlay to Coolbourg	PSL18/0362
		AT BIRTEY to Coarnouse	Client Ref:
4043	Professional Soils Laboratory		3043



Diameter (mm):		102.0	Height (mm):		207.0	Test:	UU Single Stage		Remarks:
Specimen	Moisture	Bulk	Dry	Cell	Corr. Max.	Shear	Failure	Mode	Undisturbed Sample
	Content	Density	Density	Pressure	Deviator	Strength	Strain	of	Sample taken from top of tube
	(%)	(Mg/m3)	(Mg/m3)	(kPa)	Stress	Cu	(%)	Failure	Rate of strain = $2 \%$ /min
					(kPa)	(kPa)			Latex Membrane used 0.2 mm thick,
				$\theta_3$	$(\theta_1 - \theta_3)_f$	$^{1}/_{2}(\theta_{1}-\theta_{3})_{f}$			Correction applied 0.33
1	29	1.99	1.55	110	64	32	21.2	Plastic	See summary of soil descriptions

	PSIL Professional Soils Laboratory	A1 Pirtley to Coolbours	Contract No:
			PSL18/0362
		AT BIFILEY to Coamouse	Client Ref:
4043			3043



#### Certificate Number 18-02042

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-02042
- Client Reference PSL18/0362
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 27-Jan-18
  - Date Started 27-Jan-18
- Date Completed 01-Feb-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



01-Feb-18


## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-02042 *Client Ref* PSL18/0362 *Contract Title* A1 Birtley to Coalhouse

,				
			Lab No	1289737
		Sa	ample ID	BH17-15
			Depth	2.50-2.95
			Other ID	9
		Sam	ple Type	D
		Sampl	ing Date	n/s
		Sampl	ing Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10
Inorganics				
рН	DETSC 2008#			8.1
Chloride Aqueous Extract	DETSC 2055	1	mg/l	9.6
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	87
Sulphur as S, Total	DETSC 2320	0.01	%	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09



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## Information in Support of the Analytical Results

*Our Ref* 18-02042 *Client Ref* PSL18/0362 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1289737	BH17-15 2.50-2.95 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/0525

- Report Date: 13 February 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
-----------------	-------------------------

Date Received:	1/2/2018
Date Commenced:	1/2/2018
Date Completed:	13/2/2018

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight

(Senior Technician)

S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS17-13	12	D	3.00	3.45	Brown slightly gravelly sandy CLAY.
WS17-14	5	D	0.60		Brown slightly gravelly slightly sandy CLAY.
WS17-15	7	D	1.20	1.65	Brown mottled grey slightly sandy CLAY.
WS17-16	5	D	0.80		Brown slightly gravelly slightly sandy CLAY.
WS17-16	12	D	2.90		Brown slightly gravelly slightly sandy CLAY.

			Contract No:
$( \diamond \diamond )$		A1 Birtlay to Coolbours	PSL 18/0525
		A T Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
WS17-13	12	D	3.00	3.45	26			48	23	25	98	Intermediate plasticity CI.
WS17-14	5	D	0.60		36			52	24	28	92	High plasticity CH.
WS17-15	7	D	1.20	1.65	30			55	25	30	100	High plasticity CH.
WS17-16	5	D	0.80		30			53	24	29	97	High plasticity CH.
WS17-16	12	D	2.90		34			58	26	32	99	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 40 30 20 10 M MH M٧ ME MĹ 0 10 20 30 40 50 60 70 90 100 110 120 130 0 80 Liquid Limit (LL%). Contract No: PSL 18/0525 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043



## LABORATORY REPORT



4043

### Contract Number: PSL 18/0789

- Report Date: 06 March 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title: A1 Birtley to Coalhouse

Date Received:	16/2/2018
Date Commenced:	16/2/2018
Date Completed:	6/6/2018

### Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director)

L Knight (Senior Technician)

C Marshall (Laboratory Manager) R Berriman (Quality Manager)

> A Fry (Senior Technician)

> > Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-14	14	D	5.45		Brown sandy very silty CLAY.
BH17-14	19	UT	8.00	8.45	Firm brown very silty CLAY.
BH17-14	24	UT	11.00	11.45	Brown very silty CLAY.
BH17-14	42	UT	20.00	20.45	Firm brown CLAY.
BH17-14	53	D	25.50		Brown slightly sandy very silty CLAY.
BH17-14	69	D	33.50	33.95	Brown slightly sandy very silty CLAY.
BH17-14	91	D	43.50		Brown very silty SAND.

GÍD _			Contract No:
$( \diamond \diamond )$		A1 Birtley to Coolbours	PSL 18/0789
		AT Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-14	14	D	5.45		22			47	24	23	100	Intermediate plasticity CI.
BH17-14	24	UT	11.00	11.45	32			73	31	42	100	Very high plasticity CV.
BH17-14	42	UT	20.00	20.45	31			63	29	34	100	High plasticity CH.
BH17-14	53	D	25.50		42			65	30	35	100	High plasticity CH.
BH17-14	69	D	33.50	33.95	31			61	28	33	100	High plasticity CH.
BH17-14	91	D	43.50		22				NP			

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 40 30 20 10 M $\mathbf{MH}$ M٧ ME MĹ 0 10 20 30 40 50 60 70 90 100 110 120 130 0 80 Liquid Limit (LL%). Contract No: PSL 18/0789 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH17-14

Top Depth (m): 11.00

Sample Number:

24

Base Depth (m): 11.45

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location			
Moisture Content (%):	30	kP	a	m2/MN	m2/yr	within tube:	Тор		
Bulk Density (Mg/m3):	1.95	0	200	0.281	3.143	Method used to			
Dry Density (Mg/m3):	1.50	200	400	0.120	2.629	determine CV: T90			
Voids Ratio:	0.802	400	600	0.089	2.450	Nominal temperature			
Degree of saturation:	101.6	600	40	0.057	-	during test 'C:	20		
Height (mm):	19.95	40	200	0.086	5.580	Remarks:			
Diameter (mm)	75.02	200	400	0.063	5.187	See summary of soil descriptions			
Particle Density (Mg/m3): 2 70		400	600	0.048	4.795				
Assumed	2.70	600	1200	0.061	2.273				









_ 🤹 _			Contract No:
(≯≮)-		A1 Pirtley to Coolhouse	PSL18/0789
		A I DIFILEY TO COMMOUSE	Client Ref:
4043	Professional Soils Laboratory		3043



â			Contract No:
		A1 Pirtley to Coolhouse	PSL18/0789
		AT BIFILEY to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043



#### Certificate Number 18-04246

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-04246
- Client Reference PSL18/0789
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 21-Feb-18
  - Date Started 21-Feb-18
- Date Completed 27-Feb-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



27-Feb-18



## **Summary of Chemical Analysis Soil Samples**

Our Ref 18-04246 Client Ref PSL18/0789 *Contract Title* A1 Birtley to Coalhouse

			_	
			Lab No	1301448
		Sa	mple ID	BH17-14
			Depth	2.00-2.45
		C	Other ID	8
		Samp	ole Type	D
		Sampli	ng Date	20/02/18
		Sampli	ng Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10
Inorganics				
рН	DETSC 2008#			7.8
Chloride Aqueous Extract	DETSC 2055	1	mg/l	5.6
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	38
Sulphur as S, Total	DETSC 2320	0.01	%	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06



## Information in Support of the Analytical Results

*Our Ref* 18-04246 *Client Ref* PSL18/0789 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

				Holding time	Inappropriate
		Date		exceeded for	container for
Lab No	Sample ID	Sampled	Containers Received	tests	tests
1301448	BH17-14 2.00-2.45 SOIL	20/02/18	PT 1L		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

lnorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/0790

- Report Date: 13 March 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title: A1 Birtley to Coalhouse

Date Received:	16/2/2018
Date Commenced:	16/2/2018
Date Completed:	13/3/2018

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

(Director)

A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-16a	22	UT	9.00	9.45	Brown CLAY.
BH17-16a	31	D	14.00		Brown slightly sandy CLAY.
BH17-16a	57	UT	30.00	3045	Brown slightly sandy CLAY.
BH17-16a	68	D	36.50		Brown slightly sandy CLAY.
BH17-19	13	UT	3.00	3.45	Brown CLAY.
BH17-19	28	D	10.50		Brown slightly sandy CLAY.
BH17-19	47	D	20.45		Brown slightly sandy CLAY.
BH17-19	68	D	30.00	30.45	Brown slightly gravelly very sandy CLAY.
BH17-20	16	D	6.00	6.45	Brown slightly sandy CLAY.
BH17-20	32	UT	16.50	16.95	Brown slightly sandy CLAY.
BH17-20	44	D	22.50		Brown slightly sandy CLAY.
BH17-20	52	D	26.45		Brown sandy CLAY.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-16a	22	UT	9.00	9.45	37			70	30	40	100	High plasticity CH.
BH17-16a	31	D	14.00		34			63	25	38	100	High plasticity CH.
BH17-16a	57	UT	30.00	3045	30			67	26	41	100	High plasticity CH.
BH17-16a	68	D	36.50		27			59	24	35	100	High plasticity CH.
BH17-19	28	D	10.50		33			61	25	36	100	High plasticity CH.
BH17-19	47	D	20.45		26			58	25	33	100	High plasticity CH.
BH17-19	68	D	30.00	30.45	12			29	15	14	94	Low plasticity CL.
BH17-20	16	D	6.00	6.45	32			61	26	35	100	High plasticity CH.
BH17-20	32	UT	16.50	16.95	32			59	25	34	100	High plasticity CH.
BH17-20	44	D	22.50		31			60	<b>2</b> 5	35	100	High plasticity CH.
BH17-20	52	D	26.45		22			38	18	20	100	Intermediate plasticity CI.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-16a

Top Depth (m): 9.00

Sample Number:

Base Depth (m) : 9.45

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	38	kPa		m2/MN	m2/yr	within tube: Top	
Bulk Density (Mg/m3):	1.85	0	50	0.679	12.681	Method used to	
Dry Density (Mg/m3):	1.34	50	200	0.352	2.614	determine CV:	T90
Voids Ratio:	1.012	200	400	0.175	1.033	Nominal temperature	
Degree of saturation:	101.2	400	200	0.103	-	during test 'C:	20
Height (mm):	19.81	200	50	0.154	-	Remarks:	
Diameter (mm)	75.02	50	200	0.200	0.743	See summary of soil descriptions	
Particle Density (Mg/m3):	2 70	200	400	0.120	0.607		
Assumed	2.70	400	800	0.213	0.499		







BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-16a

Top Depth (m): 30.00

Sample Number:

Base Depth (m): 30.45

Sample Type: UT

Initial Conditions	Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	34	kPa		m2/MN	m2/yr	within tube: Top	
Bulk Density (Mg/m3):	1.91	0	400	0.224	3.734	Method used to	
Dry Density (Mg/m3):	1.42	400	600	0.094	1.749	determine CV: T90	
Voids Ratio:	0.899	600	800	0.078	1.513	Nominal temperature	
Degree of saturation:	103.0	800	600	0.021	-	during test ' C:	20
Height (mm):	20.04	600	400	0.019	-	Remarks:	
Diameter (mm)	75.06	400	600	0.028	5.318	See summary of soil descriptions	
Particle Density (Mg/m3): 2 70		600	800	0.030	4.005		
Assumed	2.70						









BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-19

Top Depth (m): 3.00

Sample Number:

Base Depth (m) :

3.45

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	35	kPa		m2/MN	m2/yr	within tube: Top	
Bulk Density (Mg/m3):	1.89	0	25	0.962	25.729	Method used to	
Dry Density (Mg/m3):	1.40	25	200	0.365	3.220	determine CV: T9	
Voids Ratio:	0.924	200	400	0.162	1.374	Nominal temperature	
Degree of saturation:	102.3	400	200	0.080	-	during test 'C:	20
Height (mm):	20.22	200	25	0.177	-	Remarks:	
Diameter (mm)	75.09	25	200	0.216	1.754	See summary of soil descriptions	
Particle Density (Mg/m3): 2 70		200	400	0.106	1.503		
Assumed	2.70						







BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-20

Top Depth (m): 16.50

Sample Number:

Base Depth (m) :

16.95

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	35	kPa		m2/MN	m2/yr	within tube: Top	
Bulk Density (Mg/m3):	1.90	0	200	0.321	1.942	Method used to	
Dry Density (Mg/m3):	1.40	200	400	0.151	1.736	determine CV: T90	
Voids Ratio:	0.927	400	600	0.106	1.351	Nominal temperature	
Degree of saturation:	103.2	600	400	0.035	-	during test 'C:	20
Height (mm):	20.02	400	200	0.039	-	Remarks:	
Diameter (mm)	75.10	200	400	0.053	3.399	See summary of soil descriptions	
Particle Density (Mg/m3): 2 70		400	600	0.050	1.950		
Assumed	2.70						









#### Certificate Number 18-04225

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-04225
- Client Reference PSL18/0790
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 3 Soil samples.
  - Date Received 21-Feb-18
  - Date Started 21-Feb-18
- Date Completed 26-Feb-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



26-Feb-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-04225 *Client Ref* PSL18/0790 *Contract Title* A1 Birtley to Coalhouse

			-			
			Lab No	1301378	1301379	1301380
		Sa	ample ID	BH17-16a	BH17-19	BH17-20
			Depth	5.00	3.00-3.45	1.50-1.95
		(	Other ID	16	13	6
		Sam	ple Type	D	UT	D
		Sampl	ing Date	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s
Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	21	12	12
Inorganics						
рН	DETSC 2008#			7.8	7.9	7.8
Chloride Aqueous Extract	DETSC 2055	1	mg/l	43	7.6	10
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	260	130	90
Sulphur as S, Total	DETSC 2320	0.01	%	0.18	0.02	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.19	0.07	0.08



Inappropriate

## Information in Support of the Analytical Results

*Our Ref* 18-04225 *Client Ref* PSL18/0790 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1301378	BH17-16a 5.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1301379	BH17-19 3.00-3.45 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1301380	BH17-20 1.50-1.95 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

lnorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/1505

- Report Date: 18 April 2018
- Client's Reference: 3043 sch 007
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title: A1 Birtley to Coalhouse

Date Received:	4/4/2018
Date Commenced:	4/4/2018
Date Completed:	18/4/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director)



L Knight (Senior Technician)

C Marshall (Laboratory Manager) R Berriman (Quality Manager)

> A Fry (Senior Technician)

> > Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP17-01	6	D	0.90		Brown slightly gravelly sandy CLAY.
TP17-02	1	В	0.20		Dark brown gravelly slightly sandy silty CLAY.
TP17-02	7	D	1.50		Brown mottled grey CLAY.
TP17-03B	3	D	0.80		Brown slightly gravelly slightly sandy CLAY.
TP17-03B	8	D	1.70		Brown mottled grey slightly gravelly CLAY.

			Contract No:
$( \diamond \diamond )$		A1 Birtlay to Coolbours	PSL 18/1505
		A T Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
TP17-01	6	D	0.90		28			60	26	34	95	High plasticity CH.
TP17-02	1	В	0.20		27			54	29	25	81	High plasticity CH.
TP17-02	7	D	1.50		31			61	27	34	100	High plasticity CH.
TP17-03B	3	D	0.80		25			59	26	33	94	High plasticity CH.
TP17-03B	8	D	1.70		27			61	28	33	95	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 40 æ 30 20 10 M $\mathbf{MH}$ M٧ ME MĹ 0 10 20 30 40 50 60 70 80 90 100 110 120 130 0 Liquid Limit (LL%). Contract No: PSL 18/1505 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043



## LABORATORY REPORT



4043

### Contract Number: PSL 18/1506

- Report Date: 08 May 2018
- Client's Reference: 3043 sch 009
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received:	4/4/2018

4/4/2010
4/4/2018
8/5/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director)

L Knight (Senior Technician)

C Marshall (Laboratory Manager) R Berriman (Quality Manager)

> A Fry (Senior Technician)

> > Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample				
BH17-75	2	D	0.40		Brown gravelly slightly sandy CLAY.				
BH17-75	5	D	1.20	1.65	Brown sandy very silty CLAY.				
BH17-75	8	D	2.50	2.95	Dark brown gravelly sandy very silty CLAY.				
BH17-75	10	D	3.00		Brown slightly sandy very silty CLAY.				
BH17-75	12	D	4.00		Brown sandy very silty CLAY.				
BH17-75	13	D	4.50	4.95	Brown slightly sandy very silty CLAY.				
BH17-75	16	UT	5.50	5.95	oft brown CLAY.				
BH17-75	17	D	6.00		3rown slightly sandy very silty CLAY.				
BH17-75	<b>2</b> 0	D	7.00		Brown slightly sandy very silty CLAY.				
BH17-75	<b>2</b> 3	D	8.00		Brown slightly sandy very silty CLAY.				
BH17-75	<b>2</b> 6	D	9.00		Brown slightly sandy very silty CLAY.				
BH17-75	<b>2</b> 8	D	10.00		Brown sandy very silty CLAY.				

			Contract No:
$( \diamond \langle )$		A1 Birtley to Coalbouse	PSL 18/1506
		AT Bittley to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-75	2	D	0.40		41			64	24	40	90	High plasticity CH.
BH17-75	5	D	1.20	1.65	28			58	26	32	100	High plasticity CH.
BH17-75	8	D	2.50	2.95	29			56	25	31	90	High plasticity CH.
BH17-75	10	D	3.00		30			63	28	35	100	High plasticity CH.
BH17-75	12	D	4.00		27			56	26	30	100	High plasticity CH.
BH17-75	13	D	4.50	4.95	30			61	25	36	100	High plasticity CH.
BH17-75	17	D	6.00		33			61	26	35	100	High plasticity CH.
BH17-75	20	D	7.00		34			61	25	36	100	High plasticity CH.
BH17-75	23	D	8.00		32			61	26	35	100	High plasticity CH.
BH17-75	26	D	9.00		33			63	28	35	100	High plasticity CH.
BH17-75	28	D	10.00		31			57	25	32	100	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 40 80 E<sup>DD</sup> 30 20 10 M $\mathbf{MH}$ M٧ ME MĹ 0 10 20 30 40 50 60 70 90 100 110 120 130 0 80 Liquid Limit (LL%). Contract No: PSL 18/1506 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043



_ 🏟 _			Contract No:
$( \downarrow \downarrow)$		A1 Birtlay to Coolbours	PSL18/1506
		AT BIRTEY to Coarnouse	Client Ref:
4043	Professional Soils Laboratory		3043


# LABORATORY REPORT



4043

### Contract Number: PSL 18/2313

- Report Date: 10 August 2018
- Client's Reference: 3043 sch010
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

#### For the attention of: Ben Haswell

- Contract Title: A1 Birtley to Coalhouse Date Received: 14/5/2018
- Date Commenced:14/5/2018Date Completed:10/8/2018

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample			
BH17/05A	26	D	6.00		Brown slightly sandy CLAY.			
BH17/05A	34	D	9.00		Brown slightly sandy CLAY.			
BH17/60	20	В	4.50	4.95	Brown very sandy very silty CLAY.			
BH17/60	26	В	6.50	6.95	Brown silty SAND.			
BH17/60	33	D	9.00		Brown sandy GRAVEL of cobbles.			
BH17/60	39	В	10.50	10.95	Brown slightly sandy CLAY.			
BH17/60	45	UT	13.50	13.95	Brown slightly sandy CLAY.			
BH17/60	51	UT	16.50	16.95	Firm brown slightly sandy CLAY.			
BH17/60	63	UT	22.50	22.95	Firm brown slightly sandy CLAY.			
BH17/60	80	D	31.00		Brown slightly sandy CLAY.			
BH17/60	95	D	39.00		Brown slightly sandy CLAY.			
BH17/60	116	В	48.00	48.45	Brown slightly gravelly very silty SAND.			
WS17/04	8	D	1.20	1.65	Brown slightly gravelly silty SAND.			

			Contract No:
$( \diamond \langle )$		A1 Birtley to Coalbouse	PSL 18/2313
		AT Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Particle	Liquid	Plastic	Plasticity	Passing	
Hole Number	Sample	Sample	Тор	Base	Content	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
HOLE MULTIDEL	Number	Туре	Depth	Depth	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17/05A	26	D	6.00		32		64	27	37	100	High plasticity CH.
BH17/05A	34	D	9.00		35		57	25	32	100	High plasticity CH.
BH17/60	20	В	4.50	4.95	24		28	18	10	95	Low plasticity CL.
BH17/60	33	D	9.00		2.9			NP			
BH17/60	45	UT	13.50	13.95	34		67	28	39	100	High plasticity CH.
BH17/60	51	UT	16.50	16.95	33		69	29	40	100	High plasticity CH.
BH17/60	63	UT	<b>22</b> .50	22.95	30		63	27	36	100	High plasticity CH.
BH17/60	80	D	31.00		34		65	27	38	100	High plasticity CH.
BH17/60	95	D	39.00		31		66	27	39	100	High plasticity CH.
WS17/04	8	D	1.20	1.65	12			NP			

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.







Professional Soils Laboratory

4043

A1 Birtley to Coalhouse

PSL 18/2313 Client Ref: 3043





Professional Soils Laboratory

4043

A1 Birtley to Coalhouse





BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



4043

3043



1	33	1.88	1.42	330	96	48	12.9	Plastic	See summary of	of soil descriptions
r										
_ 🛱 _										Contract No:
(≯≮)						∆1 Dimtl	av to Cor	alhouco		PSL18/2313
						A i Difti		annouse		Client Ref:



_ @			Contract No:
$( \downarrow \downarrow)$		A1 Birtlay to Coolbours	PSL18/2313
		AT BITTIEY to Coarnouse	Client Ref:
4043	Professional Soils Laboratory		3043

# **ONE DIMENSIONAL CONSOLIDATION TEST**

### BS 1377: Part 5: 1990: Clause 3

I	Hole Number	•	<b>BH17</b> /	60						Top l	Dep	th (1	n):		13	.50			
S	Sample Numl	ber: 45 Base Depth (m) : 13.9		.95															
S	Sample Type:	:	UT																
Initial Con	nditions		Pressu	ıre R	lange		Τ		Mv	Cv	7	Spec	imen l	ocatic	n				
Moisture	Content (%):	34		kPa				n	n2/MN	m2/	yr	with	in tube	:				ſ	lop
Bulk Dens	sity (Mg/m3):	1.86	0		200	)		(	0.208	1.79	90	Metł	nod use	ed to					
Dry Densi	ity (Mg/m3):	1.40	200		400	)		(	0.161	1.57	76	deter	mine (	CV:				1	<b>790</b>
Voids Rat	io:	0.898	400		800	)		(	0.108	1.53	38	Nom	inal te	mpera	ature				
Degree of	saturation:	99.0	800		400	)		(	0.020	6.22	23	durir	ng test	' C:					20
Height (m	m):	20.052	400		200	)		(	0.050	3.68	38	Rem	arks:						
Diameter	(mm)	74.918	200		400	)		(	0.174	1.21	6	See s	summa	ry of	soil c	lescr	ipti	ons	;
Particle D	ensity (Mg/m3):	2.65	400		800	)		(	0.106	0.95	59								
Assumed		2.65	800		160	0		(	0.057	0.64	14								
2.0 1.0 0.0 1	00					Pres	sure	100 -kP	00 Pa	•									100
10 0 850	00							100	00										100
0.050																			
0.800																			
0.750							Π												
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0.600 0.550						+	Π											╡	



Cv - m2/yr

<b>Contract No:</b>
PSL18/2313
<b>Client Ref:</b>
3043

10000

10000



#### Certificate Number 18-18615

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-18615
- Client Reference PSL18/2313
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 5 Soil samples.
  - Date Received 03-Aug-18
  - Date Started 03-Aug-18
- Date Completed 09-Aug-18

Test Procedures Identified by prefix DETSn (details on request).

*Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



09-Aug-18



# Summary of Chemical Analysis Soil Samples

*Our Ref* 18-18615 *Client Ref* PSL18/2313 *Contract Title* A1 Birtley to Coalhouse

	Lab No			1375732	1375733	1375734	1375735	1375736
				BH17/05	BH17/05			
		Sa	ample ID	A	A	BH17/60	BH17/60	WS17/04
			Depth	3.00	7.00	2.00	11.00	0.50
			Other ID	17	29	10	40	3
		Sam	ple Type	D	D	D	D	D
Sampling Date					n/s	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units					
Metals								
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	88	38	27	35	< 10
Inorganics								
рН	DETSC 2008#			8.0	8.5	7.5	7.7	6.8
Chloride Aqueous Extract	DETSC 2055	1	mg/l	29	7.2	54	250	17
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	5.1	< 1.0	3.2	4.0	1.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1600	970	370	350	79
Sulphur as S, Total	DETSC 2320	0.01	%	0.25	0.24	0.07	0.11	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.69	0.25	0.13	0.09	0.04

Г



Inappropriate

## Information in Support of the Analytical Results

*Our Ref* 18-18615 *Client Ref* PSL18/2313 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1375732	BH17/05A 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1375733	BH17/05A 7.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1375734	BH17/60 2.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
1373734				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1375735	BH17/60 11.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1375736	WS17/04 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	·
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY **REPORT**



4043

#### Contract Number: PSL18/2314

- 16 November 2018 Report Date:
- Client's Reference: 3043 sch008
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

#### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received: Date Commenced: Date Completed:	14/5/2018 14/5/2018 2/8/2018

#### Notes: **Opinions and Interpretations are outside the UKAS Accreditation**

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)

**Doncaster DN4 0AR** 

tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642

e-mail: rgunson@prosoils.co.uk

awatkins@prosoils.co.uk

A Watkins (Director)

R Berriman (Quality Manager)

L Knight (Senior Technician)

S Eyre (Senior Technician)

A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,

Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-21	13	D	5.00		Brown slightly sandy CLAY.
BH17-21	20	D	8.00		Brown slightly sandy CLAY.
BH17-21	31	UT	13.50	13.95	Firm brown slightly gravelly slightly sandy CLAY.
BH17-21	37	UT	16.50	16.95	Stiff brown slightly gravelly sandy CLAY.
BH17-21	46	D	21.00	21.45	Brown sandy very clayey SILT.
BH17-24	3	UT	9.50	9.95	Brown sandy very silty CLAY.
BH17-24	4	UT	13.00	13.45	Firm brown slightly sandy silty CLAY.
BH17-24	31	D	15.80		Grey slightly gravelly very sandy silty CLAY.
BH17-24	37	D	19.40		Grey slightly gravelly very sandy very silty CLAY.

			<b>Contract No:</b>
$( \diamond \langle )$		A1 Birtley to Coelhouse	PSL18/2314
		AT BIT dey to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-21	13	D	5.00		32			69	29	40	100	High plasticity CH.
BH17-21	20	D	8.00		33			67	28	39	100	High plasticity CH.
BH17-21	31	UT	13.50	13.95	34							
BH17-21	46	D	21.00	21.45	25			37	24	13	100	Intermediate plasticity CI.
BH17-24	3	UT	9.50	9.95	29			44	25	19	100	Intermediate plasticity CI.
BH17-24	4	UT	13.00	13.45	31			64	27	37	100	High plasticity CH.
BH17-24	31	D	15.80		4.9			32	17	15	96	Low plasticity CL.
BH17-24	37	D	19.40		8.4			31	17	14	92	Low plasticity CL.

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.





# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			Contract No:
$( \diamond \langle )$	PS L	A1 Dirtley to Coelhouse	PSL18/2314
		AT bit they to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043

# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
$( \diamond \langle )$		A1 Dirtley to Caelhouse	PSL18/2314
		AT bit they to Coamouse	<b>Client Ref:</b>
4043	Professional Solis Laboratory		3043

# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
[ (>≮) -	PS L	A1 Dirtley to Coalhouse	PSL18/2314
UKAS TESTING		AT bit ney to Coamouse	<b>Client Ref:</b>
4043	Professional Solis Laboratory		3043

# **ONE DIMENSIONAL CONSOLIDATION TEST**

#### BS 1377: Part 5: 1990: Clause 3



# **ONE DIMENSIONAL CONSOLIDATION TEST**



#### Summary Report

Sample Details	Depth	13.50-13.9	5m				
	Description	See summ	ary of soil des	criptions.			
	Туре	Undisturbe	d, Vertical orio	entation.			
	Initial Sample Length	Lo	(mm)	211.1			
	Initial Sample Diameter	Do	(mm)	104.1			
sketch showing specimen	Initial Sample Weight	Wo	(gr)	3382.0			
location in original sample	Initial Bulk Density	ρο	(Mg/m3)	1.88			
		ha	(Mg/m3)	2.65			
Initial Conditions				Stage 1	2	3	4
Initial Cell Pressure		σ3i	(kPa)	850	900	950	
Initial Back Pressure		υы	(kPa)	800	800	800	
Membrane Thickness		т. —	(mm)	0.400			
		0	(((((((((((((((((((((((((((((((((((((((	0.400			
Displacement Input		LIP	(mm)	CH 2			
Load Input		N IP	(N)	CH 1			
Pore Water Pressure Input		Արտթ	(kPa)	CH 3			
Sample Volume		V	(cc)	CH 2			
Initial Moisture		ωi	(%)	33			
Initial Dry Density		ρdi	(Mg/m3)	1.42			
Initial Voids Ratio		ei		0.872			
Initial Degree of Saturation		Si	(%)	100			
B Value		в		0.99			
Final Conditions							
Final Moisture		ωf	(%)	30			
Final Dry Density		ρdf	(Mg/m3)	1.45			
Final Voids Ratio		er		0.824			
Final Degree of Saturation		Sf	(%)	97.6			
				Stage 1	2	3	4
E 11 - O 11 - I				Max. Dev.	Max. Dev.	Max. Dev.	
			•	Stress	Stress	Stress	
		δf /	(%)	1.90	4.99	6.86	
Stress At Failure		(σ1-σ3.	(kPa)	59.2	103.7	149.9	
Minor Stress At Failure		σ3.	(kPa)	50.0	100.0	150.0	
Major Stress At Failure		σ1'	(kPa)	109.2	203.7	299.9	
Principal Stress At Failure		σ1./σ3,		2.185	2.037	1.999	
Notes				and the second	X		
					7		

t t t t t t t t t t t t t t t t t t t	Test Method	BS1377-8 : 1990 :	Clause 8	Test Name Test Date	BH17-21 13.50-13.95m 31UT 21/07/2018		
	Site Reference				Borehole	hole BH17-21	
	Jobfile	house		Sample	13.50-13.95m 31UT		
U K A S TESTING	Client	Central Alliance			Depth	13.50-13.95m	
4043	Operator *		Checked	*		Approved *	
	Database: .\SQLE>	(PRESS \ tester-2					



#### **Saturation Plots**





	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name Test Date	BH17-21 13.50-13.95m 31UT 21/07/2018	
	Site Reference			Borehole	BH17-21	
	Jobfile	A1 Bertley to Coa	lhouse	Sample	13.50-13.95m 31UT	
U K A S	Client	Central Alliance		Depth	13.50-13.95m	
4043	Operator *		Checked *		Approved *	



#### **Consolidation Plots**

Initial Conditions			Store 1	2	2
			Stage	2	3
Initial Cell Pressure	σз	(kPa)	850	900	950
Initial Back Pressure	и Бі	(kPa)	800	800	800
Pore Water Pressure Input	Ա բւտբ	(kPa)	830	833	821
Drainage Method			Radial+One	e End	
Final Conditions					
			Stage 1	2	3
PWP Dissipation %	U%	(%)	100.00	100.00	100.00
Volumetric Strain	εν%	(%)	1.35	2.21	2.56
Corrected Length	Lс	(mm)	210.2	204.2	195.0
Corrected Area	Ac	(cm2)	84.35	84.86	87.77
Corrected Volume	Vс	(cc)	1772.462	1756.936	1750.685
T100 Time to Failure	t 100	(min)	454.84	27.84	27.84
Consolidation	cν	(m2/year)	0.492	8.038	8.038
Compressibility	mν	(m2/MN)	0.453	0.663	1.203
Test Time	tF	(h:m:s)	106:07:45	06:29:45	06:29:45
Estimated Strain to Failure	ε%	(%)	5.0	5.0	5.0
Shear Machine Speed	d r	(mm/min)	0.00165	0.02620	0.02501
Notes					



) B	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name BH17-21 13.50-13.95m 31UT   Test Date 21/07/2018			
· (}\$)=	Site Reference			Borehole	BH17-21		
	Jobfile	A1 Bertley to Coal	house	Sample	13.50-13.95m 31UT		
U K A S TESTING	Client	Central Alliance		Depth	13.50-13.95m		
4043	Operator *		Checked *		Approved *		



Shear Stage Plots



± €	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name Test Date	BH17-21 13.50-13.95m 31UT 21/07/2018
·(≱≰)-	Site Reference	A1 Bertley to Coal	house	Borehole Sample	BH17-21 13 50-13 95m 31UT
	Client	Central Alliance		Depth	13.50-13.95m
4043	Operator *		Checked *		Approved *



### **Effective Stress Triaxial Compression**

### **Consolidated Drained**

**Shear Stage Plots** 



do	Test Method	BS1377-8 : 1990	Clause 8	Test Name	BH17-21 13.50-13.95m 31UT
	Database: .\SQLEX	(PRESS \ tester-2		Test Date	21/07/2018
	Site Reference			Borehole	BH17-21
	Jobfile	A1 Bertley to Coa	lhouse	Sample	13.50-13.95m 31UT
U K A S TESTING	Client	Central Alliance		Depth	13.50-13.95m
4043	Operator *		Checked *		Approved *



#### Summary Report

Sample Details	Depth	13.00-13.4	5m				
	Description	See summ	ary of soil des	criptions.			
	Туре	Undisturbe	d, Vertical orie	entation.			
	heitigt Ogenerate Leventh		()	000.0			
$z = z^{2}$	Initial Sample Length Initial Sample Diameter	LO Do	(mm) (mm)	209.9 103.5			
	Initial Sample Weight	Wo	(gr)	3400.1			
sketch showing specimen	Initial Bulk Density	ρο	(Mg/m3)	1.93			
	Particle Density	ρs	(Mg/m3)	2.65			
Initial Conditions				Stage 1	2	3	4
Initial Cell Pressure		σ3i	(kPa)	800	850	900	
Initial Back Pressure		U Бі	(kPa)	750	750	750	
Membrane Thickness		mь	(mm)	0.400			
Displacement Input		LIP	(mm)	CH 2			
Load Input		NIP	(N)	CH 4			
Pore Water Pressure Input		U pwp	(kPa)	CH 3			
Sample Volume		v	(cc)	CH 2			
Initial Moisture		ωi	(%)	30			
Initial Dry Density		ρdi	(Mg/m3)	1.48			
Initial Voids Ratio		ei		0.787			
Initial Degree of Saturation		Si	(%)	100			
B Value		в		0.98			
Final Conditions							
Final Moisture		ωf	(%)	29			
Final Dry Density		ρdf	(Mg/m3)	1.52			
Final Voids Ratio		ef		0.744			
Final Degree of Saturation		Sf	(%)	100.0			
				Stage 1	2	3	4
Ecilura Critoria				Max. Dev.	Max. Dev.	Max. Dev.	
Strain At Failure		5 4	(%)	1 01	6 67	8.62	
Stress At Failure		ν, (σ4-σ2)	(70) (kPa)	62.4	95.9	132.3	
Minor Stress At Failure		(ση-ου. σβ'	(kPa)	50.0	100.0	150.0	
Maior Stress At Failure		σ1'	(kPa)	112.4	195.9	282.3	
Principal Stress At Failure		σ1'/σ3'	<u> </u>	2.249	1.959	1.882	
Notes				6			
				$\mathcal{C}$			

	Test Method BS1377-8 : 1990 : Clause 8			Test Name Test Date	BH17-24 13.00-13.45m 4UT 22/07/2018
	Site Reference			Borehole	BH17-24
	Jobfile	A1 Birtley to Coall	nouse	Sample	13.00-13.45m 4UT
U K A S TESTING	Client	Central Alliance		Depth	13.00-13.45m
4043	Operator *		Checked *		Approved *



Database: .\SQLEXPRESS \ tester-2

#### **Saturation Plots**





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·(}*)=	Site Reference			Borehole	BH17-24
	Jobfile	A1 Birtley to Coall	nouse	Sample	13.00-13.45m 4UT
	Client	Central Alliance		Depth	13.00-13.45m
4043	Operator *		Checked *		Approved *



#### **Consolidation Plots**

Initial Conditions			Store 1	2	2
				2	5
	03	(кРа)	800	850	900
Initial Back Pressure	и Бі	(kPa)	750	750	750
Pore Water Pressure Input	Ա բւտբ	(kPa)	746	796	789
Drainage Method			Radial+One	e End	
Final Conditions					
			Stage 1	2	3
PWP Dissipation %	U%	(%)	100.00	100.00	100.00
Volumetric Strain	εν%	(%)	0.09	1.50	2.59
Corrected Length	Lс	(mm)	209.8	204.6	192.9
Corrected Area	Ac	(cm2)	84.08	84.95	87.83
Corrected Volume	Vс	(cc)	1764.417	1739.465	1720.237
T100 Time to Failure	t 100	(min)	580.58	27.84	27.84
Consolidation	сv	(m2/year)	0.381	7.946	7.946
Compressibility	mν	(m2/MN)	0.245	0.329	0.664
Test Time	tF	(h:m:s)	135:28:07	06:29:45	06:29:45
Estimated Strain to Failure	ε%	(%)	5.0	5.0	5.0
Shear Machine Speed	d r	(mm/min)	0.00129	0.02625	0.02475
Notes					



± €	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name Test Date	BH17-24 13.00-13.45m 4UT 22/07/2018
· (}*)-	Site Reference			Borehole	BH17-24
	Jobfile	A1 Birtley to Coall	nouse	Sample	13.00-13.45m 4UT
U K A S TESTING	Client	Central Alliance		Depth	13.00-13.45m
4043	Operator *		Checked *		Approved *



Shear Stage Plots



_ €£	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name Test Date	BH17-24 13.00-13.45m 4UT 22/07/2018
· (>4) -	Site Reference			Borehole	BH17-24
	Jobfile	A1 Birtley to Coalh	nouse	Sample	13.00-13.45m 4UT
U K A S	Client	Central Alliance		Depth	13.00-13.45m
4043	Operator *		Checked *		Approved *



### **Effective Stress Triaxial Compression**

### **Consolidated Drained**

**Shear Stage Plots** 



	Test Method Database: .\SQLEX	BS1377-8 : 1990 : PRESS \ tester-2	Clause 8	Test Name Test Date	BH17-24 13.00-13.45m 4UT 22/07/2018
	Site Reference			Borehole	BH17-24
	Jobfile	A1 Birtley to Coal	house	Sample	13.00-13.45m 4UT
	Client	Central Alliance		Depth	13.00-13.45m
4043	Operator *		Checked *		Approved *





Certificate Number 18-14123

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-14123
- Client Reference PSL8/2314
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 4 Soil samples.
  - Date Received 12-Jun-18
  - Date Started 12-Jun-18
- Date Completed 18-Jun-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



18-Jun-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-14123 *Client Ref* PSL8/2314 *Contract Title* A1 Birtley to Coalhouse

•			-				
			Lab No	1351176	1351177	1351178	1351179
	Sample ID			BH17-21	BH17-21	BH17-24	BH17-24
			Depth	4.00	10.00	0.50	5.00
			Other ID	11	24	2	15
		Sam	ple Type	D	D	D	D
		Sampl	ing Date	n/s	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s	n/s
Test	Method	LOD	Units				
Metals							
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	23	12	10	< 10
Inorganics							
рН	DETSC 2008#			7.8	8.1	8.0	8.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	31	20	12	17
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	1.7	1.0	1.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	230	250	240	100
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.09	0.10	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.06	0.11	0.09	0.03



## Information in Support of the Analytical Results

*Our Ref* 18-14123 *Client Ref* PSL8/2314 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			Inappropriate container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1351176	BH17-21 4.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351177	BH17-21 10.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1351178	BH17-24 0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351179	BH17-24 5.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of  $28^\circ$ C +/- $2^\circ$ C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months


## LABORATORY REPORT



4043

### Contract Number: PSL 18/2557

- Report Date: 06 July 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received:	25/5/2018
Date Commenced:	25/5/2018
Date Completed:	6/7/2018

Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)



L Knight (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk S Eyre (Senior Technician) A Fry (Senior Technician)

Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17/01	23	В	5.00	6.00	Dark brown CLAY.
BH17/01	27	D	7.00	7.45	Dark brown CLAY.
BH17/41	7	В	2.00	3.00	MADE GROUND brown mottled grey very gravelly very sandy clay.
BH17/41	9	D	3.30		MADE GROUND brown mottled grey very gravelly very sandy clay
BH17/41	10	D	7.20		Brown mottled grey very gravelly very sandy CLAY.
BH17/68	21	UT	4.50	4.95	Brown mottled grey gravelly sandy CLAY.
BH17/68	30	D	7.00		Brown mottled grey gravelly sandy CLAY.
BH17/69	13	UT	2.50	2.95	Brown gravelly very sandy CLAY.
BH17/69	16	В	3.50	3.95	Brown gravelly very sandy CLAY.
BH17-054	2	В	0.40		Brown TOPSOIL.
BH17-054	11	D	3.00		Brown mottled grey gravelly very sandy CLAY.
BH17-054	15	UT	4.20	4.65	Very stiff brown mottled grey gravelly very sandy CLAY.
BH17-054	19	В	6.20	6.70	Brown mottled grey gravelly very sandy CLAY.
BH17-22	15	UT	4.00	4.45	Brown mottled grey slightly sandy CLAY.
BH17-22	20	UT	6.50	6.95	Soft brown slightly gravelly slightly sandy CLAY.
BH17-22	24	UT	9.50	9.95	Soft brown slightly gravelly slightly sandy CLAY.

			Contract No:
$( \diamond \langle )$		A1 Birtlay to Coolbours	PSL 18/2557
		A T Bittley to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

## SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17/01	23	В	5.00	6.00	35			74	31	43	100	Very high plasticity CV.
BH17/01	27	D	7.00	7.45	35			77	32	45	100	Very high plasticity CV.
BH17/41	9	D	3.30		12							
BH17/41	10	D	7.20		10							
BH17/68	21	UT	4.50	4.95	19			41	20	21	84	Intermediate plasticity CI.
BH17/68	30	D	7.00		16			39	19	20	87	Intermediate plasticity CI.
BH17/69	13	UT	2.50	2.95	14			33	17	16	89	Low plasticity CL.
BH17/69	16	В	3.50	3.95	16			31	16	15	84	Low plasticity CL.
BH17-054	11	D	3.00		9.1			30	15	15	76	Low plasticity CL.
BH17-054	15	UT	4.20	4.65	14			34	17	17	88	Low plasticity CL.
BH17-054	19	В	6.20	6.70	14			29	13	16	87	Low plasticity CL.
BH17-22	15	UT	4.00	4.45	30			67	28	39	100	High plasticity CH.
BH17-22	20	UT	6.50	6.95	35			69	29	40	99	High plasticity CH.
BH17-22	24	UT	9.50	9.95	35			65	28	37	97	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 \_\_\_\_) \_\_\_\_ 40 30 \_\_\_ 20 ᅋᆱᄱ 10 M MH M٧ ME MĹ 0 10 20 30 40 50 60 70 90 100 110 120 130 0 80 Liquid Limit (LL%). Contract No: PSL 18/2557 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043



# PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4





_ 🏟 _			Contract No:
$( \downarrow \downarrow)$		A 1 Right of Coolbours	PSL18/2557
		A T Bittley to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043



a G			Contract No:
$( \downarrow \downarrow)$		A1 Pirtley to Coolhouse	PSL18/2557
		AT BIFILEY to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043



7																																															

2.01

 $\theta_3$ 

80

 $(\theta_1 - \theta_3)_f$ 

434

A1 Birtley to Coalhouse

15.3

Plastic

0.34

14

1

UKAS

4043

2.28

 $^{1}/_{2}(\theta_{1}-\theta_{3})_{f}$ 

217

Correction applied

See summary of soil descriptions



Specimen	Moisture	Bulk	Dry	Cell	Corr. Max.	Shear	Failure	Mode	Disturbed Sample
	Content	Density	Density	Pressure	Deviator	Strength	Strain	of	Remoulded with 2.5kg effort
	(%)	(Mg/m3)	(Mg/m3)	(kPa)	Stress	Cu	(%)	Failure	Rate of strain = 2 %/min
					(kPa)	(kPa)			Latex Membrane used 0.2 mm thi
				$\theta_3$	$(\theta_1 - \theta_3)_f$	$^{1}/_{2}(\theta_{1}-\theta_{3})_{f}$			Correction applied 0.33
1	16	2.14	1.85	100	199	99	19.4	Plastic	See summary of soil descriptions

	Det.		Contract No: PSI 18/2557
		A1 Birtley to Coalhouse	Client Ref:
4043	Professional Soils Laboratory		3043

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-22

15

Top Depth (m): 4.00

Sample Number:

Base Depth (m) : 4.45

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location	
Moisture Content (%):	30	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	1.92	0	50	0.128	42.669	Method used to	
Dry Density (Mg/m3):	1.48	50	100	0.071	36.320	determine CV:	T90
Voids Ratio:	0.796	100	200	0.105	10.363	Nominal temperature	
Degree of saturation:	99.9	200	100	0.032	-	during test 'C:	20
Height (mm):	20.02	100	50	0.076	-	Remarks:	
Diameter (mm)	75.01	50	100	0.029	2.166	See summary of soil descrip	otions
Particle Density (Mg/m3):	2 65	100	200	0.061	1.751		
Assumed	2.03						







3043

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17/68

21

Top Depth (m): 4.50

Sample Number:

Base Depth (m): 4.95

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location	
Moisture Content (%):	19	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	2.04	0	50	0.171	11.431	Method used to	
Dry Density (Mg/m3):	1.72	50	100	0.078	7.428	determine CV:	T90
Voids Ratio:	0.543	100	200	0.061	7.193	Nominal temperature	
Degree of saturation:	92.8	200	100	0.005	-	during test 'C:	20
Height (mm):	20.00	100	50	0.009	-	Remarks:	
Diameter (mm)	75.00	50	10	0.017	-	See summary of soil descrip	otions
Particle Density (Mg/m3):	2.65	10	200	0.015	29.928		
Assumed	2.05	200	400	0.051	9.894		







BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17/69

13

Top Depth (m): 2.50

Sample Number:

Base Depth (m): 2.95

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location	
Moisture Content (%):	14	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	2.14	0	50	0.140	36.754	Method used to	
Dry Density (Mg/m3):	1.87	50	100	0.082	31.095	determine CV:	T90
Voids Ratio:	0.415	100	200	0.079	24.921	Nominal temperature	
Degree of saturation:	89.4	200	100	0.001	-	during test ' C:	20
Height (mm):	20.02	100	50	0.010	-	Remarks:	
Diameter (mm)	75.02	50	100	0.012	41.194	See summary of soil descrip	otions
Particle Density (Mg/m3):	2 65	100	200	0.008	37.136		
Assumed	2.03						







4043

**Professional Soils Laboratory** 



Certificate Number 18-14135

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-14135
- Client Reference PSL18/2557
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 7 Soil samples.
  - Date Received 12-Jun-18
  - Date Started 12-Jun-18
- Date Completed 18-Jun-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



18-Jun-18



### Summary of Chemical Analysis Soil Samples

*Our Ref* 18-14135 *Client Ref* PSL18/2557 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1351244	1351245	1351246	1351247	1351248	1351249	1351250
								BH17/05		
		Sa	ample ID	BH17/01	BH17/01	BH17/41	BH17/69	4	BH17/22	BH17/22
			Depth	1.40-2.00	2.50-3.00	1.40	1.00	0.40	1.20-1.70	3.50-4.00
			Other ID	10	14	5	6	2	6	14
		Sam	ple Type	В	В	D	D	В	В	В
		Sampl	ing Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units							
Metals										
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10		42	15	< 10	53	15
Inorganics										
рН	DETSC 2008#			7.8		6.2	8.6	7.0	7.6	8.1
Organic matter	DETSC 2002#	0.1	%		2.0					
Chloride Aqueous Extract	DETSC 2055	1	mg/l	160		25	52	5.3	49	68
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	10		36	< 1.0	16	6.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120		13000	61	92	770	190
Sulphur as S, Total	DETSC 2320	0.01	%	0.07		0.76	0.01	0.03	0.12	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10		2.3	0.03	0.06	0.35	0.06



### Information in Support of the Analytical Results

*Our Ref* 18-14135 *Client Ref* PSL18/2557 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

					Inappropriate
		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1351244	BH17/01 1.40-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351245	BH17/01 2.50-3.00 SOIL		PT 500ml	Sample date not supplied, Organic Matter (Manual) (28 days)	
1351246	BH17/41 1.40 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351247	BH17/69 1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351248	BH17/054 0.40 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351249	BH17/22 1.20-1.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1351250	BH17/22 3.50-4.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/2558

- Report Date: 10 August 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

#### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received:	25/5/2018
Date Commenced:	25/5/2018
Date Completed:	10/8/2018

Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample			
BH17/035	27	D	6.00		Brown gravelly very sandy CLAY.			
BH17/035	37	D	9.00		Brown gravelly very sandy CLAY.			
BH17/044	6	D	1.00		Dark grey very gravelly sandy CLAY.			
BH17/044	14	В	2.50	2.95	Brown gravelly very sandy CLAY.			
BH17/044	15	D	3.00		Brown slightly gravelly very sandy CLAY.			
BH17/045	3	В	0.70	1.20	MADE GROUND brown slightly gravelly sandy CLAY.			
BH17/045	8	В	2.00	3.00	MADE GROUND dark grey very gravelly very sandy CLAY.			
BH17/045	12	В	4.00	5.00	MADE GROUND dark grey sandy slightly clayey very silty gravel.			
BH17-26	24	В	7.00	7.50	Brown slightly gravelly slightly sandy CLAY.			
BH17-26	25	UT	8.00	8.45	Brown slightly sandy CLAY.			
BH17-26	4	D	11.50		Brown slightly sandy CLAY.			
BH17-26	4	UT	14.00	14.45	Firm brown sandy silty CLAY.			
BH17-27A	3	D	7.50		Brown slightly gravelly sandy CLAY.			
BH17-27A	8	D	9.80		Greyish brown slightly gravelly sandy CLAY.			
BH17-27A	10	D	10.85		Grey sandy very silty CLAY.			
WS17/06	6	В	0.50	0.70	Brown very gravelly silty SAND.			
WS17/07	8	В	0.70	1.10	Brown gravely sandy very silty CLAY with some rootlets.			
WS17/08	2	В	0.80	1.20	Brown gravely sandy very silty CLAY with some rootlets.			
WS17/18A	3	D	1.20	1.65	MADE GROUND brown very gravelly silty SAND.			

			Contract No:
$( \diamond \langle ) $		A1 Birtlay to Coolbours	PSL 18/2558
UKAS TESTING		A T Bittley to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS17/18A	5	В	2.00	2.90	MADE GROUND reddish brown sandy silty gravel.
WS17/18A	11	D	4.00	4.45	MADE GROUND brown sandy silty gravel.
WS17/19	3	В	0.70	1.20	MADE GROUND brown very gravelly sand.
WS17/19	11	D	3.00	3.45	MADE GROUND brown very gravelly sand.
WS17/19	15	D	4.30		MADE GROUND brown very sandy slightly clayey very silty gravel.

_ G			Contract No:
-(≯≮)-		A1 Birtley to Coolbours	PSL 18/2558
		A T Bittley to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043

## SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Particle	Liquid	Plastic	Plasticity	Passing	
	Sample	Sample	Тор	Base	Content	Density	Limit	Limit	Index	.425mm	Remarks
Hole Number	Number	Туре	Depth	Depth	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17/035	27	D	6.00		18		29	14	15	87	Low plasticity CL.
BH17/035	37	D	9.00		13		31	15	16	89	Low plasticity CL.
BH17/044	15	D	3.00		21		33	16	17	92	Low plasticity CL.
BH17/045	3	В	0.70	1.20	19						
BH17/045	12	В	4.00	5.00	7.6						
BH17-26	24	В	7.00	7.50	33		66	27	39	97	High plasticity CH.
BH17-26	25	UT	8.00	8.45							
BH17-26	4	D	11.50		32		69	29	40	100	High plasticity CH.
BH17-26	4	UT	14.00	14.45	23		39	22	17	100	Intermediate plasticity CI.
BH17-27A	3	D	7.50		19		49	26	23	93	Intermediate plasticity CI.
BH17-27A	8	D	9.80		19		39	19	20	96	Intermediate plasticity CI.
BH17-27A	10	D	10.85		18		44	26	18	100	Intermediate plasticity CI.
WS17/06	6	В	0.50	0.70	12						
WS17/07	8	В	0.70	1.10	22		41	25	16	89	Intermediate plasticity CI.
WS17/08	2	В	0.80	1.20	15		36	19	17	86	Intermediate plasticity CI.
WS17/18A	3	D	1.20	1.65	11			NP			
WS17/18A	11	D	4.00	4.45	5.7						
WS17/19	3	В	0.70	1.20	12						
WS17/19	11	D	3.00	3.45	8.9						

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.















Professional Soils Laboratory

# PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



4043

3043



Initial Moisture Content:		18	Method of Compaction:	Separate Samples			
Particle Density (Mg/m3):	2.62	Assumed	Material Retained on 37.5 mm Test Sieve (%): 0				
Maximum Dry Density (Mg	/m3):	1.99	Material Retained on 20.0 mm Test Sieve	6			
Optimum Moisture Content	(%):	11					
Remarks							
See summary of soil descrip	tions.						



A1 Birtley to Coalhouse

Contract
PSL18/2558
Client Ref
3043



Remarks

See summary of soil descriptions.



A1 Birtley to Coalhouse

Contract PSL 18/2558 Client Ref 3043

BS 1377: Part 5: 1990: Clause 3

Hole Number:BH17-26Top Depth (m):8.00Sample Number:25Base Depth (m):8.45

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	39	kP	kPa		m2/yr	within tube: Top		
Bulk Density (Mg/m3):	1.82	0	100	0.211	0.860	Method used to		
Dry Density (Mg/m3):	1.31	100	200	0.246	0.850	determine CV:	T90	
Voids Ratio:	1.023	200	400	0.180	0.849	Nominal temperature		
Degree of saturation:	101.8	400	200	0.055	1.768	during test 'C:	20	
Height (mm):	19.986	200	100	0.129	0.615	Remarks:		
Diameter (mm)	74.933	100	200	0.084	1.330	See summary of soil descriptions		
Particle Density (Mg/m3):	2.65	200	400	0.097	1.223			
Assumed	2.03							









Contract No:
PSL 18/2558
Client Ref:
3043



_ @			Contract No:
$( \downarrow \downarrow)$		A1 Pirtley to Coalhours	PSL18/2558
		AT BITTIEY to Coarnouse	Client Ref:
4043	Professional Soils Laboratory		3043







#### Certificate Number 18-18151

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-18151
- Client Reference PSL18/2558
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 7 Soil samples.
  - Date Received 30-Jul-18
  - Date Started 30-Jul-18
- Date Completed 02-Aug-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



02-Aug-18



### Summary of Chemical Analysis Soil Samples

*Our Ref* 18-18151 *Client Ref* PSL18/2558 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1373117	1373118	1373119	1373120	1373121	1373122	1373123
				BH17/03	BH17/04	BH17/04	BH17-	BH17-		WS17/01
		Sa	ample ID	5	4	5	026	027	WS17/07	9
			Depth	1.00	2.50-2.95	0.70-1.20	2.00	5.20-5.65	0.70-1.10	0.70-1.20
			Other ID	6	14	3	8	16	8	3
	Sample Type			D	В	В	D	D	В	В
		Sampl	ing Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units							
Metals										
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	12	16	< 10	13	14	< 10	< 10
Inorganics										
рН	DETSC 2008#			7.7	7.8	7.9	7.6	7.0	7.3	8.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	17	51	13	16	19	33	14
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	3.8	1.2	26	< 1.0	14	19	1.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	67	860	59	130	180	39	36
Sulphur as S, Total	DETSC 2320	0.01	%	0.05	0.10	0.04	0.08	0.05	0.03	0.05
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10	0.25	0.08	0.18	0.09	0.05	0.11



Inappropriate

### Information in Support of the Analytical Results

Our Ref 18-18151 Client Ref PSL18/2558 Contract A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1373117	BH17/035 1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373118	BH17/044 2.50-2.95 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373119	BH17/045 0.70-1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373120	BH17-026 2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373121	BH17-027 5.20-5.65 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373122	WS17/07 0.70-1.10 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1373123	WS17/019 0.70-1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

### Contract Number: PSL 18/2559

- Report Date: 13 June 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received:	25/5/2018
Date Commenced:	25/5/2018
Date Completed:	13/6/2018

### Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director)



L Knight (Senior Technician)

C Marshall (Laboratory Manager) R Berriman (Quality Manager)

> A Fry (Senior Technician)

> > Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-28	13	В	2.50	2.95	Dark grey slightly sandy clayey GRAVEL.
BH17-28	37	UT	9.50	9.95	Soft brown CLAY.
BH17-28	43	UT	12.00	12.45	Grey very silty CLAY.
BH17-37	12	В	3.20	3.70	Brown very gravelly very sandy CLAY.
BH17-37	15	В	5.20	6.00	Brown slightly sandy slightly silty GRAVEL of cobbles.

		A1 Birtley to Coalhouse	Contract No:
			PSL 18/2559
			Client Ref:
4043	Professional Solls Laboratory		3043
## SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mo/m <sup>3</sup>	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
		. , po	m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4	/0	
BH17-28	37	UT	9.50	9.95	34			59	29	30	100	High plasticity CH.
BH17-28	43	UT	12.00	12.45	29			38	22	16	100	Intermediate plasticity CI.
BH17-37	12	В	3.20	3.70	12			35	19	16	62	Low plasticity CL.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



#### PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION. 90 CL CE CI CV CH 80 70 60 Plasticity Index (PI%). 50 40 30 20 10 M $\mathbf{MH}$ M٧ ME MĹ 0 10 20 30 40 50 60 70 80 90 100 110 120 130 0 Liquid Limit (LL%). Contract No: PSL 18/2559 A1 Birtley to Coalhouse Client Ref: UKAS **Professional Soils Laboratory** 4043 3043





Remarks

See summary of soil descriptions.



A1 Birtley to Coalhouse

Contract PSL 18/2559 Client Ref 3043



## ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17-28

43

Top Depth (m): 12.00

Sample Number:

Base Depth (m): 12.45

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	29	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	1.96	0	200	0.220	4.010	Method used to	
Dry Density (Mg/m3):	1.52	200	400	0.082	3.471	determine CV:	T90
Voids Ratio:	0.779	400	600	0.050	2.458	Nominal temperature	
Degree of saturation:	100.6	600	400	0.003	-	during test ' C:	20
Height (mm):	20.11	400	200	0.014	-	Remarks:	
Diameter (mm)	75.04	200	400	0.010	18.592	See summary of soil descrip	otions
Particle Density (Mg/m3):	2 70	400	600	0.015	5.886		
Assumed	2.70	600	800	0.035	1.868		







**Professional Soils Laboratory** 

Client Ref:

3043

4043



çiq Q			Contract No:
		A1 Pietlay to Coolbourg	PSL18/2559
		AT BIRTEY to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043



#### Certificate Number 18-13449

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-13449
- Client Reference PSL18/2559
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 3 Soil samples.
  - Date Received 05-Jun-18
  - Date Started 05-Jun-18
- Date Completed 11-Jun-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



11-Jun-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-13449 *Client Ref* PSL18/2559 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1348038	1348039	1348040
		S	ample ID	BH17-28	BH17-28	BH17-37
			Depth	0.50	5.00	0.30
			Other ID	3	22	2
		Sam	ple Type	D	D	В
		Samp	ling Date	n/s	n/s	n/s
		Sampl	ing Time	n/s	n/s	n/s
Test	Method	LOD	Units			
Metals						
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	60	46	13
Inorganics						
рН	DETSC 2008#			8.0	7.3	8.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	13	12	15
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	2.0	< 1.0	29
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1700	860	100
Sulphur as S, Total	DETSC 2320	0.01	%	0.28	0.15	0.04
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.76	0.34	0.08



Inappropriate

## Information in Support of the Analytical Results

*Our Ref* 18-13449 *Client Ref* PSL18/2559 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1348038	BH17-28 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1348039	BH17-28 5.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
1348040	BH17-37 0.30 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

lnorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



## LABORATORY REPORT



4043

#### Contract Number: PSL 18/2563

- Report Date: 19 July 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

#### For the attention of: Ben Haswell

Contract Title:	A1 Birtley to Coalhouse
Date Received:	25/5/2018
Date Commenced:	25/5/2018
Date Completed:	19/7/2018

Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17/23	38	UT	9.50	9.95	Brown slightly sandy CLAY.
BH17/23	44	UT	12.00	12.45	Stiff brown slightly sandy CLAY.
BH17/23	56	D	17.00		Brown sandy CLAY.
BH17/23	58	UT	18.00	18.45	Brown sandy CLAY.
BH17/25	11	В	2.50	2.95	Brown very gravelly very sandy CLAY.
BH17/25	34	В	9.50	9.95	Grey slightly sandy CLAY.
BH17/25	43	UT	13.50	13.95	Firm brown slightly sandy CLAY.
BH17/25	46	D	15.00	15.45	Brown slightly sandy CLAY.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17/23	38	UT	9.50	9.95	34			56	25	31	100	High plasticity CH.
BH17/23	44	UT	12.00	12.45	30							
BH17/23	56	D	17.00		24			41	20	21	100	Intermediate plasticity CI.
BH17/23	58	UT	18.00	18.45	22			37	18	19	100	Intermediate plasticity CI.
BH17/25	34	В	9.50	9.95	35			60	<b>2</b> 6	34	100	High plasticity CH.
BH17/25	43	UT	13.50	13.95	30							
BH17/25	46	D	15.00	15.45	34			57	25	32	100	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.





See summary of soil descriptions.



A1 Birtley to Coalhouse

Contract PSL 18/2563 Client Ref 3043



4043 Professional Soils Laboratory	A1 Birtley to Coalhouse	Contract No: PSL 18/2563 Client Ref: 3043
---------------------------------------	-------------------------	--



_ ¢			Contract No:
$( \downarrow \downarrow)$	PS L	A1 Pintley to Coalbourg	PSL18/2563
		AT BIFfley to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043

## ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17/23

38

Top Depth (m): 9.50

Sample Number:

Base Depth (m) :

: 9.95

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location	
Moisture Content (%):	34	kP	a	m2/MN	m2/yr	within tube: Top	
Bulk Density (Mg/m3):	1.92	0	100	0.174	4.758	Method used to	
Dry Density (Mg/m3):	1.43	100	200	0.210	2.568	determine CV:	T90
Voids Ratio:	0.853	200	400	0.159	1.191	Nominal temperature	
Degree of saturation:	106.8	400	200	0.046	-	during test 'C:	20
Height (mm):	20.064	200	100	0.123	-	Remarks:	
Diameter (mm)	74.765	100	200	0.082	1.416	See summary of soil descrip	otions
Particle Density (Mg/m3):	2.65	200	400	0.083	1.380		
Assumed	2.05						







A1 Birtley to Coalhouse

Contract No:
PSL18/2563
Client Ref:
3043

## ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:

BH17/23

Top Depth (m): 18.00

Sample Number:

58

Base Depth (m): 18.45

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location	
Moisture Content (%):	22	kP	a	m2/MN	m2/yr	within tube:	Тор
Bulk Density (Mg/m3):	2.07	0 200		0.467	17.212	Method used to	
Dry Density (Mg/m3):	1.69	200	400	0.098	6.484	determine CV:	T90
Voids Ratio:	0.564	400	600	0.064	6.168	Nominal temperature	
Degree of saturation:	103.7	600	400	0.006	-	during test 'C:	20
Height (mm):	20.076	400	200	0.020	-	Remarks:	
Diameter (mm)	75.02	200	400	0.015	30.756	See summary of soil descriptions	
Particle Density (Mg/m3):	e Density (Mg/m3):		600	0.021	13.472		
Assumed	2.05	600	800	0.044	5.403		











#### Certificate Number 18-16544

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-16544
- Client Reference PSL18/2563
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 2 Soil samples.
  - Date Received 11-Jul-18
  - Date Started 11-Jul-18
- Date Completed 16-Jul-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



16-Jul-18



## **Summary of Chemical Analysis Soil Samples**

Our Ref 18-16544 Client Ref PSL18/2563 *Contract Title* A1 Birtley to Coalhouse

	450				
			Lab No	1365159	1365160
		Sa	ample ID	BH17/23	BH17/25
			Depth	7.00	2.00
			Other ID	9	31
		Sam	ple Type	D	D
		Sampl	ling Date	n/s	n/s
		Sampl	ing Time	n/s	n/s
Test	Method	LOD	Units		
Metals					
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	28	14
Inorganics					
рН	DETSC 2008#			8.1	8.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	49	11
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	530	310
Sulphur as S, Total	DETSC 2320	0.01	%	0.06	0.14
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.14	0.27



## Information in Support of the Analytical Results

*Our Ref* 18-16544 *Client Ref* PSL18/2563 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			Inappropriate container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1365159	BH17/23 7.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1365160	BH17/25 2.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

lnorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months







4043

#### Contract Number: PSL18/3168

Report Date: 14 August 2018

Client's Reference: 3043 (sch 25)

Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

For the attention of: Ben Haswell

Contract Title:A1 Birtley to CoalhouseDate Received:26/6/2018Date Commenced:26/6/2018

Date Completed: 14/8/2018

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) L Pavey (Senior/Quality Technician) S Wilson (Senior Technician)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-51	9	В	1.20	1.65	Brown very gravelly slightly clayey SAND.
BH17-51	17	В	3.50	3.95	Brown slightly gravelly sandy very silty CLAY.
BH17-51	20	В	4.50	4.95	Brown very gravelly clayey silty SAND.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liqui <b>d</b> Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-51	17	В	3.50	3.95	13							

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.















See summary of soil descriptions.



A1 Birtley to Coalhouse

Contract PSL 18/3168 Client Ref 3043





# LABORATORY REPORT REPORT



4043

#### Contract Number: PSL 18/3169

- Report Date: 09 August 2018
- Client's Reference: 3043 (sch 24)`
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

#### For the attention of: Ben Haswell

Contract Title: A1 Birtley to Coalhouse

Date Received:	26/6/2018
Date Commenced:	26/6/2018
Date Completed:	9/8/2018

Notes: Opinions and Interpretations are outside the UKASAccreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:



A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample					
BH17-11	14	В	2.50	2.95	Brown very gravelly very sandy SILT.					
BH17-11	21	UT	4.50	4.95	Brown very sandy CLAY.					
BH17-11	42	UT	13.50	13.95	Firm brown slightly sandy CLAY.					
BH17-11	54	UT	19.50	19.95	Brown slightly sandy CLAY.					
BH17-11	66	UT	25.50	25.95	Stiff brown CLAY.					
BH17-11	80	D	33.00		Grey CLAY.					
BH17-11	89	D	37.00		Brown CLAY.					
BH17-11	111	В	46.50	46.70	Brown & grey very silty SAND.					
BH17-13	22	D	7.30		Brown slightly gravelly sandy CLAY.					
BH17-13	29	В	9.85	10.85	Brown slightly gravelly very sandy SILT.					
BH17-13	32	В	11.50	12.35	Brown slightly sandy CLAY.					
BH17-13	34	В	12.90	15.80	Brown sandy CLAY.					

			Contract No:
$( \diamond \langle )$		A1 Birtley to Coolbours	PSL 18/3169
		AT Bittley to Coarrouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.4 <b>2</b> 5mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-11	21	UT	4.50	4.95	30			40	20	20	100	Intermediate plasticity CI.
BH17-11	42	UT	13.50	13.95	32			61	28	33	100	High plasticity CH.
BH17-11	54	UT	19.50	19.95	34			67	30	37	100	High plasticity CH.
BH17-11	66	UT	25.50	25.95	27			65	29	36	100	High plasticity CH.
BH17-11	80	D	33.00		30			61	27	34	100	High plasticity CH.
BH17-11	89	D	37.00		30			64	28	36	100	High plasticity CH.
BH17-13	22	D	7.30		27			44	23	21	96	Intermediate plasticity CI.
BH17-13	32	В	11.50	12.35	29			48	23	25	100	Intermediate plasticity CI.
BH17-13	34	В	12.90	15.80	31			48	24	24	100	Intermediate plasticity CI.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.







Professional Soils Laboratory

4043

A1 Birtley to Coalhouse







4043

A1 Birtley to Coalhouse




Initial Moisture Content:		15	Method of Compaction: 4.5kg		Separate Samples
Particle Density (Mg/m3):	2.60	Assumed	Material Retained on 37.5 mm Test Sieve	24	
Aaximum Dry Density (Mg/m3):		2.08	Material Retained on 20.0 mm Test Sieve	11	
Optimum Moisture Content	Im Moisture Content (%): 9				
Remarks					
See summary of soil descrip	otions.				



A1 Birtley to Coalhouse

Contract						
PSL18/3169						
Client Ref						
3043						





# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH17-11

Top Depth (m): 4.50

Sample Number:

21

Base Depth (m): 4.95

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	31	kP	a	m2/MN	m2/yr	within tube:	Тор	
Bulk Density (Mg/m3):	1.90	0	50	0.197	17.718	Method used to		
Dry Density (Mg/m3):	1.45	50	100	0.211	16.932	determine CV:	T90	
Voids Ratio:	0.823	100	200	0.161	16.076	Nominal temperature		
Degree of saturation:	98.6	200	100	0.012		during test 'C:	20	
Height (mm):	19.906	100	50	0.041		Remarks:		
Diameter (mm)	75.02	50	100	0.023	34.555	See summary of soil descriptions		
Particle Density (Mg/m3):	2 65	100	200	0.037	26.377			
Assumed	2.03	200	400	0.070	15.352			









Contract No:
PSL18/3169
Client Ref:
3043

# ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number:BH17-11Top Depth (m):19.50Sample Number:54Base Depth (m):19.95

Sample Type: UT

Initial Conditions		Pressure	Range	Mv	Cv	Specimen location		
Moisture Content (%):	34	kP	a	m2/MN	m2/yr	within tube:	Тор	
Bulk Density (Mg/m3):	1.89	0	400	0.148	3.886	Method used to		
Dry Density (Mg/m3):	1.41	400	800	0.097	2.799	determine CV:	T90	
Voids Ratio:	0.879	800	1600	0.058	2.358	Nominal temperature		
Degree of saturation:	102.5	1600	800	0.012		during test 'C: 2		
Height (mm):	20.196	800	400	0.041		Remarks:		
Diameter (mm)	75.05	400	800	0.028	4.610	See summary of soil descriptions		
Particle Density (Mg/m3):	2.65	800	1600	0.026	3.573			
Assumed	2.03	1600	3200	0.031	1.964			









	(%)	(Mg/m3)	(Mg/m3)	(kPa)	Stress	Cu	(%)	Failure	Rate of strain = $2 \%$ /min
					(kPa)	(kPa)			Latex Membrane used 0.2 mm thick
				$\theta_3$	$(\theta_1 - \theta_3)_f$	$^{1}/_{2}(\theta_{1}-\theta_{3})_{f}$			Correction applied 0.36
1	33	1.92	1.45	280	86	43	7.9	Brittle	See summary of soil descriptions
	-			_					

A1 Birtley to Coalhouse PSL 18/31	_ cåg			Contract No:
A l Birtley to Coarnouse Client Re	(>≮)-		A1 Pirtley to Coolhouse	PSL18/3169
			AT BIFLIEV to Coamouse	Client Ref:
4043 Professional Soils Laboratory 3043	4043	Professional Soils Laboratory		3043



_ dig			Contract No:
$( \downarrow \downarrow)$		A 1 Pirtlay to Coolhouse	PSL18/3169
		AT BIRTEY to Coamouse	Client Ref:
4043	Professional Soils Laboratory		3043



### Certificate Number 18-17402

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-17402
- Client Reference PSL18/3169
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 2 Soil samples.
  - Date Received 20-Jul-18
  - Date Started 20-Jul-18
- Date Completed 27-Jul-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



27-Jul-18



# **Summary of Chemical Analysis Soil Samples**

Our Ref 18-17402 Client Ref PSL18/3169 *Contract Title* A1 Birtley to Coalhouse

contract ritic rit birticy to count	,usc				
			Lab No	1369343	1369344
		Sa	ample ID	BH17-13	BH17-13
			Depth	0.20-1.20	4.00-4.45
			Other ID	4	15
		Sam	ple Type	В	D
		Samp	ing Date	n/s	n/s
		Sampl	ing Time	n/s	n/s
Test	Method	LOD	Units		
Metals					
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	12
Inorganics	_				
рН	DETSC 2008#			8.3	8.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	7.8	71
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	5.5	2.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	37	300
Sulphur as S, Total	DETSC 2320	0.01	%	0.04	0.11
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.07	0.10



### Information in Support of the Analytical Results

*Our Ref* 18-17402 *Client Ref* PSL18/3169 *Contract* A1 Birtley to Coalhouse

### **Containers Received & Deviating Samples**

		Date			Inappropriate
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1369343	BH17-13 0.20-1.20 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1369344	BH17-13 4.00-4.45 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

### Contract Number: PSL 18/3175

- Report Date: 20 July 2018
- Client's Reference: 3043(sch 23)
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

- Contract Title: A1 Birtley to Coalhouse Date Received: 26/6/2018
- Date Received:26/6/2018Date Commenced:26/6/2018Date Completed:20/7/2018

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-55	9	D	2.20	2.65	Dark grey slightly sandy CLAY with some rootlets.

			Contract No:
$( \diamond \langle )$		A1 Birtlay to Coolbours	PSL 18/3175
		AT BIFLIEV to Coarnouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liqui <b>d</b> Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-55	9	D	2.20	2.65	12			63	30	33	100	High plasticity CH.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.





### Certificate Number 18-17438

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-17438
- Client Reference PSL18/3175
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 20-Jul-18
  - Date Started 20-Jul-18
- Date Completed 26-Jul-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



26-Jul-18



# **Summary of Chemical Analysis Soil Samples**

Our Ref 18-17438 Client Ref PSL18/3175 *Contract Title* A1 Birtley to Coalhouse

1			_	
			Lab No	1369448
		Sa	mple ID	BH17-55
			Depth	1.20-1.65
		(	Other ID	5
		Sam	ole Type	D
		Sampli	ing Date	n/s
		Sampli	ng Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10
Inorganics				
рН	DETSC 2008#			8.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	4.7
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	1.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	55
Sulphur as S, Total	DETSC 2320	0.01	%	0.03
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.07



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# Information in Support of the Analytical Results

*Our Ref* 18-17438 *Client Ref* PSL18/3175 *Contract* A1 Birtley to Coalhouse

### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1369448	BH17-55 1.20-1.65 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	
	in The		·		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT REPORT



4043

### Contract Number: PSL 18/3176

- Report Date: 08 August 2018
- Client's Reference: 3043(sch 22)
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Ben Haswell

- Contract Title: A1 Birtley to Coalhouse Date Received: 26/6/2018
- Date Commenced: 26/6/2018 Date Completed:

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)

A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-12	14	В	2.60	3.00	Reddish brown very sandy silty GRAVEL.
BH17-12A	30	D	6.00	6.45	Brown CLAY.

_ @			Contract No:
$( \downarrow \downarrow)$		A1 Birtlay to Coolbours	PSL 18/3176
		A T Bittley to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liqui <b>d</b> Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-12A	30	D	6.00	6.45	36			44	23	21	100	Intermediate plasticity CI.

SYMBOLS: NP: Non Plastic

\*: Liquid Limit and Plastic Limit Wet Sieved.



# PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.





Particle Density (Mg/m3):	2.60	Assumed	Material Retained on 37.5 mm Test Sieve (%):	18
Maximum Dry Density (Mg/m3):		1.98	Material Retained on 20.0 mm Test Sieve (%):	10
Optimum Moisture Content (%):		11		
Remarks				
See summary of soil descrip	otions.			



A1 Birtley to Coalhouse





Test Number	1	2	3	4	5
Moisture Content (%)	8.4	11.3	13.4	15.6	17.3
MCV	15.0	11.0	8.4	5.7	3.2





### Certificate Number 18-17440

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-17440
- Client Reference PSL18/3176
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 20-Jul-18
  - Date Started 20-Jul-18
- Date Completed 26-Jul-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



26-Jul-18



# Summary of Chemical Analysis Soil Samples

*Our Ref* 18-17440 *Client Ref* PSL18/3176 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1369459
		Sa	mple ID	BH17-12
			Depth	3.60-4.00
		(	Other ID	18
		Sam	ple Type	В
		Sampl	ing Date	n/s
		Sampli	ing Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	12
Inorganics				
рН	DETSC 2008#			9.2
Chloride Aqueous Extract	DETSC 2055	1	mg/l	88
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	300
Sulphur as S, Total	DETSC 2320	0.01	%	0.08
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.10



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# Information in Support of the Analytical Results

*Our Ref* 18-17440 *Client Ref* PSL18/3176 *Contract* A1 Birtley to Coalhouse

### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1369459	BH17-12 3.60-4.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

### Contract Number: PSL18/5027

- Report Date: 23 October 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received:	2/10/2018
Date Commenced:	2/10/2018
Date Completed:	23/10/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-09A	8	В	5.00	5.50	Brown slightly sandy CLAY.
BH17-09A	14	В	7.00	7.50	Brown slightly sandy CLAY.
BH17-09A	21	UT	10.00	10.45	Brown slightly sandy CLAY.
BH17-09A	37	UT	19.00	19.45	Firm brown slightly sandy CLAY.
BH17-09A	46	D	24.50		Brown slightly sandy CLAY.
BH17-09A	52	UT	28.00	28.45	Brown slightly sandy CLAY.
BH17-09A	57	UT	31.00	31.45	Stiff brown slightly sandy CLAY.
BH17-09A	67	D	36.50		Brown slightly sandy CLAY.
BH17-09A	75	D	41.00		Brown slightly sandy CLAY.
BH17-09A	84	UT	46.00	46.45	Firm brown slightly sandy CLAY.
BH17-33	10	В	2.00	2.90	Brown slightly gravelly very sandy CLAY.

			<b>Contract No:</b>
		A1 Birtley to Coelhouse	PSL18/5027
		AT bit they to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-09A	8	В	5.00	5.50	31			66	28	38	100	High plasticity CH.
BH17-09A	14	В	7.00	7.50	35			65	27	38	100	High plasticity CH.
BH17-09A	21	UT	10.00	10.45	30			61	26	35	100	High plasticity CH.
BH17-09A	37	UT	19.00	19.45	32			67	28	39	100	High plasticity CH.
BH17-09A	46	D	24.50		30			66	27	39	100	High plasticity CH.
BH17-09A	52	UT	28.00	28.45	27			62	26	36	100	High plasticity CH.
BH17-09A	57	UT	31.00	31.45	26			63	27	36	100	High plasticity CH.
BH17-09A	67	D	36.50		28			62	25	37	100	High plasticity CH.
BH17-09A	75	D	41.00		32			69	28	41	100	High plasticity CH.
BH17-09A	84	UT	46.00	46.45	31			68	28	40	100	High plasticity CH.
BH17-33	10	В	2.00	2.90	11			33	16	17	94	Low plasticity CL.

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.





# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
$( \diamond \langle )$	PS L	A1 Birtley to Coelhouse	PSL18/5027
		AT bit dey to Coamouse	Client Ref:
4043	Protessional Solis Laboratory		3043

# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
$( \diamond \diamond )$		A1 Birtley to Coelhouse	PSL18/5027
UKAS TESTING		AT bit dey to Coamouse	<b>Client Ref:</b>
4043	Professional Solis Laboratory		3043

# UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
$( \diamond \diamond )$		A1 Birtley to Coelhouse	PSL18/5027
		AT bit they to Coamouse	Client Ref:
4043	Protessional Solis Laboratory		3043

# **ONE DIMENSIONAL CONSOLIDATION TEST**

### BS 1377: Part 5: 1990: Clause 3

Hole Number:	BH17-09	A		Top De	pth (m):	1	10.00				
Sample Number:	21			Base De	epth (m) :	1	10.45				
Sample Type:	UT										
Initial Conditions	Pressure	Range	Mv	Cv	Specimen lo	ocation					
Moisture Content (%): 30	kPa	1	m2/MN	m2/vr	within tube:			Top			
Bulk Density (Mg/m3): $1.93$	0	200	0.245	7.482	Method use	d to		10p			
Dry Density (Mg/m3): $1.49$	200	400	0.144	1.572	determine (	V:		Т90			
Voids Ratio: 0.782	400	800	0.106	1 427	Nominal ter	meratur	e	170			
Degree of saturation: 100.8	800	400	0.037	4 238	during test '	C.	-	20			
Height (mm): 19 974	400	200	0.089	6 523	Remarks:	0.		20			
Diameter (mm) 75.03	200	400	0.063	1.842	See summa	v of soil	descript	tions			
Particle Density (Mg/m3):	400	800	0.067	1.042	See Summa	<i>y</i> or som	desemp	.10115			
Assumed 2.65	400	800	0.007	1.720							
8.0 7.0 5.0 5.0								$\square$			
CE 5.0		$\rightarrow$									
→ 4.0 → 3.0											
2.0								<u> </u>			
1.0				T			T				
100		Press	ure -kPa					1000			
100				_				1000			
0.720											
0.700		/									
0.680											
. <u>9</u> 0.660											
<sup>2</sup> 0.640											
S 0.620								+			
0.600								<u> </u>			
0.580						$\rightarrow$		<u> </u>			
0.560											
0.640 0.640 0.620 0.600 0.580 0.560							Contr	<u>ract N</u> 18/502			
4043 Professional Soils L	aboratory		AI biruey	To Coali	louse		Clie 3	nt Ref: 043			

Cv - m2/yr

# **ONE DIMENSIONAL CONSOLIDATION TEST**

### BS 1377: Part 5: 1990: Clause 3

Hole Number	BH17-09A							Top Depth (m):				28	28.00						
Sample Num	52	52							Base Depth (m) :				28.45						
Sample Type	:	UT																	
Initial Conditions		Pres	ssure	Rang	e				Mv	0	Ċv	Spee	cimen	locatio	on		Τ		
Moisture Content (%):	27		kPa	ı				r	m2/MN	m2	2/yr	with	in tub	e:				Т	op
Bulk Density (Mg/m3):	1.97	0		4	400				0.140	8.1	50	Met	hod us	sed to			Τ		
Dry Density (Mg/m3):	1.55	400		8	800				0.075	7.1	14	dete	rmine	CV:				T	90
Voids Ratio:	0.713	800		1	600				0.057	6.4	468	Non	ninal to	empera	ature				
Degree of saturation:	100.9	1600		8	800				0.010	18.	861	duri	ng test	' C:				2	0
Height (mm):	19.73	800		4	400				0.038	5.6	646	Rem	narks:						
Diameter (mm)	75	400		8	800				0.021	10.	950	See	summ	ary of	soil c	lescr	iptic	ons	
Particle Density (Mg/m3)	: 2.65	800		1	600				0.027	10.	601								
Assumed		1600		3	200				0.034	2.9	929								
20.0 18.0 16.0 14.0 12.0						/													
																	ゴ	+	
6.0		-															+		-
2.0																	$\neg$	_	-
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0.390													-						
UKAS UKAS 4043 Professiona	<b>SI</b> al Soils	Laborate	ory					A1	l Birtley	To C	oalh	ouse	2			Cor PS Cl	itra L18 ien 30	<u>ict</u> 8/50 t R 43	No: 027 ef:

Cv - m2/yr



Certificate Number 18-23625-1

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

Our Reference 18-23625-1

- Client Reference PSL18/5027
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 2 Soil samples.
  - Date Received 05-Oct-18
  - Date Started 05-Oct-18
- Date Completed 17-Oct-18

*Test Procedures* Identified by prefix DETSn (details on request).

*Notes* This report supersedes 18-23625, amendments.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



17-Oct-18



# Summary of Chemical Analysis Soil Samples

*Our Ref* 18-23625-1 *Client Ref* PSL18/5027 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1401769	1401770
		Sa	ample ID	BH17-09A	BH17-33
			Depth	5.00-5.50	1.40-2.00
			Other ID	8	6
		Sam	ple Type	В	В
		Sampl	ing Date	n/s	n/s
		Sampl	ing Time	n/s	n/s
Test	Method	LOD	Units		
Metals					
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	34	29
Inorganics					
рН	DETSC 2008#			7.9	7.8
Chloride Aqueous Extract	DETSC 2055	1	mg/l	110	100
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	1.6	2.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	320	150
Sulphur as S, Total	DETSC 2320	0.01	%	0.15	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.13	0.05


## Information in Support of the Analytical Results

*Our Ref* 18-23625-1 *Client Ref* PSL18/5027 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			Inappropriate container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401769	BH17-09A 5.00-5.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
1401770	BH17-33 1.40-2.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425μm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

## Contract Number: PSL18/5028

- Report Date: 19 October 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received: Date Commenced: Date Completed:	2/10/2018 2/10/2018 19/10/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

Page 1 of

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk

awatkins@prosoils.co.uk

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17/50	6	В	2.60	3.00	Brown slightly gravelly very sandy CLAY.
BH17/50	8	В	3.20	4.20	Brown very gravelly very sandy CLAY.

			<b>Contract No:</b>
$( \diamond \langle )$		A1 Pirtley to Coelhouse	PSL18/5028
		AT BIT they to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

### (BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
BH17/50	6	В	2.60	3.00	16	Clause 0.5	Clause 0.2	31	16	15	90	Low plasticity CL.
DIII//00			2.00	0.00	10			•1	10	10	20	

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.





# PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



3043

**Professional Soils Laboratory** 

4043



Certificate Number 18-23540

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-23540
- Client Reference PSL18/5028
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 04-Oct-18
  - Date Started 04-Oct-18
- Date Completed 11-Oct-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



11-Oct-18



## **Summary of Chemical Analysis Soil Samples**

Our Ref 18-23540 Client Ref PSL18/5028 *Contract Title* A1 Birtley to Coalhouse

1				
			Lab No	1401425
		Sa	mple ID	BH17/50
			Depth	2.00
		(	Other ID	5
		Sam	ple Type	D
		Sampl	ing Date	n/s
		Sampli	ing Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10
Inorganics				
рН	DETSC 2008#			8.3
Chloride Aqueous Extract	DETSC 2055	1	mg/l	63
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	14
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	140
Sulphur as S, Total	DETSC 2320	0.01	%	0.02
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.04



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## Information in Support of the Analytical Results

*Our Ref* 18-23540 *Client Ref* PSL18/5028 *Contract* A1 Birtley to Coalhouse

### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401425	BH17/50 2.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	,
				(7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

## Contract Number: PSL18/5029

- Report Date: 22 October 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received:	2/10/2018
Date Commenced:	2/10/2018
Date Completed:	22/10/2018

## Notes: Opinions and Interpretations are outside the UKAS Accreditation

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Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-04	14	В	2.60	3.00	Brown very gravelly sandy CLAY.

			Contract No:
		A1 Pirtley to Coelhouse	PSL18/5029
		AT bit they to Coamouse	Client Ref:
4043	Professional Solls Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m <sup>3</sup> Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH17-04	14	В	2.60	3.00	10			42	20	22	63	Intermediate plasticity CI.

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.







Certificate Number 18-23543

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-23543
- Client Reference PSL18/5029
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description One Soil sample.
  - Date Received 04-Oct-18
  - Date Started 04-Oct-18
- Date Completed 12-Oct-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



12-Oct-18



## **Summary of Chemical Analysis Soil Samples**

Our Ref 18-23543 Client Ref PSL18/5029 *Contract Title* A1 Birtley to Coalhouse

,			_	
			Lab No	1401430
		Sa	mple ID	BH17-
			Depth	2.20-2.80
		(	Other ID	16
		Sam	ple Type	SOIL
		Sampl	ing Date	n/s
		Sampli	ing Time	n/s
Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10
Inorganics				
рН	DETSC 2008#			8.6
Chloride Aqueous Extract	DETSC 2055	1	mg/l	98
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	2.5
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	100
Sulphur as S, Total	DETSC 2320	0.01	%	0.04
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.04



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## Information in Support of the Analytical Results

*Our Ref* 18-23543 *Client Ref* PSL18/5029 *Contract* A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401430	BH17-04A 2.20-2.80 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days),	
				Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity	
				(7 days)	
Kaun D. Dia at					•

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

### Contract Number: PSL18/5030

- Report Date: 18 October 2018
- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received: Date Commenced: Date Completed:	2/10/2018 2/10/2018 18/10/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

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Checked and Approved Signatories:

R Gunson (Director) A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-71	16	В	3.00	4.00	Brown slightly gravelly very sandy CLAY.
BH17-71	19	В	4.00	5.00	Brown very sandy slightly clayey silty GRAVEL.
WS17/29B	17	D	3.50		Brown slightly sandy CLAY.
WS17/24	5	D	1.00		Brown slightly gravelly very sandy CLAY.
WS17-27	12	D	2.50		Brown slightly sandy CLAY.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Denth	Base Denth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
1 (unioci	1 (unito et	1,100	m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4	/0	
BH17-71	16	В	3.00	4.00	14			35	18	17	92	Low plasticity CL.
WS17/29B	17	D	3.50		27			64	27	37	100	High plasticity CH.
WS17/24	5	D	1.00		14			34	17	17	95	Low plasticity CL.
WS17-27	12	D	2.50		28			62	26	36	100	High plasticity CH.
												ļ

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.





## PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2



**Professional Soils Laboratory** 

4043

**Client Ref:** 

3043



Certificate Number 18-23635

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

Our Reference 18-23635

- Client Reference PSL18/5030
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 6 Soil samples.
  - Date Received 05-Oct-18
  - Date Started 05-Oct-18
- Date Completed 12-Oct-18

Test Procedures Identified by prefix DETSn (details on request).

*Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



12-Oct-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-23635 *Client Ref* PSL18/5030 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1401815	1401816	1401817	1401818	1401819	1401820
		Sa	mple ID	BH17-42	BH17-42	BH17-73	WS17/29	WS17-24	WS17-27
			Depth	3.00-4.00	6.00-7.00	1.00	1.20-1.46	0.50	1.00
		(	Other ID	17	29	5	5	3	5
		Sam	ple Type	В	В	D	D	D	D
		Sampl	ing Date	n/s	n/s	n/s	n/s	n/s	n/s
		Sampli	ing Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10	< 10	< 10	< 10
Inorganics									
рН	DETSC 2008#			7.5	7.6	9.9	12.3	9.9	10.4
Chloride Aqueous Extract	DETSC 2055	1	mg/l	18	47	41	55	100	54
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	13	13	15	48	11
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	62	64	76	12	110	170
Sulphur as S, Total	DETSC 2320	0.01	%	0.01	0.04	0.08	0.26	0.14	0.06
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.02	0.02	0.13	0.48	0.21	0.10



Inappropriate

## Information in Support of the Analytical Results

Our Ref 18-23635 Client Ref PSL18/5030 Contract A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401815	BH17-42 3.00-4.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401816	BH17-42 6.00-7.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401817	BH17-73 1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401818	W517/29 1.20-1.46 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401819	WS17-24 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401820	WS17-27 1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

## Contract Number: PSL18/5031

Report Date: 17 October 2018

- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received: Date Commenced: Date Completed:	2/10/2018 2/10/2018 17/10/2018

## Notes: Opinions and Interpretations are outside the UKAS Accreditation

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Checked and Approved Signatories:

R Gunson (Director)

.

A Watkins (Director) R Berriman (Quality Manager)

L Knight (Senior Technician) S Eyre (Senior Technician) A Fry (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe, Doncaster DN4 0AR tel: +44 (0)844 815 6641 fax: +44 (0)844 815 6642 e-mail: rgunson@prosoils.co.uk awatkins@prosoils.co.uk Page 1 of

## SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH17-39	21	В	4.00	5.00	Brown gravelly very sandy CLAY.
BH17-39 A	13	D	3.20		Brown gravelly very sandy CLAY.
BH17-39 A	13	В	3.50	4.50	Brown very gravelly slightly clayey very silty SAND.
BH17-49	17	D	5.00		Brown slightly gravelly silty SAND.



# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth	Base Depth	Moisture Content %	Linear Shrinkage %	Particle Density Mg/m <sup>3</sup>	Liquid Limit %	Plastic Limit %	Plasticity Index %	Passing .425mm %	Remarks
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17-39	21	В	4.00	5.00	12			31	16	15	86	Low plasticity CL.
BH17-39 A	13	D	3.20		13			37	19	18	85	Intermediate plasticity CI.
BH17-49	17	D	5.00		10				NP			

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.





# PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4



3043

**Professional Soils Laboratory** 

4043



#### Certificate Number 18-23620

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

- Our Reference 18-23620
- Client Reference PSL18/5031
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 6 Soil samples.
  - Date Received 05-Oct-18
  - Date Started 05-Oct-18
- Date Completed 12-Oct-18
- Test Procedures Identified by prefix DETSn (details on request).
  - *Notes* Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick Contracts Manager



12-Oct-18



## Summary of Chemical Analysis Soil Samples

*Our Ref* 18-23620 *Client Ref* PSL18/5031 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1401756	1401757	1401758	1401759	1401760	1401761
		Sa	mple ID	BH17-39	BH17-	BH17-	BH17-	BH17-49	WS17-26
			Depth	0.50	1.20	0.70	1.20-2.00	3.20	1.00
		(	Other ID	3	13	3	10	13	5
		Sam	ple Type	D	D	D	В	В	D
		Sampl	ing Date	n/s	n/s	n/s	n/s	n/s	n/s
		Sampli	ing Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10	49	< 10	< 10
Inorganics									
рН	DETSC 2008#			8.3	10.3	8.0	7.0	7.1	10.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	29	54	32	62	90	46
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	13	4.8	21	1.6	< 1.0	1.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	64	510	62	1200	84	530
Sulphur as S, Total	DETSC 2320	0.01	%	0.05	0.15	0.05	1.3	0.02	0.15
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.09	0.26	0.09	0.38	0.02	0.33

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Inappropriate

## Information in Support of the Analytical Results

Our Ref 18-23620 Client Ref PSL18/5031 Contract A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401756	BH17-39 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401757	BH17-39A 1.20 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1401758	BH17-48A 0.70 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1401759	BH17-48C 1.20-2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1401760	BH17-49 3.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1401761	WS17-26 1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377. Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis. The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



# LABORATORY REPORT



4043

## Contract Number: PSL18/5032

Report Date: 17 October 2018

- Client's Reference: 3043
- Client Name: Central Alliance Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ

### For the attention of: Richard Hardwick

Contract Title:	A1 Birtley to Coalhouse
Date Received: Date Commenced: Date Completed:	2/10/2018 2/10/2018 17/10/2018

### Notes: Opinions and Interpretations are outside the UKAS Accreditation

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# SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample					
BH17/02	12	UT	2.00	2.40	Brown slightly gravelly sandy CLAY.					
BH17/02B	12	UT	2.00	2.45	cown mottled grey slightly gravelly sandy CLAY.					
BH17/02B	19	UT	4.00	4.45	rown sandy CLAY.					
BH17/02B	27	В	6.00	7.00	rown slightly sandy CLAY.					
BH17/02B	36	В	9.00	10.00	rown slightly sandy CLAY.					
BH17/08	8	В	1.20	1.30	rown sandy slightly clayey silty GRAVEL with cobbles.					
BH17-22	28	UT	12.50	13.00	Frown slightly sandy CLAY.					
BH17-22	33	UT	15.50	15.95	Soft brown slightly gravelly slightly sandy CLAY.					
BH17-22	37	D	18.00		Brown slightly sandy CLAY.					
WS17/09	5	D	1.20	1.65	Brown sandy CLAY.					
WS17/20	13	D	3.00	3.45	Brown SAND & GRAVEL.					

			<b>Contract No:</b>
		A1 Birtley to Coelhouse	PSL18/5032
		AT bit trey to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

# SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

					Moisture	Linear	Particle	Liquid	Plastic	Plasticity	Passing	
Hole	Sample	Sample	Тор	Base	Content	Shrinkage	Density	Limit	Limit	Index	.425mm	Remarks
Number	Number	Туре	Depth	Depth	%	%	Mg/m <sup>3</sup>	%	%	%	%	
			m	m	Clause 3.2	Clause 6.5	Clause 8.2	Clause 4.3/4	Clause 5.3	Clause 5.4		
BH17/02	12	UT	2.00	2.40	23			43	20	23	95	Intermediate plasticity CI.
BH17/02B	12	UT	2.00	2.45	29			46	22	24	98	Intermediate plasticity CI.
BH17/02B	19	UT	4.00	4.45	28			48	23	25	100	Intermediate plasticity CI.
BH17/02B	27	В	6.00	7.00	27			56	25	31	100	High plasticity CH.
BH17/02B	36	В	9.00	10.00	32			54	24	30	100	High plasticity CH.
BH17-22	28	UT	12.50	13.00	40			52	24	28	100	High plasticity CH.
BH17-22	33	UT	15.50	15.95	32			57	26	31	97	High plasticity CH.
BH17-22	37	D	18.00		24			59	25	34	100	High plasticity CH.
WS17/09	5	D	1.20	1.65	12			37	18	19	100	Intermediate plasticity CI.
WS17/20	13	D	3.00	3.45	9.6				NP			

**SYMBOLS :** NP : Non Plastic

\* : Liquid Limit and Plastic Limit Wet Sieved.




#### PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2



3043

**Professional Soils Laboratory** 

4043

#### **ONE DIMENSIONAL CONSOLIDATION TEST**



#### **ONE DIMENSIONAL CONSOLIDATION TEST**

#### BS 1377: Part 5: 1990: Clause 3



#### **ONE DIMENSIONAL CONSOLIDATION TEST**

#### BS 1377: Part 5: 1990: Clause 3



#### UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8



			<b>Contract No:</b>
$( \diamond \diamond )$	PS L	A1 Birtley to Coelhouse	PSL18/5032
		AT bit ney to Coamouse	Client Ref:
4043	Professional Solis Laboratory		3043

37

11.4

Plastic

See summary of soil descriptions

1

32

1.89

1.43

310

74



Certificate Number 18-23619-1

Client Professional Soils Laboratory Ltd 5/7 Hexthorpe Road Hexthorpe DN4 0AR

Our Reference 18-23619-1

- Client Reference PSL18/5032
  - Order No (not supplied)
  - Contract Title A1 Birtley to Coalhouse
  - Description 6 Soil samples.
  - Date Received 05-Oct-18
  - Date Started 05-Oct-18
- Date Completed 19-Oct-18

Test Procedures Identified by prefix DETSn (details on request).

Notes This report supersedes 18-23619, extra testing added.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

,

Adam Fenwick Contracts Manager



19-Oct-18



#### Summary of Chemical Analysis Soil Samples

*Our Ref* 18-23619-1 *Client Ref* PSL18/5032 *Contract Title* A1 Birtley to Coalhouse

			Lab No	1401750	1401751	1401752	1401753	1401754	1401755
					BH17/02				
		Sa	mple ID	BH17/02	В	BH17/08	WS17/12	WS17/20	WS17/20
			Depth	1.00	0.50	1.20-1.30	0.70-1.20	0.80-1.20	3.30
		(	Other ID	5	3	8	3	3	14
		Sam	ple Type	D	D	В	В	В	D
		Sampl	ing Date	n/s	n/s	n/s	n/s	n/s	n/s
		Sampli	ing Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	Method	LOD	Units						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	25	13	< 10	< 10	< 10	24
Inorganics									
Loss on Ignition at 440oC	DETSC 2003#	0.01	%						1.1
рН	DETSC 2008#			8.2	8.1	8.7	8.6	9.6	8.5
Organic matter	DETSC 2002#	0.1	%						2.4
Chloride Aqueous Extract	DETSC 2055	1	mg/l	86	72	11	37	34	150
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	3.1	4.6	< 1.0	7.1	1.1	< 1.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	360	160	24	66	60	230
Sulphur as S, Total	DETSC 2320	0.01	%	0.09	0.05	0.01	0.06	0.05	0.08
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.08	0.07	< 0.01	0.09	0.04	0.07



Inappropriate

#### Information in Support of the Analytical Results

Our Ref 18-23619-1 Client Ref PSL18/5032 Contract A1 Birtley to Coalhouse

#### **Containers Received & Deviating Samples**

		Date			container for
Lab No	Sample ID	Sampled	<b>Containers Received</b>	Holding time exceeded for tests	tests
1401750	BH17/02 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730	
				days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401751	BH17/02B 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401752	BH17/08 1.20-1.30 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	,
1401753	WS17/12 0.70-1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401754	WS17/20 0.80-1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1401755	WS17/20 3.30 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), Loss on Ignition (730 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	

#### Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

#### **Soil Analysis Notes**

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

#### Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

BH ref	Depth	PSL Report	Shedule Number	Laboratory Record
BH17-21	13.50	2314	GSH008	MC Completed as part of UUT and reported separatly.
BH17-25	2.00	2563	GSH-011	MCV was scheduled on disturbed sample so test amendment as insufficient material
BH17-33	0.60	5027	GSH-021	Sample not received
BH17-33	0.60	5027	GSH-021	Sample not received
BH17-15	36.00	362	GSH-002	Schedule revision not correctly updated.
BH17-16a	9.00	790	GSH-003	Not on original scheduled, all material used in other testing.
BH17-19	30.00	790/2558	GSH-003	Schedule revision not correctly updated.
BH17-20	16.50	790	GSH-003	Not on original schedule, all material used in other testing.
BH17-21	13.50	2314	GSH-008	Insufficient material for all testing, 38mm triaxial was all that could be carried out.
BH17-25	17.00	2563	GSH-011	BH17-25 17.00m is a disturbed sample - Insufficient material/not suitable.
BH17-75	3.50	1506	GSH-009	Sample not received
BH17-75	9.50	1506	GSH-009	Sample not received

#### APPENDIX H(2) GEOTECHNICAL CORE SAMPLE LABORATORY TESTING

# DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth	Sample Diameter	Sample Length	Height Ratio	Initial Mass	Bulk Density	Moisture Content	Dry Density (Ma/m)	Load Failure		Failure Mode	Date Tested	Remarks
DU17 07	2	<u> </u>	(11)	(11)	(1111)	(1111)	20	(9)	(Mg/III)	(70)	(NIG/III)		(IVIF a)	Duittle	02/00/19	
	3		46.99	49.20	60	170	2.0	2423	2.51	0.4	2.50	96.9	17.1	Drittle	03/09/18	
BH17-07	1	U U	55.40	55.60	85	170	2.0	2310	2.39	1.4	2.30	330.0	59.3	Brittle	03/09/18	
BH17-11	1	С	59.00	59.24	75	170	2.3	1774	2.36	0.7	2.35	253.4	57.4	Brittle	03/09/18	
BH17-11	3	С	61.10	61.50	75	170	2.3	1837	2.45	1.3	2.41	119.7	27.1	Brittle	03/09/18	
BH17-11	4	С	66.30	66.59	75	170	2.3	1775	2.36	0.8	2.34	288.1	65.2	Brittle	03/09/18	
BH17-25	2	С	24.27	24.50	85	170	2.0	<b>2</b> 415	2.50	0.5	2.49	162.1	28.6	Brittle	03/09/18	
BH17-27A	3	С	21.02	21.25	85	170	2.0	2409	2.50	0.6	2.48	380.1	67.0	Brittle	03/09/18	
BH17-39A	1	С	7.80	8.24	85	180	2.1	2579	2.52	0.8	2.50	98.6	17.4	Brittle	03/09/18	
BH17-48A	2	С	8.55	8.90	85	170	2.0	2343	2.43	9.3	2.22	22.6	4.0	Brittle	03/09/18	
BH17-49	1	С	7.50	7.91	85	170	2.0	2213	2.29	1.8	2.25	130.6	23.0	Brittle	03/09/18	
BH17-69	2	С	10.15	10.45	85	170	2.0	2178	2.26	1.3	2.23	99.0	17.4	Brittle	03/09/18	
BH17-72	1	С	14.53	14.80	85	170	2.0	2237	2.32	3.1	2.25	80.4	14.2	Brittle	03/09/18	



#### DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111-116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
BH17-14		С	54.83	55.20	85	170	2.0	2409	2.50	1.0	2.47	149.9	26.4	Brittle	13/09/18	

		Contract No:
	PA1 Pirtley	PSL18/4544
	BATBILLEy	Client Ref:
Professional Soils Laboratory		A1B2CH
		////

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	l <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		i te	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-07	48.50	5	А	Perp	85	29	2465	3138.54	56.02	-	14.82	4.72	1.053	4.97	Valid	
BH17-07	48.50	5	I	U	50	22	1100	1400.56	37.42	-	9.37	6.69	0.878	5.87	Valid	
BH17-07	48.50	5	-	U	62	33	2046	2605.05	51.04	-	15.8 <b>2</b>	6.07	1.009	6.13	Valid	
BH17-07	48.50	5		U	85	35	2975	3787.89	61.55	-	15.47	4.08	1.098	4.48	Valid	
BH17-07	48.99	3		U	85	32	2720	3463.21	58.85	-	14.83	4.28	1.076	4.61	Valid	
BH17-07	48.99	3	-	U	62	15	930	1184.11	34.41	-	13.88	11.72	0.845	9.91	Valid	
BH17-07	48.99	3		U	71	32	2272	2892.80	53.78	-	17.94	6.20	1.033	6.41	Valid	
BH17-07	53.90	4	А	Perp	72	20	1440	1833.46	42.82	-	7.08	3.86	0.933	3.60	Valid	
BH17-07	53.90	4	Ι	U	71	24	1704	2169.60	46.58	-	6.09	<b>2</b> .81	0.969	2.72	Valid	
BH17-07	53.90	4	I	U	79	23	1817	2313.48	48.10	-	13.12	5.67	0.983	5.57	Valid	
BH17-07	53.90	4	Ι	U	70	34	2380	3030.31	55.05	-	17.97	5.93	1.044	6.19	Valid	
BH17-07	54.20	2	I	U	82	19	1558	1983.71	44.54	-	4.69	2.36	0.949	2.24	Valid	
BH17-07	<b>54.2</b> 0	2	Ι	U	84	18	151 <b>2</b>	1925.14	43.88	-	5.92	3.08	0.943	2.90	Valid	
BH17-07	54.20	2	I	U	85	15	1275	1623.38	40.29	-	5.67	3.49	0.907	3.17	Valid	
BH17-07	55.40	1	А	Perp	85	24	2040	2597.41	50.96	-	7.52	2.90	1.009	2.92	Valid	
BH17-07	55.40	1	Ι	U	39	25	975	1241.41	35.23	-	3.72	3.00	0.854	2.56	Valid	
BH17-07	55.40	1	Ι	U	75	41	3075	3915.21	62.57	-	8.83	2.26	1.106	2.49	Valid	
BH17-09	51.9 <b>2</b>	4	I	U	40	52	2080	2648.34	51.46	-	8.92	3.37	1.013	3.41	Valid	
BH17-09	51.9 <b>2</b>	4		U	45	49	<b>22</b> 05	2807.49	52.99	-	9.52	3.39	1.026	3.48	Valid	
BH17-09	52.82	1	Α	U	85	28	2380	3030.31	55.05	-	8.45	2.79	1.044	2.91	Valid	
BH17-09	52.82	1	I	U	48	31	1488	1894.58	43.53	-	4.32	2.28	0.940	2.14	Valid	
BH17-09	52.82	1	I	U	42	27	1134	1443.85	38.00	-	5.81	4.02	0.884	3.56	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Depth Sample Test Orientation Dimens (m) Ref Type Par / Pern I		nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks		
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-07	48.50	5	D	Par	-	85	7225	85.00	-	19.13	2.648	1.270	3.36	Valid	
BH17-07	53.90	4	D	Par	-	72	5184	72.00	-	15.35	2.961	1.178	3.49	Valid	
BH17-07	55.40	1	D	Par	-	85	7225	85.00	-	3.73	0.516	1.270	0.66	Valid	
BH17-09	52.82	1	D	U	-	85	7225	85.00	-	1.40	0.194	1.270	0.25	Valid	
*Note	All testing	L parried out or	l camples :	t as received w	ater cont	ent		Dor -	narallal Dar	n – normandi	cular II – P	andom			
Note	All testing (		i samples a	a as received wa		JIII		r ai —	parallel, r el	p – perpendi	culai, 0 – K	andom			
ŵ															Contract No:
							Ad Distlay to Coolhouse								PSL 18/4216
									AI	Dirtiey to		u58			Client Ref:
4043	Pro	ressio	nal S	olis Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D_e}^2$	D <sub>e</sub>	Failurel	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		i to	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-09	52.82	1	I	U	72	45	3240	4125.30	64.23	-	12.80	3.10	1.119	3.47	Valid	
BH17-09	53.00	6	I	U	60	52	3120	3972.51	63.03	-	3.42	0.86	1.110	0.96	Valid	
BH17-09	53.00	6	-	U	53	24	1272	1619.56	40.24	-	4.87	3.01	0.907	2.73	Valid	
BH17-09	53.00	6		U	52	30	1560	1986.25	44.57	-	4.23	2.13	0.950	2.02	Valid	
BH17-09	53.62	2	А	U	85	32	2720	3463.21	58.85	-	11.15	3.22	1.076	3.46	Valid	
BH17-09	53.62	2	-	U	69	39	2691	3426.29	58.53	-	7.50	2.19	1.073	2.35	Valid	
BH17-09	53.6 <b>2</b>	2		U	85	31	<b>2</b> 635	3354.99	57.92	-	4.67	1.39	1.068	1.49	Valid	
BH17-09	53.6 <b>2</b>	2	I	U	62	40	<b>2</b> 480	3157.63	56.19	-	4.34	1.37	1.054	1.45	Valid	
BH17-09	53.92	7	Ι	А	85	55	4675	5952.39	77.15	-	4.09	0.69	1.216	0.84	Valid	
BH17-09	53.92	7	I	U	42	23	966	1229.95	35.07	-	2.34	1.90	0.852	1.62	Valid	
BH17-09	53.9 <b>2</b>	7	I	U	34	22	748	952.38	30.86	-	1.10	1.15	0.805	0.93	Valid	
BH17-09	53.92	7	Ι	U	58	47	2726	3470.85	58.91	-	2.45	0.71	1.077	0.76	Valid	
BH17-09	54.90	5	I	U	66	16	1056	1344.54	36.67	-	2.72	2.02	0.870	1.76	Valid	
BH17-09	54.90	5	Ι	U	70	20	1400	1782.54	42.22	-	6.95	3.90	0.927	3.61	Valid	
BH17-09	54.90	5	Ι	U	69	23	1587	2020.63	44.95	-	8.73	4.32	0.953	4.12	Valid	
BH17-09	54.90	5	Ι	U	72	11	792	1008.41	31.76	-	6.28	6.23	0.815	5.08	Valid	
BH17-09	55.39	3	А	Perp	85	32	2720	3463.21	58.85	-	9.04	2.61	1.076	2.81	Valid	
BH17-09	55.39	3	I	U	66	20	1320	1680.68	41.00	-	6.80	4.05	0.915	3.70	Valid	
BH17-09	55.39	3		U	64	28	1792	2281.65	47.77	-	9.58	4.20	0.980	4.11	Valid	
BH17-11	58.38	6	Α	Perp	75	32	2400	3055.77	55.28	-	10.39	3.40	1.046	3.56	Valid	
BH17-11	58.38	6	Ι	U	40	29	1160	1476.96	38.43	-	2.59	1.75	0.888	1.56	Valid	
BH17-11	59.86	2	А	Perp	75	26	1950	2482.82	49.83	-	5.85	2.36	0.998	2.35	Valid	

\**Note* All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Depth Sample Test Orientation Dimension (m) Ref Type Par / Perp			nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks	
Number	(11)	T(G	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-09	53.6 <b>2</b>	2	D	U	-	85	7225	85.00	-	8.20	1.135	1.270	1.44	Valid	
BH17-09	55.39	3	D	Par	-	85	7225	85.00	-	5.44	0.753	1.178	0.89	Valid	
BH17-11	58.38	6	D	Par	-	75	56 <b>2</b> 5	75.00	-	10.73	1.908	1.270	2.42	Valid	
BH17-11	59.86	2	D	Par	-	75	5625	75.00	-	11.67	<b>2</b> .075	1.270	2.63	Valid	
*Note	All testing	arried out or	n samples a	t as received w	ater cont	ent		Par –	narallel Per	) = perpendia	cular. U = Re	andom			
	· ··· coung (	arried out of	i sampios t					1 ur –	paramen, r er	perpendix					
_ dia															Contract No:
							A 1 Rivelay to Coolhouse								PSL18/4216
									AI	Dirtiey (	JCUarrio	use			Client Ref:
4043	Pro	essio	nal S	olis Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\rm e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		IXG	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-11	59.86	2	Ι	U	49	20	980	1247.77	35.32	-	4.67	3.74	0.855	3.20	Valid	
BH17-11	59.86	2	Ι	U	40	24	960	1222.31	34.96	-	4.08	3.34	0.851	2.84	Valid	
BH17-11	59.86	2	-	U	55	30	1650	2100.85	45.83	-	6.71	3.19	0.962	3.07	Valid	
BH17-11	64.88	5	А	Perp	75	24	1800	2291.83	47.87	-	7.19	3.14	0.981	3.08	Valid	
BH17-11	64.88	5		U	75	20	1500	1909.86	43.70	-	6.43	3.37	0.941	3.17	Valid	
BH17-11	64.88	5	I	U	75	18	1350	1718.87	41.46	-	3.80	2.21	0.919	2.03	Valid	
BH17-11	64.88	5		U	38	40	1520	1935.3 <b>2</b>	43.99	-	2.93	1.51	0.944	1.43	Valid	
BH17-11	64.88	5	I	U	39	32	1248	1589.00	39.86	-	6.38	4.02	0.903	3.63	Valid	
BH17-11	64.88	5		U	43	26	1118	1423.48	37.73	-	3.26	2.29	0.881	2.02	Valid	
BH17-11	64.88	5	I	U	41	23	943	1200.66	34.65	-	5.15	4.29	0.848	3.64	Valid	
BH17-19	30.50	4	А	U	90	52	4680	5958.76	77.19	-	0.36	0.06	1.216	0.07	Valid	
BH17-19	30.50	4	I	U	49	51	2499	3181.83	56.41	-	0.08	0.03	1.056	0.03	Valid	
BH17-19	30.50	4	I	U	34	45	1530	1948.06	44.14	-	0.02	0.01	0.945	0.01	Valid	
BH17-19	33.28	1	I	U	63	30	1890	2406.42	49.06	-	2.80	1.16	0.991	1.15	Valid	
BH17-19	33.28	1	Ι	U	53	34	1802	2294.38	47.90	-	4.51	1.97	0.981	1.93	Valid	
BH17-19	36.42	5	А	Perp	85	40	3400	4329.01	65.80	-	17.76	4.10	1.131	4.64	Valid	
BH17-19	36.42	5		U	41	31	1271	1618.29	40.23	-	8.97	5.54	0.907	5.03	Valid	
BH17-19	36.42	5	I	U	43	30	1290	1642.48	40.53	-	7.07	4.30	0.910	3.92	Valid	
BH17-19	36.42	5	I	U	36	19	684	870.90	29.51	-	2.15	2.47	0.789	1.95	Valid	
BH17-19	36.42	5	I	U	39	45	1755	2234.54	47.27	-	10.29	4.60	0.975	4.49	Valid	
BH17-19	36.42	5	I	U	49	39	1911	2433.16	49.33	-	14.22	5.84	0.994	5.81	Valid	
BH17-19	37.53	6	I	U	42	24	1008	1283.43	35.82	-	0.26	0.20	0.861	0.17	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions ım)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i KG	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Туре	
BH17-11	64.88	5	D	Par	-	75	5625	75.00	-	9.24	1.643	1.200	1.97	Valid	
BH17-19	30.50	4	D	U	-	90	8100	90.00	-	0.41	0.051	1.303	0.07	Valid	
BH17-19	36.42	5	D	Par	-	85	7225	85.00	-	15.55	2.152	1.270	2.73	Valid	
															ļ
*Note	All testing	arriad out or		at as received w	ater cont	ent		Dor -	narallal Dar	n – normandi	cular II – P	andom			I
Note	An testing (		ii sampies a	at as received wa		ciit		r ai —	paranei, r ei	p – perpendi	culai, 0 – K	andom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	١ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		I Co	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-19	37.53	6	Ι	U	51	29	1479	1883.12	43.39	-	0.36	0.19	0.938	0.18	Valid	
BH17-19	39.87	2	I	U	56	10	560	713.01	26.70	-	3.98	5.58	0.754	4.21	Valid	
BH17-19	39.87	2	I	U	69	21	1449	1844.92	42.95	-	3.95	2.14	0.934	2.00	Valid	
BH17-19	39.87	2	I	U	81	22	1782	2268.91	47.63	-	9.07	4.00	0.978	3.91	Valid	
BH17-19	39.87	2		U	70	35	2450	3119.44	55.85	-	8.29	2.66	1.051	2.79	Valid	
BH17-19	40.20	3	А	U	85	35	2975	3787.89	61.55	-	12.88	3.40	1.098	3.73	Valid	
BH17-19	40.20	3	Ι	U	49	34	1666	2121.22	46.06	-	9.38	4.42	0.964	4.26	Valid	
BH17-19	40.20	3	I	U	83	38	3154	4015.80	63.37	-	12.34	3.07	1.113	3.42	Valid	
BH17-19	40.20	3	Ι	U	55	12	660	840.34	28.99	-	3.31	3.94	0.782	3.08	Valid	
BH17-19	40.20	3	Ι	U	52	16	832	1059.34	32.55	-	4.38	4.13	0.824	3.41	Valid	
BH17-19	40.20	3	Ι	U	71	20	1420	1808.00	42.52	-	5.44	3.01	0.930	2.80	Valid	
BH17-21	24.30	5	Ι	U	37	40	1480	1884.39	43.41	-	0.09	0.05	0.938	0.04	Valid	
BH17-21	24.30	5	Ι	U	65	50	3250	4138.03	64.33	-	0.37	0.09	1.120	0.10	Valid	
BH17-21	24.93	1	Ι	U	51	54	2754	3506.50	59.22	-	0.10	0.03	1.079	0.03	Valid	
BH17-21	24.93	1	Ι	U	53	62	3286	4183.87	64.68	-	0.17	0.04	1.123	0.05	Valid	
BH17-21	26.80	6	Ι	U	44	32	1408	1792.72	42.34	-	0.15	0.08	0.928	0.08	Valid	
BH17-21	26.80	6	Ι	U	53	40	2120	2699.27	51.95	-	0.20	0.07	1.017	0.08	Valid	
BH17-21	26.80	6	I	U	59	30	1770	2253.63	47.47	-	0.91	0.40	0.977	0.39	Valid	
BH17-21	27.65	3	А	U	85	31	<b>2</b> 635	3354.99	57.92	-	0.25	0.07	1.068	0.08	Valid	
BH17-21	27.65	3	I	U	50	36	1800	2291.83	47.87	-	0.09	0.04	0.981	0.04	Valid	
BH17-21	27.65	3	I	U	85	28	2380	3030.31	55.05	-	0.18	0.06	1.044	0.06	Valid	
BH17-21	27.65	3	Ι	U	59	50	2950	3756.06	61.29	-	0.24	0.06	1.096	0.07	Valid	

All testing carried out on samples at as received water content \*Note

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

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Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions Im)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-19	40.20	3	D	U	-	85	7225	85.00	-	5.5 <b>2</b>	0.764	1.270	0.97	Valid	
BH17-21	27.65	3	D	U	-	85	7225	85.00	-	0.40	0.055	1.270	0.07	Valid	
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*INOLE	All testing (	carried out of	n samples a	at as received Wa	ater cont	ent		Par =	paranei, Per	p = perpendi	cutar, $U = R$	anuom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	l <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		I\G	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-21	27.65	3	Ι	U	79	49	3871	4928.71	70.20	-	0.07	0.01	1.165	0.02	Valid	
BH17-21	28.20	2	Ι	U	49	41	2009	2557.94	50.58	-	0.15	0.06	1.005	0.06	Valid	
BH17-21	30.30	4	А	U	85	29	2465	3138.54	56.02	-	4.43	1.41	1.053	1.49	Valid	
BH17-21	30.30	4	I	U	62	35	2170	2762.93	52.56	-	4.90	1.77	1.023	1.81	Valid	
BH17-21	30.30	4		U	83	19	1577	2007.90	44.81	-	4.08	2.03	0.952	1.93	Valid	
BH17-21	30.30	4		U	55	20	1100	1400.56	37.42	-	1.20	0.86	0.878	0.75	Valid	
BH17-21	30.30	4	Ι	U	60	26	1560	1986.25	44.57	-	5.24	2.64	0.950	<b>2</b> .51	Valid	
BH17-22	20.62	1	I	U	50	26	1300	1655.21	40.68	-	0.07	0.04	0.911	0.04	Valid	
BH17-22	20.62	1	Ι	U	62	51	316 <b>2</b>	4025.98	63.45	-	0.24	0.06	1.113	0.07	Valid	
BH17-22	24.00	6	Ι	U	51	70	3570	4545.47	67.42	-	0.25	0.05	1.144	0.06	Valid	
BH17-22	24.00	6	Ι	U	42	69	2898	3689.85	60.74	-	0.34	0.09	1.092	0.10	Valid	
BH17-22	24.00	6	Ι	U	85	55	4675	5952.39	77.15	-	0.31	0.05	1.216	0.06	Valid	
BH17-22	28.95	2	А	U	85	40	3400	4329.01	65.80	-	0.83	0.19	1.131	0.22	Valid	
BH17-22	28.95	2	Ι	U	48	49	2352	2994.66	54.7 <b>2</b>	-	1.91	0.64	1.041	0.66	Valid	
BH17-22	26.95	2	Ι	U	50	62	3100	3947.04	62.83	-	0.47	0.12	1.108	0.13	Valid	
BH17-22	29.20	7	Ι	U	64	26	1664	2118.67	46.03	-	0.86	0.41	0.963	0.39	Valid	
BH17-22	29.20	7	Ι	U	46	19	874	1112.81	33.36	-	0.56	0.50	0.834	0.42	Valid	
BH17-22	31.12	8	Ι	U	49	30	1470	1871.66	43.26	-	5.57	2.98	0.937	2.79	Valid	
BH17-22	31.12	8	Ι	U	54	32	1728	2200.16	46.91	-	4.07	1.85	0.972	1.80	Valid	
BH17-22	31.12	8	Ι	U	64	30	1920	2444.62	49.44	-	1.74	0.71	0.995	0.71	Valid	
BH17-22	34.60	10	А	Perp	80	32	2560	3259.49	57.09	-	14.84	4.55	1.062	4.83	Valid	
BH17-22	34.60	10	Ι	U	41	32	1312	1670.49	40.87	-	7.45	4.46	0.913	4.07	Valid	

All testing carried out on samples at as received water content \*Note

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

3043



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions im)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-21	30.30	4	D	U	-	85	7225	85.00	-	3.85	0.533	1.270	0.68	Valid	
BH17-22	<b>2</b> 8.95	2	D	U	-	85	7225	85.00	-	0.59	0.082	1.270	0.10	Valid	
BH17-22	34.60	10	D	Par	-	80	6400	80.00	-	21.42	3.347	1.236	4.14	Valid	
*Note	All testing	carried out or	n samples a	at as received wa	ater cont	ent		Par =	parallel, Per	o = perpendi	cular, $\mathbf{U} = \mathbf{R}$	andom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample R <i>e</i> f	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure Type	Remarks
Number		NO	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-22	34.60	10	-	U	80	15	1200	1527.89	39.09	-	5.16	3.38	0.895	3.02	Valid	
BH17-22	34.60	10	-	U	62	51	3162	4025.98	63.45	-	7.90	1.96	1.113	2.18	Valid	
BH17-22	34.87	3	А	Perp	85	49	4165	5303.04	72.82	-	5.14	0.97	1.184	1.15	Valid	
BH17-22	34.87	3	-	U	41	29	1189	1513.88	38.91	-	0.99	0.65	0.893	0.58	Valid	
BH17-22	34.87	3		U	85	26	2210	2813.86	53.05	-	4.96	1.76	1.027	1.81	Valid	
BH17-22	34.87	3	-	U	52	27	1404	1787.63	42.28	-	3.43	1.92	0.927	1.78	Valid	
BH17-22	35.51	4		U	46	44	2024	2577.04	50.76	-	5.11	1.98	1.007	2.00	Valid	
BH17-22	35.51	4	-	U	42	36	1512	1925.14	43.88	-	3.30	1.71	0.943	1.62	Valid	
BH17-22	35.51	4		U	42	39	1638	2085.57	45.67	-	3.97	1.90	0.960	1.83	Valid	
BH17-22	35.51	4	I	U	43	49	2107	2682.72	51.79	-	1.79	0.67	1.016	0.68	Valid	
BH17-22	35.80	5	А	Perp	80	21	1680	2139.04	46. <b>2</b> 5	-	7.44	3.48	0.966	3.36	Valid	
BH17-22	35.80	5	I	U	67	36	2412	3071.05	55.42	-	11.86	3.86	1.047	4.04	Valid	
BH17-22	35.80	5	I	U	63	15	945	1203.21	34.69	-	6.95	5.78	0.848	4.90	Valid	
BH17-22	35.80	5	I	U	65	38	2470	3144.90	56.08	-	9.95	3.16	1.053	3.33	Valid	
BH17-22	35.80	5	Ι	U	62	31	1922	2447.17	49.47	-	10. <b>2</b> 5	4.19	0.995	4.17	Valid	
BH17-22	36.02	11	А	Perp	85	46	3910	4978.37	70.56	-	15.01	3.02	1.168	3.52	Valid	
BH17-22	36.02	11	I	U	43	26	1118	1423.48	37.73	-	4.18	2.94	0.881	2.59	Valid	
BH17-22	36.02	11	I	U	40	27	1080	1375.10	37.08	-	6.28	4.57	0.874	3.99	Valid	
BH17-22	36.02	11	I	U	85	23	1955	2489.18	49.89	-	6.76	2.72	0.999	2.71	Valid	
BH17-22	36.02	11	Ι	U	29	34	986	1255.41	35.43	-	1.54	1.23	0.856	1.05	Valid	
BH17-22	36.02	11	I	U	51	39	1989	2532.47	50.32	-	8.06	3.18	1.003	3.19	Valid	
BH17-25	21.00	11	I	U	59	42	2478	3155.09	56.17	-	0.24	0.08	1.054	0.08	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-22	34.87	3	D	Par	-	85	7225	85.00	-	1.44	0.199	1.270	0. <b>2</b> 5	Valid	
BH17-22	35.80	5	D	Par	-	80	6400	80.00	-	8.33	1.302	1.236	1.61	Valid	
BH17-22	36.02	11	D	Par	-	85	7225	85.00	-	3.34	0.462	1.270	0.59	Valid	
*Note	All testing of	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendi	cular, U = Raci	andom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		i ta	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-25	21.00	11	Ι	U	32	29	928	1181.57	34.37	-	0.17	0.14	0.845	0.12	Valid	
BH17-25	21.50	1	I	U	61	42	2562	3262.04	57.11	-	0.10	0.03	1.062	0.03	Valid	
BH17-25	21.50	1	Ι	U	62	37	2294	2920.81	54.04	-	0.08	0.03	1.036	0.03	Valid	
BH17-25	21.50	1	I	U	41	22	902	1148.46	33.89	-	1.62	1.41	0.839	1.18	Valid	
BH17-25	21.50	1	I	U	43	20	860	1094.99	33.09	-	2.24	2.05	0.830	1.70	Valid	
BH17-25	21.50	1		U	43	42	1806	2299.47	47.95	-	1.42	0.62	0.981	0.61	Valid	
BH17-25	<b>2</b> 1.50	1		U	83	48	3984	5072.59	71.22	-	0.17	0.03	1.173	0.04	Valid	
BH17-25	24.27	2	I	U	56	20	1120	1426.03	37.76	-	7.14	5.01	0.881	4.41	Valid	
BH17-25	24.27	2		U	59	28	165 <b>2</b>	2103.39	45.86	-	2.64	1.26	0.962	1.21	Valid	
BH17-25	24.50	10	А	Perp	85	25	2125	2705.63	52.02	-	5.53	2.04	1.018	2.08	Valid	
BH17-25	<b>2</b> 4.50	10	I	U	51	22	1122	1428.57	37.80	-	5.80	4.06	0.882	3.58	Valid	
BH17-25	24.50	10	Ι	U	85	18	1530	1948.06	44.14	-	3.07	1.58	0.945	1.49	Valid	
BH17-25	<b>2</b> 4.50	10	I	U	85	22	1870	2380.96	48.80	-	6.19	2.60	0.989	2.57	Valid	
BH17-25	24.50	10	Ι	U	62	29	1798	2289.28	47.85	-	10.08	4.40	0.980	4.32	Valid	
BH17-25	24.50	10	Ι	U	60	27	1620	2062.65	45.42	-	7.15	3.47	0.958	3.32	Valid	
BH17-25	24.50	10		U	46	22	1012	1288.52	35.90	-	4.66	3.62	0.861	3.12	Valid	
BH17-25	24.50	10	Ι	U	71	14	994	1265.60	35.58	-	4.94	3.90	0.858	3.35	Valid	
BH17-25	25.90	3	А	Perp	85	29	2465	3138.54	56.02	-	5.51	1.76	1.053	1.85	Valid	
BH17-25	25.90	3	Ι	U	50	27	1350	1718.87	41.46	-	2.34	1.36	0.919	1.25	Valid	
BH17-25	25.90	3	Ι	U	71	25	1775	2260.00	47.54	-	6.33	2.80	0.978	2.74	Valid	
BH17-25	25.90	3	Ι	U	70	20	1400	1782.54	42.22	-	4.77	2.68	0.927	2.48	Valid	
BH17-25	25.90	3	Ι	U	66	27	1782	2268.91	47.63	-	7.79	3.43	0.978	3.36	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Contract No:	
PSL18/4216	
Client Ref:	
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Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(m)	Ref	Туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Туре	
BH17-25	24.50	10	D	Par	-	85	7225	85.00	-	7.79	1.078	1.270	1.37	Valid	
BH17-25	25.90	3	D	Par	-	85	7225	85.00	-	6.20	0.858	1.270	1.09	Valid	
*17-4-	A 11 to-t:	amiadt						D	monolle1 D	1'		andow			
<u>*Note</u>	All testing (	carried out of	i sampies a	at as received wa	ater conte			Par =	parallel, Perj	p = perpendic	cutar, $U = R$	andom			
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4043	Pro	ressio	nal S	olis Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample R <i>e</i> f	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure Type	Remarks
Number		NG	турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-25	26.33	9	Ι	U	36	36	1296	1650.12	40.62	-	7.68	4.65	0.911	4.24	Valid	
BH17-25	26.33	9	Ι	U	37	36	1332	1695.96	41.18	-	7.04	4.15	0.916	3.80	Valid	
BH17-25	27.20	8	I	U	40	34	1360	1731.61	41.61	-	0.58	0.33	0.921	0.31	Valid	
BH17-25	27.20	8	Ι	U	45	25	11 <b>2</b> 5	1432.39	37.85	-	1.39	0.97	0.882	0.86	Valid	
BH17-25	27.20	8	Ι	U	69	37	2553	3250.58	57.01	-	0.38	0.12	1.061	0.12	Valid	
BH17-25	28.77	4	А	Perp	85	40	3400	4329.01	65.80	-	4.12	0.95	1.131	1.08	Valid	
BH17-25	28.77	4	I	U	51	21	1071	1363.64	36.93	-	5.90	4.33	0.873	3.78	Valid	
BH17-25	28.77	4	Ι	U	62	31	1922	2447.17	49.47	-	3.43	1.40	0.995	1.39	Valid	
BH17-25	28.77	4	I	U	74	39	2886	3674.57	60.62	-	6.94	1.89	1.091	2.06	Valid	
BH17-25	28.77	4	Ι	U	49	34	1666	2121.22	46.06	-	7.11	3.35	0.964	3.23	Valid	
BH17-25	28.77	4	Ι	U	56	39	2184	2780.76	52.73	-	8.35	3.00	1.024	3.08	Valid	
BH17-25	29.17	7	Ι	U	34	42	1428	1818.19	42.64	-	6.56	3.61	0.931	3.36	Valid	
BH17-25	29.17	7	Ι	U	55	50	2750	3501.41	59.17	-	1.80	0.51	1.079	0.55	Valid	
BH17-25	29.54	5	Ι	U	45	33	1485	1890.76	43.48	-	3.57	1.89	0.939	1.77	Valid	
BH17-25	29.54	5	Ι	U	42	34	1428	1818.19	42.64	-	3.73	2.05	0.931	1.91	Valid	
BH17-25	29.54	5	I	U	51	30	1530	1948.06	44.14	-	5.22	2.68	0.945	<b>2</b> .53	Valid	
BH17-25	29.54	5	I	U	41	26	1066	1357.27	36.84	-	3.85	2.84	0.872	2.47	Valid	
BH17-25	<b>2</b> 9.54	5	Ι	U	59	17	1003	1277.06	35.74	-	2.56	2.00	0.860	1.72	Valid	
BH17-25	29.54	5	Ι	U	52	27	1404	1787.63	42.28	-	3.58	2.00	0.927	1.86	Valid	
BH17-25	30.44	6	Α	Perp	85	34	2890	3679.66	60.66	-	6.34	1.72	1.091	1.88	Valid	
BH17-25	30.44	6	Ι	U	52	31	1612	2052.46	45.30	-	6.03	2.94	0.957	2.81	Valid	
BH17-25	30.44	6	Ι	U	39	33	1287	1638.66	40.48	-	4.10	2.50	0.909	2.28	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

Contract No:

PSL18/4216

Client Ref:

3043



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Borehole	Depth	Sample	Test	Orientation	(m	im)	D <sub>e</sub> <sup>2</sup>	D <sub>e</sub>	Failur	eLoad	l <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	Rei	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-25	28.77	4	D	Par	-	85	7225	85.00	-	1.73	0.239	1.270	0.30	Valid	
BH17-25	30.44	6	D	Par	-	85	7225	85.00	-	4.91	0.680	1.270	0.86	Valid	
*Noto	All tostin -	armind out		t as reasized	ator cort	ont		Dorr	norollal D	- nom on -1:	oulor U – D	ndom			
- <i>inole</i>	An testing (	arrieu out ol	n samples a	at as received Wa		CIII		Par =	paraner, Perj	p – perpendi	Cutat, U = K	anuom			
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4043	Pro	ressio	nal S	ons Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		i (G	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-25	30.44	6	Ι	U	42	32	1344	1711.23	41.37	-	5.50	3.21	0.918	2.95	Valid	
BH17-27A	17.01	1	А	U	85	34	2890	3679.66	60.66	-	15.22	4.14	1.091	4.51	Valid	
BH17-27A	17.01	1		U	51	24	1224	1558.45	39.48	-	9.93	6.37	0.899	5.73	Valid	
BH17-27A	17.01	1	I	U	85	39	3315	4220.79	64.97	-	14.19	3.36	1.125	3.78	Valid	
BH17-27A	17.90	7		U	54	49	2646	3368.99	58.04	-	0.27	0.08	1.069	0.09	Valid	
BH17-27A	17.90	7		U	40	52	2080	2648.34	51.46	-	0.18	0.07	1.013	0.07	Valid	
BH17-27A	17.90	7		U	60	32	1920	2444.62	49.44	-	0.24	0.10	0.995	0.10	Valid	
BH17-27A	18.04	6	А	U	85	42	3570	4545.47	67.42	-	0.21	0.05	1.144	0.05	Valid	
BH17-27A	18.04	6		U	59	24	1416	1802.91	42.46	-	0.43	0.24	0.929	0.22	Valid	
BH17-27A	18.04	6	Ι	U	51	36	1836	2337.67	48.35	-	0.16	0.07	0.985	0.07	Valid	
BH17-27A	18.04	6	I	U	35	40	1400	1782.54	42.22	-	0.17	0.10	0.927	0.09	Valid	
BH17-27A	19. <b>2</b> 5	5	Ι	U	46	16	736	937.10	30.61	-	3.72	3.97	0.802	3.18	Valid	
BH17-27A	19. <b>2</b> 5	5	I	U	47	19	893	1137.00	33.72	-	4.09	3.60	0.838	3.01	Valid	
BH17-27A	19. <b>2</b> 5	5	Ι	U	42	31	1302	1657.76	40.72	-	4.24	2.56	0.912	2.33	Valid	
BH17-27A	19. <b>2</b> 5	5	Ι	U	62	21	1302	1657.76	40.72	-	1.92	1.16	0.912	1.06	Valid	
BH17-27A	19. <b>2</b> 5	5		U	58	19	1102	1403.11	37.46	-	1.22	0.87	0.878	0.76	Valid	
BH17-27A	19.97	2	А	U	80	28	2240	2852.06	53.40	-	10.93	3.83	1.030	3.95	Valid	
BH17-27A	19.97	2	I	U	73	33	2409	3067.23	55.38	-	11.01	3.59	1.047	3.76	Valid	
BH17-27A	19.97	2	Ι	U	80	51	4080	5194.8 <b>2</b>	72.08	-	15.81	3.04	1.179	3.59	Valid	
BH17-27A	21.60	4		Par	35	37	1295	1648.85	40.61	-	5.50	3.34	0.911	3.04	Valid	
BH17-27A	21.60	4	I	Par	42	43	1806	2299.47	47.95	-	7.51	3.27	0.981	3.21	Valid	
BH17-27A	21.60	4	Ι	Par	42	26	1092	1390.38	37.29	-	6.63	4.77	0.876	4.18	Valid	

\**Note* All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-27A	17.01	1	D	U	-	85	7225	85.00	-	<b>2</b> 8.81	3.988	1.270	5.06	Valid	
BH17-27A	18.04	6	D	U	-	85	7225	85.00	-	0.29	0.040	1.270	0.05	Valid	
BH17-27A	19.97	2	D	U	-	80	6400	80.00	-	13.17	2.058	1.236	2.54	Valid	
<u>*Note</u>	All testing carried out on samples at as received water content Par = parallel, Perp = perpendicular, U = Random														
<b>G</b>	Contract												Contract No:		
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4043	Pro	fessio	nal S	oils Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample R <i>e</i> f	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure Type	Remarks
Number		i to	турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-36	11.80	3	А	U	85	35	2975	3787.89	61.55	-	0.08	0.02	1.098	0.02	Valid	
BH17-36	11.80	3		U	63	56	3528	4491.99	67.02	-	0.22	0.05	1.141	0.06	Valid	
BH17-36	11.80	3		U	49	54	2646	3368.99	58.04	-	0.09	0.03	1.069	0.03	Valid	
BH17-36	11.80	3		U	34	45	1530	1948.06	44.14	-	0.10	0.05	0.945	0.05	Valid	
BH17-36	12.05	1	А	U	85	34	2890	3679.66	60.66	-	0.40	0.11	1.091	0.12	Valid	
BH17-36	12.05	1		U	51	42	2142	2727.28	52.22	-	0.16	0.06	1.020	0.06	Valid	
BH17-36	12.05	1		U	50	32	1600	2037.18	45.14	-	0.32	0.16	0.955	0.15	Valid	
BH17-36	12.05	1		U	64	24	1536	1955.70	44.22	-	0.25	0.13	0.946	0.12	Valid	
BH17-36	14.75	2		U	80	57	4560	5805.97	76.20	-	5.66	0.97	1.209	1.18	Valid	
BH17-36	14.75	2	Ι	U	46	49	2254	2869.88	53.57	-	4.30	1.50	1.032	1.55	Valid	
BH17-36	14.75	2	I	U	41	53	2173	2766.75	52.60	-	2.74	0.99	1.023	1.01	Valid	
BH17-39A	5.15	3	Ι	U	72	49	3528	4491.99	67.02	-	3.19	0.71	1.141	0.81	Valid	
BH17-39A	5.15	3	I	U	52	45	2340	2979.38	54.58	-	4.18	1.40	1.040	1.46	Valid	
BH17-39A	7.00	2	А	Perp	85	33	2805	3571.44	59.76	-	<b>2</b> .54	0.71	1.084	0.77	Valid	
BH17-39A	7.00	2	Ι	U	46	35	1610	2049.92	45. <b>2</b> 8	-	2.34	1.14	0.956	1.09	Valid	
BH17-39A	7.00	2	Ι	U	41	26	1066	1357.27	36.84	-	1.64	1.21	0.872	1.05	Valid	
BH17-39A	7.00	2	Ι	U	81	31	<b>2</b> 511	3197.10	56.54	-	3.58	1.12	1.057	1.18	Valid	
BH17-39A	7.00	2	I	U	85	27	2295	2922.08	54.06	-	4.64	1.59	1.036	1.64	Valid	
BH17-39A	10.30	4	А	U	90	40	3600	4583.66	67.70	-	0.16	0.03	1.146	0.04	Valid	
BH17-39A	10.30	4	Ι	U	46	34	1564	1991.35	44.62	-	0.16	0.08	0.950	0.08	Valid	
BH17-39A	10.30	4	Ι	U	45	49	2205	2807.49	52.99	-	0.12	0.04	1.026	0.04	Valid	
BH17-39A	10.30	4	Ι	U	52	31	1612	2052.46	45.30	-	0.08	0.04	0.957	0.04	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions Im)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tei	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Туре	
BH17-36	11.80	3	D	U	-	85	7225	85.00	-	0.17	0.024	1.270	0.03	Valid	
BH17-36	12.05	1	D	U	-	85	7225	85.00	-	0.45	0.062	1.270	0.08	Valid	
BH17-39A	7.00	2	D	Par	-	85	7225	85.00	-	5.27	0.729	1.270	0.93	Valid	
BH17-39A	10.30	4	D	U	-	90	8100	90.00	-	0.25	0.031	1.303	0.04	Valid	
			ļ												
*Note	All testing	carried out or	n samples a	Image: state second water content Par = parallel, Perp = perpendicular, U = Random											
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							A1 Pirtley to Coolhours								PSL 18/4216
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4043	Pro	ressio	nal S	olis Lab	oorat	ory		3043						3043	

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\rm e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure	Remarks
Number		I Co	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-48A	5.41	1	Α	U	85	31	2635	3354.99	57.92	-	3.69	1.10	1.068	1.18	Valid	
BH17-48A	5.41	1	I	U	80	28	2240	2852.06	53.40	-	2.89	1.01	1.030	1.04	Valid	
BH17-48A	5.41	1	I	U	80	41	3280	4176.23	64.6 <b>2</b>	-	2.84	0.68	1.122	0.76	Valid	
BH17-48A	7.60	5	Ι	U	63	52	3276	4171.13	64.58	-	0.08	0.02	1.122	0.02	Valid	
BH17-48A	7.60	5	-	U	42	39	1638	2085.57	45.67	-	0.05	0.02	0.960	0.02	Valid	
BH17-48A	7.60	5	-	U	59	43	2537	3230.21	56.83	-	0.04	0.01	1.059	0.01	Valid	
BH17-48A	10.00	4	-	U	51	24	1224	1558.45	39.48	-	2.23	1.43	0.899	1.29	Valid	
BH17-48A	10.00	4	-	U	59	19	1121	1427.30	37.78	-	1.13	0.79	0.882	0.70	Valid	
BH17-48A	10.00	4	-	U	60	42	2520	3208.56	56.64	-	2.36	0.74	1.058	0.78	Valid	
BH17-48A	10.00	4	-	U	52	39	2028	2582.13	50.81	-	5.00	1.94	1.007	1.95	Valid	
BH17-48A	11.06	3	Ι	U	90	42	3780	4812.85	69.37	-	4.00	0.83	1.159	0.96	Valid	
BH17-48A	11.06	3	-	U	52	31	161 <b>2</b>	2052.46	45.30	-	1.99	0.97	0.957	0.93	Valid	
BH17-48A	12.20	7	I	U	60	50	3000	3819.72	61.80	-	3.75	0.98	1.100	1.08	Valid	
BH17-48A	12.20	7	Ι	U	49	46	2254	2869.88	53.57	-	2.58	0.90	1.032	0.93	Valid	
BH17-48A	12.20	7	Ι	U	62	45	2790	3552.34	59.60	-	3.24	0.91	1.082	0.99	Valid	
BH17-48A	13.45	6	-	U	82	55	4510	5742.31	75.78	-	0.23	0.04	1.206	0.05	Valid	
BH17-48A	13.45	6	Ι	U	62	46	2852	3631.28	60.26	-	0.17	0.05	1.088	0.05	Valid	
BH17-48A	13.45	6	Ι	U	76	45	3420	4354.48	65.99	-	1.36	0.31	1.133	0.35	Valid	
BH17-49	6.45	8	-	U	76	49	3724	4741.54	68.86	-	2.67	0.56	1.155	0.65	Valid	
BH17-49	6.45	8	I	U	47	42	1974	2513.37	50.13	-	3.22	1.28	1.001	1.28	Valid	
BH17-49	6.45	8	I	U	39	36	1404	1787.63	42.28	-	2.69	1.50	0.927	1.40	Valid	
BH17-49	8.22	2	Α	U	85	26	2210	2813.86	53.05	-	2.37	0.84	1.027	0.86	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions Im)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	I Co	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-48A	5.41	1	D	U	-	85	7225	85.00	-	11.93	1.651	1.270	<b>2</b> .10	Valid	
BH17-49	8.22	2	D	U	-	85	7225	85.00	-	7.52	1.041	1.270	1.32	Valid	
*Note	All testing of	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Perj	o = perpendi	cular, $U = R$	andom			
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4043	Pro	lessio	nal S	ons Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure	Remarks
NUTIDE		I Co	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-49	8.22	2	Ι	U	46	28	1288	1639.93	40.50	-	2.47	1.51	0.909	1.37	Valid	
BH17-49	8.22	2	I	U	50	32	1600	2037.18	45.14	-	1.67	0.82	0.955	0.78	Valid	
BH17-49	8.22	2	I	U	56	23	1288	1639.93	40.50	-	1.99	1.21	0.909	1.10	Valid	
BH17-49	8.73	7	I	U	55	49	2695	3431.38	58.58	-	1.80	0.52	1.074	0.56	Valid	
BH17-49	8.73	7		U	53	37	1961	2496.82	49.97	-	3.89	1.56	1.000	1.56	Valid	
BH17-49	8.73	7	I	U	55	30	1650	2100.85	45.83	-	2.25	1.07	0.962	1.03	Valid	
BH17-49	8.73	7		U	59	26	1534	1953.15	44.19	-	2.70	1.38	0.946	1.31	Valid	
BH17-49	8.73	7		U	71	29	2059	2621.60	51.20	-	3.33	1.27	1.011	1.28	Valid	
BH17-49	9.90	3		U	85	83	7055	8982.70	94.78	-	1.99	0.22	1.333	0.30	Valid	
BH17-49	9.90	3		U	79	45	3555	4526.37	67.28	-	1.50	0.33	1.143	0.38	Valid	
BH17-49	9.90	3	I	U	39	37	1443	1837.28	42.86	-	2.08	1.13	0.933	1.06	Valid	
BH17-49	11.95	9		U	60	45	2700	3437.75	58.63	-	0.14	0.04	1.074	0.04	Valid	
BH17-49	11.95	9	I	U	50	32	1600	2037.18	45.14	-	0.14	0.07	0.955	0.07	Valid	
BH17-49	13.24	10	А	U	80	25	2000	2546.48	50.46	-	0.94	0.37	1.004	0.37	Valid	
BH17-49	13.24	10	Ι	U	51	20	1020	1298.70	36.04	-	0.54	0.42	0.863	0.36	Valid	
BH17-49	13.24	10		U	40	22	880	1120.45	33.47	-	0.83	0.74	0.835	0.62	Valid	
BH17-49	13.24	10		U	68	25	1700	2164.51	46.5 <b>2</b>	-	1.39	0.64	0.968	0.62	Valid	
BH17-49	13.29	4	I	U	67	16	1072	1364.91	36.94	-	2.00	1.47	0.873	1.28	Valid	
BH17-49	13.29	4	I	U	74	12	888	1130.64	33.62	-	2.12	1.88	0.836	1.57	Valid	
BH17-49	13.29	4	Ι	U	72	15	1080	1375.10	37.08	-	3.46	2.52	0.874	2.20	Valid	
BH17-49	13.29	4	I	U	82	33	2706	3445.39	58.70	-	4.89	1.42	1.075	1.53	Valid	
BH17-49	13.29	4	Ι	U	81	22	1782	2268.91	47.63	-	4.58	2.02	0.978	1.98	Valid	

\**Note* All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random



Borehole	Depth	Sample R <i>e</i> f	Test	Orientation	Dimer (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks		
Number	(11)	i KG	Турс	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Турс			
BH17-49	13.24	10	D	U	-	80	6400	80.00	-	0.11	0.017	1.236	0.02	Valid			
*Note	All testing of	carried out or	n samples a	t as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendi	cular, U = R	andom					
															Contract No:		
							A1 Birtley to Coalbourse								PSL18/4216		
	D								AI			use			Client Ref:		
4043	Pro	ressio	nal S	olis Lab	orat	ory									3043		
ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample R <i>e</i> f	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure Type	Remarks
Number		NG	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-49	13.95	12	А	U	80	30	2400	3055.77	55. <b>2</b> 8	-	0.14	0.05	1.046	0.05	Valid	
BH17-49	13.95	12	I	U	45	34	1530	1948.06	44.14	-	0.20	0.10	0.945	0.10	Valid	
BH17-49	13.95	12	-	U	41	30	1230	1566.08	39.57	-	0.26	0.17	0.900	0.15	Valid	
BH17-49	14.23	5	I	U	85	82	6970	8874.48	94.20	-	0.38	0.04	1.330	0.06	Valid	
BH17-49	14.23	5		U	42	52	2184	2780.76	52.73	-	1.18	0.42	1.024	0.43	Valid	
BH17-49	14.60	6	-	U	48	32	1536	1955.70	44.22	-	0.74	0.38	0.946	0.36	Valid	
BH17-49	14.60	6		U	46	21	966	1229.95	35.07	-	1.04	0.85	0.852	0.72	Valid	
BH17-49	14.60	6	-	U	71	42	2982	3796.80	61.6 <b>2</b>	-	1.31	0.35	1.099	0.38	Valid	
BH17-49	14.90	11	А	U	85	30	2550	3246.76	56.98	-	0.35	0.11	1.061	0.11	Valid	
BH17-49	14.90	11		U	42	21	882	1123.00	33.51	-	0.95	0.85	0.835	0.71	Valid	
BH17-50	14.45	1	I	U	73	23	1679	2137.77	46.24	-	3.21	1.50	0.965	1.45	Valid	
BH17-50	14.45	1		U	80	24	1920	2444.62	49.44	-	1.00	0.41	0.995	0.41	Valid	
BH17-50	14.45	1	I	U	72	30	2160	2750.20	52.44	-	3.30	1.20	1.022	1.23	Valid	
BH17-50	15.90	2	Ι	U	69	43	2967	3777.70	61.46	-	1.26	0.33	1.097	0.37	Valid	
BH17-50	16.30	3	А	U	80	24	1920	2444.62	49.44	-	0.07	0.03	0.995	0.03	Valid	
BH17-50	16.30	3		U	39	41	1599	2035.91	45.1 <b>2</b>	-	0.15	0.07	0.955	0.07	Valid	
BH17-50	16.30	3		U	52	25	1300	1655.21	40.68	-	0.07	0.04	0.911	0.04	Valid	
BH17-50	16.30	3	-	U	80	51	4080	5194.8 <b>2</b>	72.08	-	0.16	0.03	1.179	0.04	Valid	
BH17-54	9.77	1	А	U	85	29	2465	3138.54	56.0 <b>2</b>	-	4.79	1.53	1.053	1.61	Valid	
BH17-54	9.77	1	Ι	U	64	31	1984	2526.11	50.26	-	4.22	1.67	1.002	1.67	Valid	
BH17-54	9.77	1	Ι	U	56	27	1512	1925.14	43.88	-	2.29	1.19	0.943	1.12	Valid	
BH17-54	9.77	1	Ι	U	41	30	1230	1566.08	39.57	-	2.60	1.66	0.900	1.49	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions Im)	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-49	13.95	12	D	U	-	80	6400	80.00	-	0.17	0.027	1.236	0.03	Valid	
BH17-49	14.90	11	D	U	-	85	7225	85.00	-	0.20	0.028	1.270	0.04	Valid	
BH17-50	16.30	3	D	U	-	80	6400	80.00	-	0.15	0.023	1.236	0.03	Valid	
BH17-54	9.77	1	D	U	-	85	7225	85.00	-	7.67	1.062	1.270	1.35	Valid	
			ļ												
*Note	All testing	carried out or	n samples a	at as received w	ater cont	ent		Par =	parallel, Per	p = perpendi	cular, U = R	andom			
	e		1						1		,				
															Contract No:
									Δ1	Rivelay +	o Coalbo				PSL 18/4216
	Dur								AI	Diffiey (	U CUAITIO	use			Client Ref:
4043	Pro	ressio	nal S	ons Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	l <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		I Co	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-54	9.77	1	Ι	U	45	29	1305	1661.58	40.76	-	2.84	1.71	0.912	1.56	Valid	
BH17-54	9.77	1	Ι	U	80	35	2800	3565.07	59.71	-	3.64	1.02	1.083	1.11	Valid	
BH17-54	10.20	3	I	U	52	25	1300	1655.21	40.68	-	1.41	0.85	0.911	0.78	Valid	
BH17-54	10.20	3	I	U	61	27	1647	2097.03	45.79	-	1.80	0.86	0.961	0.83	Valid	
BH17-54	10.20	3		U	55	30	1650	2100.85	45.83	-	1.37	0.65	0.962	0.63	Valid	
BH17-54	10.20	3		U	69	21	1449	1844.92	42.95	-	1.81	0.98	0.934	0.92	Valid	
BH17-54	11.20	4		U	44	59	2596	3305.33	57.49	-	3.19	0.97	1.065	1.03	Valid	
BH17-54	11.20	4	I	U	33	54	1782	2268.91	47.63	-	2.18	0.96	0.978	0.94	Valid	
BH17-54	12.15	5	А	U	85	35	2975	3787.89	61.55	-	0.13	0.03	1.098	0.04	Valid	
BH17-54	12.15	5	Ι	U	46	25	1150	1464.23	38.27	-	0.05	0.03	0.887	0.03	Valid	
BH17-54	12.15	5	Ι	U	64	42	2688	3422.47	58.50	-	0.44	0.13	1.073	0.14	Valid	
BH17-54	13.56	2	Ι	U	60	22	1320	1680.68	41.00	-	0.21	0.12	0.915	0.11	Valid	
BH17-54	13.56	2	I	U	44	36	1584	2016.81	44.91	-	0.09	0.04	0.953	0.04	Valid	
BH17-54	13.56	2	Ι	U	51	38	1938	2467.54	49.67	-	0.22	0.09	0.997	0.09	Valid	
BH17-54	14.15	6	Ι	U	80	32	2560	3259.49	57.09	-	1.28	0.39	1.062	0.42	Valid	
BH17-54	14.15	6	Ι	U	41	29	1189	1513.88	38.91	-	0.58	0.38	0.893	0.34	Valid	
BH17-54	14.15	6	Ι	U	70	34	2380	3030.31	55.05	-	0.14	0.05	1.044	0.05	Valid	
BH17-54	17.02	3	А	Perp	85	26	2210	2813.86	53.05	-	<b>2</b> .51	0.89	1.027	0.92	Valid	
BH17-54	17.02	3	Ι	U	85	34	2890	3679.66	60.66	-	4.96	1.35	1.091	1.47	Valid	
BH17-54	17.02	3	Ι	U	51	27	1377	1753.25	41.87	-	5.17	2.95	0.923	2.72	Valid	
BH17-54	17.55	4	Α	U	85	27	2295	2922.08	54.06	-	7.25	2.48	1.036	2.57	Valid	
BH17-54	17.55	4	Ι	U	48	42	2016	2566.85	50.66	-	6.11	2.38	1.006	2.39	Valid	

\**Note* All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-54	<b>12</b> .15	5	D	U	-	85	7225	85.00	-	0.36	0.050	1.270	0.06	Valid	
BH17-54	17.02	3	D	Par	-	85	7225	85.00	-	3.18	0.440	1.270	0.56	Valid	
BH17-54	17.55	4	D	U	-	85	7225	85.00	-	4.93	0.682	1.270	0.87	Valid	
					·										
*Note	All testing	carried out or	n samples a	at as received wa	ater cont	ent		Par =	parallel, Per	p = perpendi	cular, $U = R$	andom			
	_		_							_					
<b>G</b>															Contract No:
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									A1	Birtleyt	ocoaino	use			Client Ref:
4043	Pro	fessio	nal S	oils Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failurel	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		ING.	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-54	17.55	4	Ι	U	62	39	<b>2</b> 418	3078.69	55.49	-	6.31	2.05	1.048	2.15	Valid	
BH17-54	17.55	4	I	U	59	30	1770	2253.63	47.47	-	7.38	3.27	0.977	3.20	Valid	
BH17-54	17.55	4		U	80	28	2240	2852.06	53.40	-	7.64	2.68	1.030	2.76	Valid	
BH17-55	4.40	1	А	U	85	28	2380	3030.31	55.05	-	5.31	1.75	1.044	1.83	Valid	
BH17-55	4.40	1		U	44	49	2156	2745.10	5 <b>2</b> .39	-	4.16	1.5 <b>2</b>	1.021	1.55	Valid	
BH17-55	4.40	1		U	85	40	3400	4329.01	65.80	-	5.49	1.27	1.131	1.43	Valid	
BH17-55	4.40	1		U	60	36	2160	2750.20	5 <b>2</b> .44	-	3.39	1.23	1.022	1.26	Valid	
BH17-55	6.75	3	А	U	85	33	2805	3571.44	59.76	-	5.22	1.46	1.084	1.58	Valid	
BH17-55	6.75	3		U	41	36	1476	1879.30	43.35	-	3.00	1.60	0.938	1.50	Valid	
BH17-55	6.75	3	Ι	U	43	38	1634	2080.47	45.61	-	2.63	1.26	0.960	1.21	Valid	
BH17-55	9.39	4	А	U	85	35	2975	3787.89	61.55	-	3.33	0.88	1.098	0.97	Valid	
BH17-55	9.39	4	Ι	U	39	33	1287	1638.66	40.48	-	1.38	0.84	0.909	0.77	Valid	
BH17-55	9.39	4	Ι	U	51	36	1836	2337.67	48.35	-	2.11	0.90	0.985	0.89	Valid	
BH17-55	10.33	5	А	Perp	85	30	2550	3246.76	56.98	-	3.92	1.21	1.061	1.28	Valid	
BH17-55	10.33	5	А	Perp	85	24	2040	2597.41	50.96	-	4.77	1.84	1.009	1.85	Valid	
BH17-55	10.33	5	Ι	U	83	46	3818	4861.23	69.72	-	6.47	1.33	1.161	1.55	Valid	
BH17-55	12.30	6	Ι	U	72	51	3672	4675.34	68.38	-	5.56	1.19	1.151	1.37	Valid	
BH17-55	12.30	6	Ι	U	46	40	1840	2342.76	48.40	-	2.12	0.90	0.985	0.89	Valid	
BH17-55	12.30	6	Ι	U	43	31	1333	1697.23	41.20	-	3.46	2.04	0.917	1.87	Valid	
BH17-55	13.78	2	А	U	875	21	18375	23395.78	152.96	-	2.14	0.09	1.654	0.15	Valid	
BH17-55	13.78	2	I	U	42	31	1302	1657.76	40.72	-	1.54	0.93	0.912	0.85	Valid	
BH17-55	13.78	2	Ι	U	47	40	1880	2393.69	48.93	-	3.12	1.30	0.990	1.29	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test Orientation Dimensions Type Data (Data La Data La			nsions ım)	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-55	4.40	1	D	U	-	85	7225	85.00	-	9.91	1.372	1.270	1.74	Valid	
BH17-55	6.75	3	D	U	-	85	7225	85.00	-	6.94	0.961	1.270	1.22	Valid	
BH17-55	9.39	4	D	U	-	85	7225	85.00	-	4.26	0.590	1.270	0.75	Valid	
BH17-55	10.33	5	D	Par	-	85	7225	85.00	-	7.13	0.987	1.270	1.25	Valid	
BH17-55	13.78	2	D	U	-	85	7225	85.00	-	1.42	0.197	1.270	0.25	Valid	
*Note	All testing	carried out or	n samples a	at as received wa	ater cont	ent		Par =	parallel. Per	n = perpendi	cular. U = R	andom			
									F	r rr	,				
															Contract No:
									Δ1	Rivelay to	o Coalbo				PSL 18/4216
	Due	incolo							A I		U UUAITIU	use			Client Ref:
4043	Pro	ressio	nal S	ons Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D_e}^2$	D <sub>e</sub>	Failurel	Load (P)	l <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure	Remarks
Number		i to	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-68	7.17	3	А	Perp	85	45	3825	4870.14	69.79	-	5.10	1.05	1.162	1.22	Valid	
BH17-68	7.17	3	I	U	85	27	2295	2922.08	54.06	-	3.88	1.33	1.036	1.38	Valid	
BH17-68	7.17	3		U	82	38	3116	3967.41	62.99	-	3.86	0.97	1.110	1.08	Valid	
BH17-68	8.73	1	А	Perp	85	44	3740	4761.92	69.01	-	8.93	1.88	1.156	2.17	Valid	
BH17-68	8.73	1		U	70	31	2170	2762.93	52.56	-	8.99	3.25	1.023	3.33	Valid	
BH17-68	8.73	1	-	U	85	14	1190	1515.16	38.92	-	4.87	3.21	0.893	2.87	Valid	
BH17-68	10.44	4	А	U	85	25	2125	2705.63	52.02	-	4.57	1.69	1.018	1.72	Valid	
BH17-68	10.44	4	А	U	85	29	2465	3138.54	56.0 <b>2</b>	-	6.08	1.94	1.053	2.04	Valid	
BH17-68	10.50	6	А	Perp	85	19	1615	2056.28	45.35	-	3.89	1.89	0.957	1.81	Valid	
BH17-68	10.50	6	I	U	54	25	1350	1718.87	41.46	-	4.91	2.86	0.919	2.63	Valid	
BH17-68	11.60	2	А	Perp	85	32	2720	3463.21	58.85	-	8.12	2.34	1.076	2.52	Valid	
BH17-68	11.60	2	Ι	U	73	26	1898	2416.61	49.16	-	7.53	3.12	0.992	3.09	Valid	
BH17-68	11.60	2	I	U	68	34	2312	2943.73	54.26	-	8.19	2.78	1.037	2.89	Valid	
BH17-68	11.82	5	Ι	U	65	15	975	1241.41	35.23	-	1.89	1.52	0.854	1.30	Valid	
BH17-68	11.82	5	Ι	U	70	27	1890	2406.42	49.06	-	3.55	1.48	0.991	1.46	Valid	
BH17-68	11.82	5		U	69	31	<b>2</b> 139	2723.46	52.19	-	2.61	0.96	1.019	0.98	Valid	
BH17-69	6.95	10	А	U	85	35	2975	3787.89	61.55	-	12.02	3.17	1.098	3.48	Valid	
BH17-69	8.15	11	I	U	45	40	1800	2291.83	47.87	-	0.04	0.02	0.981	0.02	Valid	
BH17-69	8.15	11	Ι	U	50	61	3050	3883.38	62.32	-	0.07	0.02	1.104	0.02	Valid	
BH17-69	9.45	1	Α	U	85	42	3570	4545.47	67.42	-	0.97	0.21	1.144	0.24	Valid	
BH17-69	9.45	1	I	U	45	37	1665	2119.94	46.04	-	2.21	1.04	0.964	1.00	Valid	
BH17-69	9.45	1	I	U	42	43	1806	2299.47	47.95	-	5.01	2.18	0.981	2.14	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Orientation Dimensions $D_e^2$ $D_e$ F						۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-68	7.17	3	D	Par	-	85	7225	85.00	-	2.88	0.399	1.270	0.51	Valid	
BH17-68	8.73	1	D	Par	-	85	7225	85.00	-	3.68	0.509	1.270	0.65	Valid	
BH17-68	10.44	4	D	U	-	85	7225	85.00	-	1.35	0.187	1.270	0.24	Valid	
BH17-68	10.50	6	D	Par	-	85	7225	85.00	-	2.76	0.382	1.270	0.49	Valid	
BH17-68	11.60	2	D	Par	-	85	7225	85.00	-	2.24	0.310	1.270	0.39	Valid	
BH17-69	6.95	10	D	U	-	85	7225	85.00	-	9.02	1.248	1.270	1.59	Valid	
BH17-69	9.45	1	D	U	-	85	7225	85.00	-	1.25	0.173	1.270	0.22	Valid	
<u>*Note</u>	All testing of	carried out or	n samples a	at as received wa	ater cont	ent		Par =	parallel, Perj	o = perpendi	cular, $U = R$	andom			
															Contract No:
$( \diamond \langle )$									Δ1	Rirtlev t	n Coalbo				PSL18/4216
	Dree	ioooio			ore							uut			Client Ref:
4043	Pro	ressio	nal S	ons Lab	oral	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	l <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUTIDE		IXG	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-69	9.78	7	Ι	U	58	28	1624	2067.74	45.47	-	3.46	1.67	0.958	1.60	Valid	
BH17-69	9.78	7	Ι	U	73	20	1460	1858.93	43.12	-	5.81	3.13	0.936	2.92	Valid	
BH17-69	9.78	7	I	U	74	32	2368	3015.03	54.91	-	4.73	1.57	1.043	1.64	Valid	
BH17-69	11.25	6	I	U	85	32	2720	3463.21	58.85	-	0.58	0.17	1.076	0.18	Valid	
BH17-69	11.25	6		U	46	36	1656	2108.48	45.9 <b>2</b>	-	0.35	0.17	0.962	0.16	Valid	
BH17-69	11.25	6		U	66	35	<b>2</b> 310	2941.18	54.23	-	0.50	0.17	1.037	0.18	Valid	
BH17-69	12.37	3	А	Perp	85	35	2975	3787.89	61.55	-	7.96	2.10	1.098	2.31	Valid	
BH17-69	12.37	3		U	69	40	2760	3514.14	59. <b>2</b> 8	-	8.87	2.52	1.080	2.73	Valid	
BH17-69	12.37	3		U	81	49	3969	5053.49	71.09	-	7.83	1.55	1.172	1.82	Valid	
BH17-69	12.70	4	А	Perp	85	37	3145	4004.34	63. <b>2</b> 8	-	8.80	2.20	1.112	2.44	Valid	
BH17-69	12.70	4	I	U	61	22	1342	1708.69	41.34	-	3.89	2.28	0.918	2.09	Valid	
BH17-69	12.70	4		U	49	16	784	998.22	31.59	-	3.92	3.93	0.813	3.19	Valid	
BH17-69	13.03	5	I	U	79	40	3160	4023.44	63.43	-	9.80	2.44	1.113	2.71	Valid	
BH17-69	13.03	5		U	76	28	2128	2709.45	5 <b>2</b> .05	-	5.03	1.86	1.018	1.89	Valid	
BH17-69	13.03	5	Ι	U	71	42	2982	3796.80	61.62	-	7.16	1.89	1.099	2.07	Valid	
BH17-69	13.03	5		U	68	20	1360	1731.61	41.61	-	3.56	2.06	0.921	1.89	Valid	
BH17-69	13.28	8	А	Perp	85	28	2380	3030.31	55.05	-	6.25	2.06	1.044	2.15	Valid	
BH17-69	13.28	8		U	85	32	2720	3463.21	58.85	-	7.42	2.14	1.076	2.31	Valid	
BH17-69	13.28	8		U	46	31	1426	1815.64	42.61	-	5.72	3.15	0.931	2.93	Valid	
BH17-69	14.00	9	А	U	85	54	4590	5844.17	76.45	-	3.70	0.63	1.211	0.77	Valid	
BH17-69	14.00	9	Ι	U	51	37	1887	2402.60	49.02	-	3.28	1.37	0.991	1.35	Valid	
BH17-69	14.00	9	Ι	U	49	16	784	998.22	31.59	-	1.91	1.91	0.813	1.56	Valid	

\**Note* All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions ım)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
NUMBER	(11)	ING.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-69	12.37	3	D	Par	-	85	7225	85.00	-	1.79	0.248	1.270	0.31	Valid	
BH17-69	12.70	4	D	Par	-	85	7225	85.00	-	2.05	0.284	1.270	0.36	Valid	
BH17-69	13.28	8	D	Par	-	85	7225	85.00	-	2.28	0.316	1.270	0.40	Valid	
BH17-69	14.00	9	D	U	-	85	7225	85.00	-	0.20	0.028	1.270	0.04	Valid	
*Note	All testing	carried out or	n samples a	at as received wa	ater cont	ent		Par =	parallel, Per	p = perpendi	cular, U = R	andom			
_ 🎡 _															Contract No:
									Δ1	Rintlay t	o Coalbo				PSL 18/4216
	Dure	inania							AI			ust			Client Ref:
4043	Pro	lessio	nal S	ons Lab	orat	ory									3043

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	l <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure	Remarks
Number		I Co	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-72	7.95	7	Ι	U	83	38	3154	4015.80	63.37	-	4.16	1.04	1.113	1.15	Valid	
BH17-72	7.95	7	I	U	51	41	2091	2662.34	51.60	-	4.55	1.71	1.014	1.73	Valid	
BH17-72	7.95	7		U	46	39	1794	2284.19	47.79	-	4.22	1.85	0.980	1.81	Valid	
BH17-72	10.25	6	I	U	72	68	4896	6233.78	78.95	-	3.30	0.53	1.228	0.65	Valid	
BH17-72	10.25	6		U	56	51	2856	3636.37	60.30	-	3.42	0.94	1.088	1.02	Valid	
BH17-72	10. <b>2</b> 5	6	I	U	52	34	1768	<b>22</b> 51.09	47.45	-	1.85	0.82	0.977	0.80	Valid	
BH17-72	12.95	5	А	Perp	85	26	2210	2813.86	53.05	-	2.03	0.72	1.027	0.74	Valid	
BH17-72	12.95	5	Ι	U	69	24	1656	2108.48	45.92	-	2.36	1.12	0.962	1.08	Valid	
BH17-72	12.95	5	Ι	U	85	32	2720	3463.21	58.85	-	4.36	1.26	1.076	1.35	Valid	
BH17-72	13.66	2	А	U	85	39	3315	4220.79	64.97	-	1.99	0.47	1.125	0.53	Valid	
BH17-72	13.66	2	Ι	U	51	24	1224	1558.45	39.48	-	1.48	0.95	0.899	0.85	Valid	
BH17-72	13.66	2	Ι	U	62	54	3348	4262.81	65. <b>2</b> 9	-	2.89	0.68	1.128	0.76	Valid	
BH17-72	14.53	1	Ι	U	72	35	2520	3208.56	56.64	-	1.68	0.52	1.058	0.55	Valid	
BH17-72	15.60	4	Ι	U	79	48	3792	4828.12	69.48	-	0.11	0.02	1.160	0.03	Valid	
BH17-72	16.20	3	А	U	85	37	3145	4004.34	63.28	-	0.12	0.03	1.112	0.03	Valid	
BH17-72	16. <b>2</b> 0	3	Ι	U	52	35	1820	2317.30	48.14	-	0.08	0.03	0.983	0.03	Valid	
BH17-72	16.20	3	I	U	48	50	2400	3055.77	55.28	-	0.06	0.02	1.046	0.02	Valid	

<u>\*Note</u> All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-72	12.95	5	D	Par	-	85	7225	85.00	-	8.59	1.189	1.270	1.51	Valid	
BH17-72	13.66	2	D	U	-	85	7225	85.00	-	5. <b>2</b> 9	0.732	1.270	0.93	Valid	
BH17-72	16.20	3	D	U	-	85	7225	85.00	-	0.09	0.012	1.270	0.02	Valid	
* 17 /	A 11 4 4	<u> </u>							11.1.5			<u> </u>			
*/ <b>NOLE</b>	All testing of	carried out of	i sampies a	it as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendit	cutar, $U = R$	andom			
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									Δ1	Rintlay t	o Coalbo				PSL18/4216
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4043	Pro	lessio	nal S	ons Lab	orat	ory									3043

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimer (m	nsions m)	Area	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	I <sub>s50</sub>	Failure Type	Remarks
Humbor			. , po	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
BH17-14	50.40		I	U	59	52	3068	3906.30	62.50	-	15.17	3.88	1.106	4.29	Valid	
BH17-14	51.30		А	Perp	85	39	3315	4220.79	64.97	-	18.6 <b>2</b>	4.41	1.125	4.96	Valid	
BH17-14	53.85		Α	U	85	26	<b>22</b> 10	2813.86	53.05	-	13.01	4.62	1.027	4.75	Valid	
BH17-14	54.40		Α	U	85	36	3060	3896.11	62.42	-	0.06	0.02	1.105	0.02	Valid	
BH17-14	55.60		I	Par	58	69	4002	5095.50	71.38	-	5.61	1.10	1.174	1.29	Valid	
BH17-14	56.60		Α	U	65	34	<b>22</b> 10	2813.86	53.05	-	13.18	4.68	1.027	4.81	Valid	
BH17-14	57.75		Α	U	69	41	2829	3601.99	60.02	-	5.97	1.66	1.086	1.80	Valid	
BH17-14	58.30		I	U	61	59	3599	4582.39	67.69	-	12.60	2.75	1.146	3.15	Valid	
BH17-14	58.40		I	U	85	38	3230	4112.56	64.13	-	8.20	1.99	1.119	2.23	Valid	
BH17-14	58.60		Α	Perp	85	20	1700	2164.51	46.5 <b>2</b>	-	5.78	2.67	0.968	2.59	Valid	
BH17-14	58.80		Α	Perp	85	26	2210	2813.86	53.05	-	12.70	4.51	1.027	4.64	Valid	
BH17-14	59.00		Α	Perp	85	39	3315	4220.79	64.97	-	8.90	2.11	1.125	2.37	Valid	
*Note	All testing c	arried out or	n samples a	at as received wa	ater conte	ent		Par = 1	parallel, Per	p = perpendio	cular, U = R	andom	-	A = Axial, D	= Diametral,	I = Irregular
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_ <b>d</b>			Contract No:
(≱≮)		BA1 Birtlay	PSL 18/4544
		DA I Bittley	Client Ref:
4043	Professional Soils Laboratory		A1B2CH

Borehole	Depth	Sample	Test Type	Orientation	Dime (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tu	турс	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-14	58.30		D	Par	-	85	7225	85.00	-	20.25	2.803	1.270	3.56	Valid	
BH17-14	50.40		D	U	-	85	7225	85.00	-	23.11	3.199	1.270	4.06	Valid	
BH17-14	51.30		D	U	-	85	7225	85.00	-	0.26	0.036	1.270	0.05	Valid	
BH17-14	54.40		D	U	-	65	4225	65.00	-	14.34	3.394	1.125	3.82	Valid	
BH17-14	55.60		D	U	-	69	4761	69.00	-	17.51	3.678	1.156	4.25	Valid	
BH17-14	57.75		D	U	-	85	7225	85.00	-	4.74	0.656	1.270	0.83	Valid	
BH17-14	58.60		D	Par	-	85	7225	85.00	-	3.54	0.490	1.270	0.62	Valid	
BH17-14	58.80		D	Par	-	85	7225	85.00	-	6.47	0.896	1.270	1.14	Valid	
BH17-14	59.00		D	Par	-	85	7225	85.00	-	1.91	0.264	1.270	0.34	Valid	
*Note	All testing of	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Per	p = perpendi	cular, U = R	andom			
															Contract No:
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4043	Pro	ressio	nal S	ons Lab	orat	ory									A1B2CH

Borehole	Depth (m)	Sample R <i>e</i> f	Test	Orientation	Dimer (m	nsions m)	Area	D <sub>e</sub> <sup>2</sup>	D <sub>e</sub>	Failure	Load (P)	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		T\G	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-16A	48.00		Α	Perp	85	32	2720	3463.21	58.85	-	6.40	1.85	1.076	1.99	Valid	
BH17-16A	49.50		I	U	64	42	2688	3422.47	58.50	-	11.03	3.22	1.073	3.46	Valid	
BH17-16A	49.70		I	U	59	47	2773	3530.69	59.4 <b>2</b>	-	2.45	0.69	1.081	0.75	Valid	
BH17-16A	49.75		I	U	46	49	2254	2869.88	53.57	-	4.07	1.42	1.032	1.46	Valid	
BH17-16A	49.80		I	U	50	62	3100	3947.04	62.83	-	10.67	2.70	1.108	3.00	Valid	
BH17-16A	50.00		Α	Perp	85	42	3570	4545.47	67.42	-	18.64	4.10	1.144	4.69	Valid	
BH17-16A	50.10		Α	Perp	63	60	3780	4812.85	69.37	-	4.73	0.98	1.159	1.14	Valid	
BH17-16A	50.30		Α	Perp	85	20	1700	2164.51	46.5 <b>2</b>	-	7.91	3.65	0.968	3.54	Valid	
BH17-16A	50.40		Α	Perp	85	29	2465	3138.54	56.0 <b>2</b>	-	12.26	3.91	1.053	4.11	Valid	
BH17-16A	50.50		Α	Par	85	34	2890	3679.66	60.66	-	14.00	3.80	1.091	4.15	Valid	
BH17-16A	50.77		Α	Par	85	40	3400	4329.01	65.80	-	16.59	3.83	1.131	4.34	Valid	
BH17-16A	51.10		Α	Par	85	49	4165	5303.04	72.82	-	15.71	2.96	1.184	3.51	Valid	
*Note	All testing c	arried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Per	p = perpendi	cular, $U = R$	andom		A = Axial, D	) = Diametral,	, I = Irregular
cto															Co	ontract No:

			Contract No:
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		DA I Bittley	Client Ref:
4043	Professional Soils Laboratory		A1B2CH

Borehole	Depth	Sample	Test	Orientation	Dimer (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Туре	
BH17-16A	49.80		D	Par		85	7225	85.00	-	<b>2</b> 5.80	3.571	1.270	4.53	Valid	
BH17-16A	50.00		D	Par		85	7225	85.00	-	23.40	3.239	1.270	4.11	Valid	
BH17-16A	50.30		D	Par		85	7225	85.00	-	16.73	2.316	1.270	2.94	Valid	
BH17-16A	50.40		D	U		85	7225	85.00	-	0.27	0.037	1.270	0.05	Valid	
BH17-16A	50.50		D	U		85	7225	85.00	-	8.01	1.109	1.270	1.41	Valid	
BH17-16A	50.77		D	U		85	7225	85.00	-	<b>2</b> 5.13	3.478	1.270	4.42	Valid	
BH17-16A	51.10		D	U		85	7225	85.00	-	22.97	3.179	1.270	4.04	Valid	
<u>*Note</u>	All testing of	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendi	cular, $U = R$	andom			
															Contract No:
										RA1 F	Rintley				PSL 18/4544
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4043	Pro	lessio	nal S	ons Lab	orat	ory									A1B2CH

ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D_e}^2$	D <sub>e</sub>	Failure	Load (P)	I <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number		i ta	туре	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-18A	41.50		Α	U	85	39	3315	4220.79	64.97	-	23.47	5.56	1.125	6.26	Valid	
BH17-18A	41.70		Α	U	85	33	2805	3571.44	59.76	-	13.02	3.65	1.084	3.95	Valid	
BH17-18A	43.40		Α	U	85	37	3145	4004.34	63.28	-	9.07	2.27	1.112	2.52	Valid	
BH17-18A	43.80		Α	U	85	60	5100	6493.52	80.58	-	0.15	0.02	1.240	0.03	Valid	
BH17-18A	44.10		Α	U	85	16	1360	1731.61	41.61	-	3.90	2.25	0.921	2.07	Valid	
BH17-18A	44.25		А	U	85	33	2805	3571.44	59.76	-	0.83	0.23	1.084	0.25	Valid	
BH17-18A	44.40		Α	U	85	24	2040	2597.41	50.96	-	4.23	1.63	1.009	1.64	Valid	
BH17-18A	44.65		А	U	85	32	2720	3463.21	58.85	-	0.46	0.13	1.076	0.14	Valid	
BH17-18A	44.76		Α	U	85	41	3485	4437.24	66.61	-	4.89	1.10	1.138	1.25	Valid	
BH17-18A	44.80		Α	U	85	48	4080	5194.82	72.08	-	5.76	1.11	1.179	1.31	Valid	
BH17-18A	44.90		А	U	85	42	3570	4545.47	67.42	-	0.19	0.04	1.144	0.05	Valid	
BH17-18A	47.05		Α	U	85	24	2040	2597.41	50.96	-	3.51	1.35	1.009	1.36	Valid	
BH17-18A	47.25		А	U	85	34	2890	3679.66	60.66	-	11.28	3.07	1.091	3.34	Valid	
BH17-18A	48.05		Α	U	85	50	4250	5411.27	73.56	-	7.34	1.36	1.190	1.61	Valid	

\*Note All testing carried out on samples at as received water content Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular



Borehole	Depth	Sample	Test	Orientation	Dimer (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	i tea	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-18A	41.50		D	U		85	7225	85.00	-	11.67	1.615	1.270	2.05	Valid	
BH17-18A	41.70		D	U		85	7225	85.00	-	9.64	1.334	1.270	1.69	Valid	
BH17-18A	43.40		D	U		85	7225	85.00	-	0.31	0.043	1.270	0.05	Valid	
BH17-18A	43.80		D	U		85	7225	85.00	-	0.77	0.770	1.270	0.98	Valid	
BH17-18A	44.10		D	U		85	7225	85.00	-	2.40	0.332	1.270	0.42	Valid	
BH17-18A	<b>44.2</b> 5		D	U		85	7225	85.00	-	2.77	0.383	1.270	0.49	Valid	
BH17-18A	44.40		D	U		85	7225	85.00	-	0.83	0.115	1.270	0.15	Valid	
BH17-18A	44.65		D	U		85	7225	85.00	-	3.76	0.520	1.270	0.66	Valid	
BH17-18A	44.76		D	U		85	7225	85.00	-	9.16	1.268	1.270	1.61	Valid	
BH17-18A	44.80		D	U		85	7225	85.00	-	2.27	0.314	1.270	0.40	Valid	
BH17-18A	44.90		D	U		85	7225	85.00	-	0.18	0.025	1.270	0.03	Valid	
BH17-18A	47.05		D	U		85	7225	85.00	-	0.58	0.080	1.270	0.10	Valid	
BH17-18A	47.25		D	U		85	7225	85.00	-	2.01	0.278	1.270	0.35	Valid	
BH17-18A	48.05		D	U		85	7225	85.00	-	3.16	0.437	1.270	0.56	Valid	
*Note	All testing	carried out or	n samples a	at as received wa	ater conte	ent		Par =	parallel, Perj	p = perpendi	cular, $U = R$	andom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D_e}^2$	D <sub>e</sub>	Failure	Load (P)	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks	
Number		i toi	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс		
BH17-19	31.80		I	U	46	49	2254	2869.88	53.57	-	0.26	0.09	1.032	0.09	Valid		
BH17-19	33.20		I	U	43	38	1634	2080.47	45.61	-	2.64	1.27	0.960	1.22	Valid		
BH17-19	37.60		I	U	44	48	2112	2689.08	51.86	-	0.70	0.26	1.017	0.26	Valid		
BH17-19	38.40			U	33	57	1881	2394.96	48.94	-	0.31	0.13	0.990	0.13	Valid		
BH17-19	39.55		Α	U	85	32	2720	3463.21	58.85	-	3.46	1.00	1.076	1.08	Valid		
BH17-19	40.15		I	U	70	72	5040	6417.13	80.11	-	6.64	1.03	1.236	1.28	Valid		
BH17-19	40.80		Α	Par	85	39	3315	4220.79	64.97	-	4.17	0.99	1.125	1.11	Valid		
BH17-19	41.05		Α	Par	85	44	3740	4761.92	69.01	-	4.05	0.85	1.156	0.98	Valid		
BH17-19	41.65		Α	Par	85	31	2635	3354.99	57.9 <b>2</b>	-	3.50	1.04	1.068	1.11	Valid		
BH17-19	42.60		Α	U	85	40	3400	4329.01	65.80	-	4.05	0.94	1.131	1.06	Valid		
*Note	All testing of	carried out or	n samples a	at as received wa	ater conte	ent	Par = parallel, Perp = perpendicular, U = Random A = Axial, D = Diametral, I = Irregular										
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Professional Soils Laboratory

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Client Ref: A1B2CH

Borehole	Depth	Sample	Test	Orientation	Dime (m	nsions m)	${\sf D}_{\sf e}^{\ 2}$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
number	(11)	Ν.Θ.	туре	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	туре	
BH17-19	39.55		D	Par	-	85	7225	85.00	-	0.60	0.083	1.270	0.11	Valid	
BH17-19	40.80		D	Par	-	85	7225	85.00	-	1.16	0.161	1.270	0.20	Valid	
BH17-19	41.05		D	Par	-	85	7225	85.00	-	1.84	0.255	1.270	0.32	Valid	
BH17-19	41.65		D	Par	-	85	7225	85.00	-	1.39	0.192	1.270	0.24	Valid	
BH17-19	42.60		D	Par	-	85	7225	85.00	-	9.68	1.340	1.270	1.70	Valid	
				1				1							
*Note	All testing	carried out of	n samples a	at as received wa	ater conte	ent		Par =	parallel. Per	p = perpendi	cular. $U = R$	andom			
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ISRM Suggested Methods: 2007

Borehole	Depth (m)	Sample R <i>e</i> f	Test	Orientation	Dimer (m	nsions m)	Area	${\sf D_e}^2$	D <sub>e</sub>	Failure	Load (P)	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure Type	Remarks
Number		T G	Турс	Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	турс	
BH17-20	31.20		Α	U	85	46	3910	4978.37	70.56	-	1.82	0.37	1.168	0.43	Valid	
BH17-20	32.40		I	U	54	49	2646	3368.99	58.04	-	0.22	0.07	1.069	0.07	Valid	
BH17-20	33.70		Α	U	85	37	3145	4004.34	63.28	-	13.59	3.39	1.112	3.77	Valid	
BH17-20	35.70		Α	U	85	34	2890	3679.66	60.66	-	8.10	2.20	1.091	2.40	Valid	
BH17-20	37.20		I	U	69	34	2346	2987.02	54.65	-	1.58	0.53	1.041	0.55	Valid	
BH17-20	39.60		Α	U	85	30	<b>2</b> 550	3246.76	56.98	-	4.86	1.50	1.061	1.59	Valid	
BH17-20	40.70		I	U	76	44	3344	4257.71	65. <b>2</b> 5	-	0.86	0.20	1.127	0.23	Valid	
BH17-20	41.25		Α	Par	85	36	3060	3896.11	62.42	-	13.97	3.59	1.105	3.96	Valid	
BH17-20	42.70		I	U	61	28	1708	2174.69	46.63	-	6.08	2.80	0.969	2.71	Valid	
BH17-20	43.20		Α	Par	85	43	3655	4653.69	68.22	-	10.28	2.21	1.150	2.54	Valid	
*Note	All testing of	carried out or	n samples a	tt as received wa	ater conte	ent		Par = j	parallel, Per	p = perpendi	cular, U = R	andom	1	A = Axial, D	= Diametral,	, I = Irregular
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**Professional Soils Laboratory** 

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Client Ref: A1B2CH

Borehole	Depth	Sample R <i>e</i> f	Test Type	Orientation	Dimer (m	nsions m)	${\sf D_e}^2$	D <sub>e</sub>	Failur	eLoad	۱ <sub>s</sub>	Corr Fac	۱ <sub>s50</sub>	Failure	Remarks
Number	(11)	T G	Турс	Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)	Турс	
BH17-20	31.20		D	U		85	7225	85.00	-	0.26	0.036	1.270	0.05	Valid	
BH17-20	33.70		D	U		85	7225	85.00	-	11.53	1.596	1.270	2.03	Valid	
BH17-20	35.70		D	U		85	7225	85.00	-	4.38	0.606	1.270	0.77	Valid	
BH17-20	39.60		D	U		85	7225	85.00	-	0.04	0.006	1.270	0.01	Valid	
BH17-20	41.25		D	Perp		85	7225	85.00	-	8.32	1.152	1.270	1.46	Valid	
BH17-20	43.20		D	Perp		85	7225	85.00	-	1.78	0.246	1.270	0.31	Valid	
*17.4	A 11 4 4	<u> </u>							11.1.5						1
<u>*/Note</u>	All testing of	carried out or	i samples a	it as received wa	ater conte	ent		Par =	parallel, Perj	b = perpendi	cutar, $U = Ra$	andom			
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### APPENDIX I CHEMICAL LABORATORY TESTING

### LONES JONES ENVIRONMENTAL

### Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Anthony Lewis-Bates
Date :	12th February, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 2
Location :	A1B2CH
Date samples received :	23rd January, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Fourteen samples were received for analysis on 23rd January, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	lliance Pre	Constructi	on Service	s Ltd	Report : Solid						
Location:	A1B2CH					Solids: V=	60g VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Anthony L	ewis-Bates	5									
JE JOD NO.:	18/779											
J E Sample No.	53-56	61-64								1		
Sample ID	CPT3	CPT7										
Denth	0.80	0.80										
COC No /mino	0.00	0.00								Please see abbrevia	e attached n ations and a	otes for all cronyms
Containers	JT	JT								1		
Sample Date	18/01/2018	18/01/2018								1		
Sample Type	Soil	Soil										
Batch Number	2	2									Units	Method
Date of Receipt	23/01/2018	23/01/2018								LOD/LOIX	Onita	No.
Arsenic <sup>#</sup>	13.4	8.5								<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	0.3	<0.1								<0.1	mg/kg	TM30/PM1
Chromium <sup>#</sup>	55.1	56.6								<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	31	13								<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	77	48								<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	23.1	27.5								<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	<1	2								<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	103	78								<5	mg/kg	TM30/PM15
											0.0	
PAH MS												
Naphthalene <sup>#</sup>	< 0.04	< 0.04								< 0.04	ma/ka	TM4/PM8
Acenaphthylene	<0.03	<0.03								<0.03	ma/ka	TM4/PM8
Acenaphthene #	<0.05	<0.05								<0.05	ma/ka	TM4/PM8
Eluoropo <sup>#</sup>	<0.00	<0.00								<0.00	ma/ka	
Phonesetherese #	0.20	<0.04								<0.04	mg/kg	
Phenanthrene	0.20	<0.03								-0.04	mg/kg	
Antinacene	0.14	<0.04								-0.02	mg/kg	
	0.14	<0.03								-0.03	mg/kg	
Pyrene	0.11	<0.03								<0.03	mg/kg	
Benzo(a)anthracene	0.11	<0.06								<0.06	mg/kg	TIVI4/PIVI8
Chrysene "	0.11	<0.02								<0.02	mg/kg	
Benzo(bk)fluoranthene *	0.16	<0.07								<0.07	mg/kg	1M4/PM8
Benzo(a)pyrene "	0.06	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene*	0.05	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene <sup>#</sup>	0.05	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.0	<0.6								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.12	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	91								<0	%	TM4/PM8
Natural Moisture Content	22.7	27.4								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Free Queside	.0.5	-0.5								-0.5		TMOO/DMA
Free Cyanide	<0.5	<0.5								<0.5	mg/kg	TM00/PM45
Total Cyanide "	<0.5	<0.5								<0.5	mg/kg	1M89/PM45
Complex Cyanide	<0.5	<0.5								<0.5	mg/kg	TM89/PM45
<b>T</b> 1 (1) (1) (1)												Th 44 CT 5 C
Iniocyanate	<0.6	<0.6								<0.6	mg/kg	1M107/PM119

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Anthony Lewis-Bates

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	2	CPT3	0.80	56	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD
18/779	2	CPT7	0.80	64	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Anthony Lewis-Bates

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
Ν	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

### LONES JONES ENVIRONMENTAL

### Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	19th December, 2017
Your reference :	3043
Our reference :	Test Report 17/19465 Batch 2
Location :	A1B2CH
Date samples received :	29th November, 2017
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 29th November, 2017 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central All 3043	liance Pre	Constructi	on Service	s Ltd	Report :						
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Ha	ardwick										
JE Job No.:	17/19465											
J E Sample No.	17-20											
Sample ID	BH17-20											
Depth	0.20									Disease		
COC No / misc										abbrevia	ations and a	cronyms
Contoinere										1		
Containers	JI											
Sample Date	27/11/2017 13:30											
Sample Type	Soil											
Batch Number	2										Linite	Method
Date of Receipt	29/11/2017									LOD/LOR	Units	No.
Arsenic <sup>#</sup>	9.4									<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	0.2									<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	95.9									<0.5	mg/kg	TM30/PM15
Copper#	35									<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	86									<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	29.9									<0.7	mg/kg	TM30/PM15
Selenium #	1									<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	98									<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene *	0.06									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene *	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene "	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene "	0.22									<0.03	mg/kg	
Anthracene "	<0.04									<0.04	mg/kg	
Puropo <sup>#</sup>	0.37									<0.03	mg/kg	
Pyrene Bonzo(a)anthracono <sup>#</sup>	0.33									<0.05	mg/kg	TM4/PM8
Chrysene #	0.29									<0.00	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.45									<0.07	ma/ka	TM4/PM8
Benzo(a)pyrene #	0.22									<0.04	ma/ka	TM4/PM8
Indeno(123cd)pyrene <sup>#</sup>	0.18									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.19									<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.32									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.13									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	112									<0	%	TM4/PM8
Natural Moisture Content	23.3									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	ma/ka	TM38/PM20
	<0.5									<0.5	ing/kg	111100/1-11120
Free Cvanide	<0.5									<0.5	ma/ka	TM89/PM4F
Total Cvanide #	<0.5									<0.5	ma/ka	TM89/PM45
Complex Cyanide	<0.5									<0.5	ma/ka	TM89/PM45
. ,											33	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465	2	BH17-20	0.20	20	12/12/2017	General Description (Bulk Analysis)	Soil/Stone
					12/12/2017	Asbestos Fibres	NAD
					12/12/2017	Asbestos Fibres (2)	NAD
					12/12/2017	Asbestos ACM	NAD
					12/12/2017	Asbestos ACM (2)	NAD
					12/12/2017	Asbestos Type	NAD
					12/12/2017	Asbestos Type (2)	NAD
					12/12/2017	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
17/19465	2	BH17-20	0.20	17-20	РАН	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range
### Method Code Appendix

### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	22nd December, 2017
Your reference :	3043
Our reference :	Test Report 17/19465 Batch 3
Location :	A1B2CH
Date samples received :	1st December, 2017
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 1st December, 2017 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub				
Contact:	Richard Ha	ardwick													
JE Job No.:	17/19465										_				
J E Sample No.	37-40														
Sample ID	BH17-15														
Depth	0.70										Please se	e attached n	otes for all		
COC No / misc	;										abbrevi	ations and a	cronyms		
Containan	1.7														
Containers	JI														
Sample Date	29/11/2017														
Sample Type	Soil														
Batch Number	3												Mathad		
Data of Dessint	04/40/0047										LOD/LOR	Units	Nethod No.		
Date of Receipt	01/12/2017														
Arsenic <sup>#</sup>	10.2										<0.5	mg/kg	TM30/PM15		
Cadmium*	<0.1										<0.1	mg/kg	TM30/PM15		
Chromium*	41.6										<0.5	mg/kg	TM30/PM15		
Copper <sup>#</sup>	35										<1	mg/kg	TM30/PM15		
Lead <sup>#</sup>	45										<5	mg/kg	TM30/PM15		
Mercury#	<0.1										<0.1	mg/kg	TM30/PM15		
Nickel <sup>#</sup>	49.2										<0.7	mg/kg	TM30/PM15		
Selenium #	2										<1	mg/kg	TM30/PM15		
Zinc <sup>#</sup>	106										<5	mg/kg	TM30/PM15		
PAH MS															
Naphthalene #	0.11										<0.04	mg/kg	TM4/PM8		
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8		
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8		
Fluorene #	<0.04										<0.04	mg/kg	TM4/PM8		
Phenanthrene #	0.32										<0.03	mg/kg	TM4/PM8		
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8		
Fluoranthene#	0.10										<0.03	mg/kg	TM4/PM8		
Pyrene #	0.10										<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	<0.06										<0.06	mg/kg	TM4/PM8		
Chrysene #	0.12										<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	0.11										<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene <sup>#</sup>	0.05										<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene#	<0.04										<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene #	0.06										<0.04	mg/kg	TM4/PM8		
PAH 16 Total	1.0										<0.6	mg/kg	TM4/PM8		
Benzo(b)fluoranthene	0.08										<0.05	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	0.03										<0.02	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	87										<0	%	TM4/PM8		
EPH >C8-C10#	<5										<5	mg/kg	TM5/PM8		
EPH >C10-C12#	<10										<10	mg/kg	TM5/PM8		
EPH >C12-C16 #	<10										<10	mg/kg	TM5/PM8		
EPH >C16-C21 #	<10										<10	mg/kg	TM5/PM8		
EPH >C21-C40	41										<10	mg/kq	TM5/PM8		
EPH >C8-C40	41										<30	mg/kg	TM5/PM8		
												5.5			
Natural Moisture Content	13.3										<0.1	%	PM4/PM0		
o contait	. 5.0											,,,			
Hexavalent Chromium #	<0.3										<0.3	ma/ka	TM38/PM20		
Sulphate as SO4 (2.1 Ext) #	0.0358										<0.0015	a/l	TM38/PM20		
												3.			
Free Cvanide	<0.5										<0.5	ma/ka	TM89/PM4F		

Location: Internet Belait Version      Statistical Version      Statistical Version        J 5 semple Semple      and and and belait Semple      and and and and belait Semple      and and and and and belait Semple      and and and and and belait Semple      and and and and and belait Semple      and and and and and and and and and and	Client Name: Reference:	Central All 3043	Alliance Pre Construction Services Ltd						Report : Solid							
Contact:      Relative Market        12 basko:      77340      Image: 1000000000000000000000000000000000000	Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub				
JE 300 Not:    17/19465      JE 300000 Not    9740	Contact:	Richard H	ardwick													
Jie Bango No.  37-00  100	JE Job No.:	17/19465														
Sample D  Birth	J E Sample No.	37-40														
Open	Sample ID	BH17-15														
COC No /mice      T      T      Set of the field	Depth	0.70										Please se	e attached n	otes for all		
Containes      J.T      Image: sector s	COC No / misc											abbrevi	ations and ac	cronyms		
Sampio Day      Sali      Mathematical	Containers	JT														
Norme by bound of the bound of th	Sample Date	29/11/2017														
Basic program      Solid      Marco	Sample Tuna	0-1														
Bate Numer      3      3      6      6      6      6      100008      00008      0008 <th>Sample Type</th> <th>501</th> <th></th>	Sample Type	501														
Date of Receipt      01/20217      0     0	Batch Number	3										LOD/LOR	Units	Method		
Total Cymunds*    -0.5    mgNa    TMeSPM      Organic Mater    113    -0.5    mgNa    TMeSPM      Organic Mater    113    -0.5    mgNa    TMeSPM      Thocyanic    -0.5    mgNa    TMeSPM    -0.5    mgNa    TMeSPM      Digaric Mater    -13.9    -0.5    mgNa    TMeSPM    -0.5    mgNa    TMeSPM      Thocyanic    -0.5    -0.5    mgNa    TMeSPM    -0.5    mgNa    TMeSPM      pt*    7.55    -0.5    -0.5    mgNa    TMeSPM    -0.5    mgNa    TMESPM      pt*    7.55    -0.5    -0.5    mgNa    TMESPM    -0.5    mgNa    TMESPM      pt*    7.55    -0.5	Date of Receipt	01/12/2017												110.		
Complex (yande      <1	Total Cyanide #	<0.5										<0.5	mg/kg	TM89/PM45		
Coganito    13.9	Complex Cyanide	<0.5										<0.5	mg/kg	TM89/PM45		
Thoopanate      Control      Contro      Control      Control	Organic Matter	13.9										<0.2	%	TM21/PM24		
Thiosyname      -0.6      mgk      Interver        pH <sup>4</sup> 755      755      755      755      755      755      755      755      755      755      757																
ph*  7.55	Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM119		
ph*    7.55																
Image: state  I	рН#	7.55										<0.01	pH units	TM73/PM11		
Image: sector of the sector																
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Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465	3	BH17-15	0.70	40	14/12/2017	General Description (Bulk Analysis)	soil/stones
					14/12/2017	Asbestos Fibres	NAD
					14/12/2017	Asbestos Fibres (2)	NAD
					14/12/2017	Asbestos ACM	NAD
					14/12/2017	Asbestos ACM (2)	NAD
					14/12/2017	Asbestos Type	NAD
					14/12/2017	Asbestos Type (2)	NAD
					14/12/2017	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
17/19465	3	BH17-15	0.70	37-40	Cyanide, EPH, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

### **JE Job No:** 17/19465

Test Method No.	Description	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis	
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

### Method Code Appendix

### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Richard Hardwick
6th June, 2018
3043
Test Report 18/779 Batch 37
A1B2CH
5th May, 2018
Final report
1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 5th May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Lucas Halliwell Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd						Report : Solid							
Location:	A1B2CH						Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub							
Contact:	Richard Ha	ardwick							,	J, · · P				
JE Job No.:	18/779													
LE Sample No	022 024										1			
J E Sample No.	022-024													
Sample ID	BH17-037													
Depth	0.50										D			
COC No / mino											abbrevi	e attached n ations and a	otes for all cronyms	
COC NO/ MISC														
Containers	VJT													
Sample Date	03/05/2018													
Sample Type	Soil													
Batch Number	37													
241011114111201	01										LOD/LOR	Units	Method No.	
Date of Receipt	05/05/2018													
Arsenic <sup>#</sup>	3.5										<0.5	mg/kg	TM30/PM15	
Cadmium <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM15	
Chromium #	91.0										<0.5	mg/kg	TM30/PM15	
Copper <sup>#</sup>	17										<1	mg/kg	TM30/PM18	
Lead <sup>#</sup>	18										<5	mg/kg	TM30/PM18	
Mercury #	<0.1										<0.1	mg/kg	TM30/PM15	
Nickel <sup>#</sup>	21.4										<0.7	mg/kg	TM30/PM15	
Selenium *	<1										<1	mg/kg	TM30/PM15	
Zinc <sup>#</sup>	56										<5	mg/kg	TM30/PM18	
PAH MS														
Naphthalene #	<0.04										<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04										<0.04	mg/kg	TM4/PM8	
Phenanthrene #	0.13										<0.03	mg/kg	TM4/PM8	
Anthracene *	<0.04										<0.04	mg/kg	TM4/PM8	
Fluoranthene *	0.12										<0.03	mg/kg	TM4/PM8	
Pyrene <sup>#</sup>	0.09										<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene *	0.07										<0.06	mg/kg	TM4/PM8	
Chrysene*	0.07										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	0.12										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	0.06										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene *	<0.04										<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene *	<0.04										<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene *	<0.04										<0.04	mg/kg	IM4/PM8	
PAH 16 Total	0.7										<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.09										<0.05	mg/kg	TM4/PM8	
Benzo(K)fluoranthene	0.03										<0.02	mg/kg		
PAR Surrogate % Recovery	93										<0	%	TM4/PM8	
	17.1											0/	DMUDMO	
Natural Moisture Content	17.4										<0.1	%	PM4/PM0	
Hovovolont Characian #	-0.2										-0.2	ma/l	TM20/DM20	
riexavalent Chromium "	<0.3										<0.3	тід/кд	1 IVI38/PM20	
Free Oursid:	0.5										0.5		TMOO/D11	
Free Cyanide	<0.5										<0.5	mg/kg	TM00/PM45	
Total Cyanide "	<0.5										<0.5	mg/kg	1M89/PM45	
Complex Cyanide	<0.5										<0.5	mg/kg	1 M89/PM45	
Thiographic	-0.0										.0.0		TM107/0144	
Thiocyanate	<0.6										<0.6	mg/kg	TMT07/PM119	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	37	BH17-037	0.50	824	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	37	BH17-037	0.50	822-824	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

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As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

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#### **DEVIATING SAMPLES**

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### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

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М	MCERTS accredited.
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NDP	No Determination Possible
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+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
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AD	Samples are dried at 35°C ±5°C
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ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th February, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 1
Location :	A1B2CH
Date samples received :	19th January, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 19th January, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.



Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub				
Contact:	Richard H	ardwick						• •							
JE Job No.:	18/779														
J E Sample No.	9-12														
Sample ID	BH17-16														
Depth	1.00										Please se	e attached n	otes for all		
COC No / misc											abbrevi	ations and a	cronyms		
Containana	1.7														
Containers	JI														
Sample Date	17/01/2018														
Sample Type	Soil														
Batch Number	1												Method		
Date of Receipt	19/01/2018										LOD/LOR	Units	No.		
	7.4										-0 F	malka	TM20/PM6		
Cadmium	0.1										<0.5	mg/kg	TM30/PM62		
Chromium	27.5										<0.1	ma/ka	TM30/PM62		
Copper	36										<1	ma/ka	TM30/PM62		
Lead	61										<5	ma/ka	TM30/PM62		
Mercury	<0.1										<0.1	ma/ka	TM30/PM62		
Nickel	39.6										<0.7	mg/kg	TM30/PM62		
Selenium	1										<1	mg/kg	TM30/PM62		
Zinc	127										<5	mg/kg	TM30/PM62		
PAH MS															
Naphthalene #	0.11										<0.04	mg/kg	TM4/PM8		
Acenaphthylene	0.04										<0.03	mg/kg	TM4/PM8		
Acenaphthene #	0.06										<0.05	mg/kg	TM4/PM8		
Fluorene #	0.10										<0.04	mg/kg	TM4/PM8		
Phenanthrene <sup>#</sup>	1.00										<0.03	mg/kg	TM4/PM8		
Anthracene #	0.22										<0.04	mg/kg	TM4/PM8		
Fluoranthene <sup>#</sup>	1.24										<0.03	mg/kg	TM4/PM8		
Pyrene <sup>#</sup>	0.91										<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	0.71										<0.06	mg/kg	TM4/PM8		
Chrysene #	0.67										<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene#	1.04										<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene #	0.50										<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene #	0.34										<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene #	0.12										<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene *	0.37										<0.04	mg/kg	TM4/PM8		
PAH 16 Total	7.4										<0.6	mg/kg	TM4/PM8		
Benzo(b)lluorantnene	0.75										<0.05	mg/kg			
	0.29										<0.02	111g/Kg			
PAR Sullogate % Recovery	90										<0	70	TIVI4/FIVIO		
Natural Moisture Contont	20.1										-0.1	0/_			
Natural Moisture Content	20.1										<0.1	70			
Hexavalent Chromium #	<0.3										<0.3	ma/ka	TM38/PM20		
	<b>LO.0</b>										×0.0	y/ky			
Free Cvanide	<0.5										<0.5	ma/ka	TM89/PM4		
Total Cvanide <sup>#</sup>	<0.5										<0.5	ma/ka	TM89/PM4		
Complex Cyanide	<0.5								l	l	<0.5	ma/ka	TM89/PM4		
												5.5			
Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM119		
				1	1	1		1							

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

A AM

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	1	BH17-16	1.00	12	02/02/2018	General Description (Bulk Analysis)	Soil/Stone
					02/02/2018	Asbestos Fibres	Fibre Bundles
					02/02/2018	Asbestos ACM	NAD
					02/02/2018	Asbestos Type	Chrysotile
					02/02/2018	Asbestos Level Screen	less than 0.1%

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	1	BH17-16	1.00	9-12	Cyanide	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 $^\circ$ C.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	22nd December, 2017
Your reference :	3043
Our reference :	Test Report 17/19465 Batch 4
Location :	A1B2CH
Date samples received :	7th December, 2017
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 7th December, 2017 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

**Compiled By:** 



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	liance Pre	Constructi	on Service	s Ltd	Report : Solid							
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard H	ardwick											
JE Job No.:	17/19465												
J E Sample No.	45-48												
Sample ID	BH17-16A												
Depth	0.20												
COC No (mino	0.20									Please se abbrevi	e attached n ations and a	otes for all cronyms	
COC NO/ MISC	;												
Containers	JT												
Sample Date	05/12/2017 12:00												
Sample Type	Soil												
Batch Number	4											Method	
Date of Receipt	07/12/2017									LOD/LOR	Units	No.	
Arsenic <sup>#</sup>	10.1									<0.5	ma/ka	TM30/PM15	
Cadmium <sup>#</sup>	0.2									<0.1	mg/kg	TM30/PM15	
Chromium <sup>#</sup>	49.3									<0.5	mg/kg	TM30/PM15	
Copper#	37									<1	mg/kg	TM30/PM15	
Lead <sup>#</sup>	73									<5	mg/kg	TM30/PM15	
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM15	
Nickel <sup>#</sup>	35.5									<0.7	mg/kg	TM30/PM15	
Selenium <sup>#</sup>	2									<1	mg/kg	TM30/PM15	
Zinc <sup>#</sup>	152									<5	mg/kg	TM30/PM15	
PAH MS													
Naphthalene #	<0.04									<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8	
Fluorene <sup>#</sup>	<0.04									<0.04	mg/kg	TM4/PM8	
Phenanthrene *	0.30									<0.03	mg/kg	TM4/PM8	
Anthracene *	0.06									<0.04	mg/kg	TM4/PM8	
Fluoranthene"	0.31									<0.03	mg/kg		
Pyrene "	0.24									<0.03	mg/kg		
Benzo(a)anthracene "	0.21									<0.06	mg/kg		
Chrysene	0.21									<0.02	mg/kg		
Benzo(a)pyrene <sup>#</sup>	0.23									<0.04	ma/ka	TM4/PM8	
Indeno(123cd)nvrene#	0.08									<0.04	ma/ka	TM4/PM8	
Dibenzo(ah)anthracene #	<0.04									<0.04	ma/ka	TM4/PM8	
Benzo(ghi)perylene #	0.08									<0.04	mg/kg	TM4/PM8	
PAH 16 Total	1.9									<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.18									<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.07									<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	95									<0	%	TM4/PM8	
EPH >C8-C10#	<5									<5	mg/kg	TM5/PM8	
EPH >C10-C12 #	<10									<10	mg/kg	TM5/PM8	
EPH >C12-C16 #	<10									<10	mg/kg	TM5/PM8	
EPH >C16-C21 #	18									<10	mg/kg	TM5/PM8	
EPH >C21-C40	147									<10	mg/kg	TM5/PM8	
EPH >C8-C40	165									<30	mg/kg	TM5/PM8	
Natural Moisture Content	32.6									<0.1	%	PM4/PM0	
11	-0.2									-0.2	mc/!	TMODUC	
Hexavalent Chromium"	<0.3									<0.0015	mg/kg	TM20/DM20	
Sulphale as SU4 (2:1 EXI)	0.0303									L0.0015	y/r	110130/1910120	
Free Cvanide	<0.5									<0.5	ma/ka	TM89/PM4F	

Client Name: Reference:	Central All 3043	iance Pre	Constructi	on Service	s Ltd	Report : Solid							
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard Ha	ardwick											
JE Job No.:	17/19465												
J E Sample No.	45-48												
Sample ID	BH17-16A												
Depth	0.20									Disses			
COC No / misc										abbrevi	ations and ac	cronyms	
Contoinoro	1.7												
Ocimainera Ocimainera	51												
Sample Date	05/12/2017 12:00												
Sample Type	Soil												
Batch Number	4									LOD/LOR	Units	Method	
Date of Receipt	07/12/2017											NO.	
Total Cyanide #	<0.5									<0.5	mg/kg	TM89/PM45	
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45	
Organia Mattar	0.7									-0.2	9/	TM21/DM24	
Organic Matter	9.7									<0.2	70	111/21/1711/24	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119	
рН#	7.35									<0.01	pH units	TM73/PM11	

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job Batch No.	1 Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465 4	BH17-16A	0.20	48	14/12/2017	General Description (Bulk Analysis)	soil/stones
				14/12/2017	Asbestos Fibres	NAD
				14/12/2017	Asbestos Fibres (2)	NAD
				14/12/2017	Asbestos ACM	NAD
				14/12/2017	Asbestos ACM (2)	NAD
				14/12/2017	Asbestos Type	NAD
				14/12/2017	Asbestos Type (2)	NAD
				14/12/2017	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 17/19465	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

### Method Code Appendix

### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 50
Location :	A1B2CH
Date samples received :	23rd May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Nine samples were received for analysis on 23rd May, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Lucas Halliwell Project Co-ordinator

Client Name:	Central A	lliance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	lardwick										
JE Job No.:	18/779									_		
J E Sample No.	1062-1064	1068-1070										
Sample ID	BH17/42	BH17/42										
Donth	0.70	2.00										
	0.70	2.00								Please se abbrevia	e attached n ations and a	otes for all cronyms
COC No / misc												, .
Containers	VJT	VJT										
Sample Date	21/05/2018	21/05/2018										
Sample Type	Soil	Soil										
Batch Number	50	50								1.00 / 00		Method
Date of Receipt	23/05/2018	23/05/2018								LOD/LOR	Units	No.
Arsenic <sup>#</sup>	2.5	<0.5								<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	56.8	51.1								<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	22	18								<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	30	30								<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	27.3	50.1								<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	<1	2								<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	88	124								<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene <sup>#</sup>	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.18	0.14								<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.30	0.03								<0.03	mg/kg	TM4/PM8
Pyrene *	0.22	0.04								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.15	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene *	0.14	0.04								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene "	0.21	<0.07								<0.07	mg/kg	
Benzo(a)pyrene "	0.10	<0.04								<0.04	mg/kg	
Dibonzo(ab)anthracono#	<0.07	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(dhi)pervlene #	0.07	<0.04								<0.04	ma/ka	TM4/PM8
PAH 16 Total	1.4	<0.6								<0.6	ma/ka	TM4/PM8
Benzo(b)fluoranthene	0.15	<0.05								< 0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.06	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	86								<0	%	TM4/PM8
EPH >C8-C10 <sup>#</sup>	<5	<5								<5	mg/kg	TM5/PM8
EPH >C10-C12#	<10	<10								<10	mg/kg	TM5/PM8
EPH >C12-C16#	<10	<10								<10	mg/kg	TM5/PM8
EPH >C16-C21 #	<10	<10								<10	mg/kg	TM5/PM8
EPH >C21-C40	<10	<10								<10	mg/kg	TM5/PM8
EPH >C8-C40	<30	<30								<30	mg/kg	TM5/PM8
Natural Moisture Content	6.1	8.7								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0803	0.0944								<0.0015	g/l	TM38/PM20
Free Cyanide	<0.5	<0.5								<0.5	mg/kg	TM89/PM45

Client Name: Reference:	Central Al 3043	lliance Pre	Constructi	on Service	s Ltd	Report : Solid							
Location:	A1B2CH					Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub							
Contact: JE Job No.:	Richard H 18/779	lardwick											
J E Sample No.	1062-1064	1068-1070								1			
o E campie ito.	1002 1004	1000 1070											
Sample ID	BH17/42	BH17/42											
Depth	0.70	2.00								Please se	e attached n	otes for all	
COC No / misc										abbrevi	ations and ad	cronyms	
Containers	VJT	VJT											
Sample Date	21/05/2018	21/05/2018											
Sample Type	Soil	Soil											
Batch Number	50	50										Mothod	
Date of Receipt	23/05/2018	23/05/2018								LOD/LOR	Units	No.	
Total Cyanide <sup>#</sup>	<0.5	<0.5								<0.5	mg/kg	TM89/PM45	
Complex Cyanide	<0.5	<0.5								<0.5	mg/kg	TM89/PM45	
Organic Matter	2.9	1.9								<0.2	%	TM21/PM24	
Thiocvanate	<0.6	<0.6								<0.6	ma/ka	TM107/PM119	
											5.5		
рН#	8.47	7.79								<0.01	pH units	TM73/PM11	
Central Alliance Pre Construction Services Ltd													
--													
3043													
A1B2CH													
Richard Hardwick													

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	50	BH17/42	0.70	1064	25/06/2018	General Description (Bulk Analysis)	Soil/Stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD
18/779	50	BH17/42	2.00	1070	25/06/2018	General Description (Bulk Analysis)	Soil/Stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	50	BH17/42	0.70	1062-1064	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded
18/779	50	BH17/42	2.00	1068-1070	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
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AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
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## Method Code Appendix

#### **JE Job No:** 18/779

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TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

## Method Code Appendix

#### **JE Job No:** 18/779

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TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	3rd January, 2018
Your reference :	3043
Our reference :	Test Report 17/19465 Batch 5
Location :	A1B2CH
Date samples received :	9th December, 2017
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 9th December, 2017 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	liance Pre	Constructi	on Service	s Ltd	Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick											
JE JOD NO.:	17/19465		1				1	1	1	1	1		
J E Sample No.	61-64										1		
Sample ID	BH17-19												
Depth	0.70										Please se	e attached n	otes for all
COC No / misc											abbrevia	ations and a	cronyms
Contoinoro	1.7												
Containers	JI												
Sample Date	06/12/2017												
Sample Type	Soil												
Batch Number	5											Unite	Method
Date of Receipt	09/12/2017										LOD/LOK	Onits	No.
Arsenic <sup>#</sup>	5.6										<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	46.0										<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	15										<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	53										<5	mg/kg	TM30/PM15
Mercury#	<0.1										<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	17.1										<0.7	mg/kg	TM30/PM15
Selenium #	<1										<1	mg/kg	TM30/PM15
Zinc*	71										<5	mg/kg	TM30/PM15
PAR MS	0.06										<0.04	ma/ka	
Acenaphthylene	<0.00										<0.04	ma/ka	TM4/PM8
Acenaphthene #	<0.05										<0.05	ma/ka	TM4/PM8
Fluorene <sup>#</sup>	<0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.22										<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.10										<0.03	mg/kg	TM4/PM8
Pyrene #	0.10										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.07										<0.06	mg/kg	TM4/PM8
Chrysene #	0.09										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.23										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.13										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.09										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene *	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene "	0.09										<0.04	mg/kg	
Renzo(b)fluoranthene	0.17										<0.0>	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.06										<0.03	ma/ka	TM4/PM8
PAH Surrogate % Recovery	95										<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6#	<0.1										<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1										<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1										<0.1	mg/kg	TM36/PM12
>C10-C12#	<0.2										<0.2	mg/kg	TM5/PM16
>C12-C16 #	<4										<4	mg/kg	TM5/PM16
>C16-C21 #	<7										<7	mg/kg	TM5/PM16
>C21-C35 #	<7										<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19										<19	mg/kg	TM5/TM36/PM12/PM1

Client Name: Reference:	Central Al 3043	liance Pre	Constructi	on Service	s Ltd	Report : Solid						
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick										
JE Job No.:	17/19465											
J E Sample No.	61-64											
Sample ID	BH17-19											
Depth	0.70									Please se	e attached n	otes for all
COC No / misc										abbrevi	ations and a	cronyms
Containers	JТ											
Sample Date	06/12/2017											
	00/12/2017											
Sample Type	Soil											
Batch Number	5										Units	Method
Date of Receipt	09/12/2017									200/2011	onno	No.
TPH CWG												
Aromatics												
>C5-EC7#	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 <sup>#</sup>	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 <sup>#</sup>	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12#	<0.2									<0.2	mg/kg	TM5/PM16
>EC12-EC16#	<4									<4	mg/kg	TM5/PM16
>EC16-EC21 #	<7									<7	mg/kg	TM5/PM16
>EC21-EC35#	<7									<7	mg/kg	TM5/PM16
Total aromatics C5-35 #	<19									<19	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-35)	<38									<38	mg/kg	TM5/TM36/PM12/PM16
MTBE <i>*</i>	<5									<5	ug/kg	TM31/PM12
Benzene"	<5									<5	ug/kg	TM31/PM12
Toluene "	<5									<5	ug/kg	TM31/PM12
Ethylbenzene	<5									<5	ug/kg	TM31/PM12
n/p-Aylene <sup>#</sup>	<5									<5	ug/kg	TM31/PM12
0-Xylene	~0										ug/ng	
Natural Moisture Content	18.2									<0.1	%	PM4/PM0
	-											
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0316									<0.0015	g/l	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Total Cyanide #	<0.5									<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119
рН *	8.15									<0.01	pH units	TM73/PM11

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465	5	BH17-19	0.70	64	19/12/2017	General Description (Bulk Analysis)	soil.stones
					19/12/2017	Asbestos Fibres	NAD
					19/12/2017	Asbestos Fibres (2)	NAD
					19/12/2017	Asbestos ACM	NAD
					19/12/2017	Asbestos ACM (2)	NAD
					19/12/2017	Asbestos Type	NAD
					19/12/2017	Asbestos Type (2)	NAD
					19/12/2017	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
17/19465	5	BH17-19	0.70	61-64	GRO	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

#### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

#### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	29th December, 2017
Your reference :	3043
Our reference :	Test Report 17/19465 Batch 6
Location :	A1B2CH
Date samples received :	13th December, 2017
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 13th December, 2017 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.



Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Al	liance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick										
JE Job No.:	17/19465											
J E Sample No.	77-80											
Sample ID	BH17-17											
Depth	0.70									Please se	e attached n	otes for all
COC No / misc	:									abbrevi	ations and a	cronyms
Containers	JT											
Sample Date	11/12/2017 12:00											
Sample Type	Soil											
Batch Number	6											
										LOD/LOR	Units	Method No.
Date of Receipt	13/12/2017											
Arsenic <sup>#</sup>	16.3									<0.5	mg/kg	TM30/PM15
Cadmium*	0.3									<0.1	mg/kg	TM30/PM15
Chromium *	43.6									<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	49									<1	mg/kg	FM30/PM15
Lead*	117									<5	mg/kg	FM30/PM15
Mercury*	<0.1									<0.1	mg/kg	FM30/PM15
Nickel <sup>#</sup>	40.7									<0.7	mg/kg	TM30/PM15
Selenium #	1									<1	mg/kg	TM30/PM15
Zinc*	169									<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene *	0.10									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene *	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene *	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene *	0.43									<0.03	mg/kg	TM4/PM8
Anthracene "	0.06									<0.04	mg/kg	TM4/PM8
Fluoranthene "	0.49									<0.03	mg/kg	TM4/PM8
Pyrene "	0.41									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene "	0.25									<0.06	mg/kg	TM4/PM8
Chrysene "	0.28									<0.02	mg/kg	
Benzo(bk)fluorantnene "	0.40									<0.07	mg/kg	
benzo(a)pyrene	0.18									<0.04	mg/kg	
Dibonzo(ab)onthrocore #	0.13									<0.04	mg/kg	
Benzo(dhi)pondono#	0.14									<0.04	mg/kg	
PAH 16 Total	20									<0.04	mg/kg	
Benzo(b)fluoranthene	0.29									<0.05	ma/ka	TM4/PM8
Benzo(k)fluoranthene	0.11									<0.02	ma/ka	TM4/PM8
PAH Surrogate % Recovery	92									<0	%	TM4/PM8
											,	
EPH >C8-C10#	<5									<5	ma/ka	TM5/PM8
EPH >C10-C12#	<10									<10	ma/ka	TM5/PM8
EPH >C12-C16#	<10									<10	ma/ka	TM5/PM8
EPH >C16-C21 #	25									<10	ma/ka	TM5/PM8
EPH >C21-C40	116									<10	ma/ka	TM5/PM8
EPH >C8-C40	141									<30	ma/ka	TM5/PM8
Natural Moisture Content	27.8									<0.1	%	PM4/PM0
	21.0										,	
Hexavalent Chromium #	<0.3									<0.3	ma/ka	TM38/PM20
Sulphate as SO4 (2.1 Fxt) #	0.0588									<0.0015	a/l	TM38/PM20
											5.1	
Free Cvanide	<0.5									<0.5	ma/ka	TM89/PM4F

Client Name: Reference:	Central Alliance P 3043	re Constructi	on Service	⊧s Ltd	Report :	Solid					
Location: Contact: JE Job No.:	A1B2CH Richard Hardwick 17/19465				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
J E Sample No.	77-80								1		
Sample ID	BH17-17										
Depth	0.70								Please se	e attached n	otes for all
COC No / misc									abbrevi	ations and ad	cronyms
Containers	JT								1		
Sample Date	11/12/2017 12:00								1		
Sample Type	Soil								1		
Batch Number	6										Mathod
Date of Receipt	13/12/2017								LOD/LOR	Units	No.
Total Cyanide #	<0.5								<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5								<0.5	mg/kg	TM89/PM45
Organic Matter	15.3								<0.2	%	TM21/PM24
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119
pH <sup>#</sup>	7.55								<0.01	pH units	TM73/PM11
									i		
			1	1			1		1		

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

_				

Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465	6	BH17-17	0.70	80	19/12/2017	General Description (Bulk Analysis)	soil.stones
					19/12/2017	Asbestos Fibres	NAD
					19/12/2017	Asbestos Fibres (2)	NAD
					19/12/2017	Asbestos ACM	NAD
					19/12/2017	Asbestos ACM (2)	NAD
					19/12/2017	Asbestos Type	NAD
					19/12/2017	Asbestos Type (2)	NAD
					19/12/2017	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason						
	No deviating sample report results for job 17/19465											

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

#### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

## Method Code Appendix

#### **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Anthony Lewis-Bates
12th February, 2018
3043
Test Report 18/779 Batch 3
A1B2CH
24th January, 2018
Final report
1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Nine samples were received for analysis on 24th January, 2018 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference: Location:	Central Al 3043 A1B2CH	lliance Pre	Constructi	on Service	s Ltd	Report : Solid Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub									
Contact: JE Job No.:	Anthony L 18/779	_ewis-Bate	S					, u-2009 gi	uoo jui, 1-p						
J E Sample No.	73-75	79-81	82-84							ł					
Sample ID	WS17-15	WS17-15	WS17-16												
Depth	0.30	1.00	0.30							Disease					
COC No / misc										abbrevi	ations and a	cronyms			
Containara	VIT	VIT	VIT							1					
Containers	VJI	VJI	VJI							1					
Sample Date	23/01/2018	23/01/2018	23/01/2018							1					
Sample Type	Soil	Soil	Soil									-			
Batch Number	3	3	3							LOD/LOR	Units	Method			
Date of Receipt	24/01/2018	24/01/2018	24/01/2018							LOBILOI	onno	No.			
Arsenic <sup>#</sup>	13.8	-	14.8							<0.5	mg/kg	TM30/PM15			
Cadmium <sup>#</sup>	0.3	-	0.4							<0.1	mg/kg	TM30/PM15			
Chromium <sup>#</sup>	61.4	-	65.9							<0.5	mg/kg	TM30/PM15			
Copper#	36	-	36							<1	mg/kg	TM30/PM15			
Lead*	88	-	98							<5	mg/kg	TM30/PM15			
Mercury"	<0.1	-	<0.1							<0.1	mg/kg	TM30/PM15			
Nickei Selenium#	<1	-	21.2							<1	ma/ka	TM30/PM15			
Zinc#	120	-	136							<5	ma/ka	TM30/PM15			
											00				
PAH MS															
Naphthalene #	0.07	-	<0.04							<0.04	mg/kg	TM4/PM8			
Acenaphthylene	<0.03	-	<0.03							<0.03	mg/kg	TM4/PM8			
Acenaphthene #	<0.05	-	<0.05							<0.05	mg/kg	TM4/PM8			
Fluorene <sup>#</sup>	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8			
Phenanthrene <sup>#</sup>	0.39	-	0.20							<0.03	mg/kg	TM4/PM8			
Anthracene "	<0.04	-	<0.04							<0.04	mg/kg				
Purene <sup>#</sup>	0.20	-	0.24							<0.03	mg/kg	TM4/PM8			
Benzo(a)anthracene #	0.16	-	0.16							<0.06	mg/kg	TM4/PM8			
Chrysene <sup>#</sup>	0.21	-	0.16							<0.02	mg/kg	TM4/PM8			
Benzo(bk)fluoranthene #	0.29	-	0.24							<0.07	mg/kg	TM4/PM8			
Benzo(a)pyrene <sup>#</sup>	0.15	-	0.13							<0.04	mg/kg	TM4/PM8			
Indeno(123cd)pyrene#	0.09	-	0.08							<0.04	mg/kg	TM4/PM8			
Dibenzo(ah)anthracene #	<0.04	-	<0.04							<0.04	mg/kg	TM4/PM8			
Benzo(ghi)perylene #	0.09	-	0.08							<0.04	mg/kg	TM4/PM8			
PAH 16 Total	2.0	-	1.5							<0.6	mg/kg	TM4/PM8			
Benzo(b)fluoranthene	0.21	-	0.17							<0.05	mg/kg				
PAH Surrogate % Recovery	0.08	-	0.07							<0.02	mg/kg				
An ounogate // Recovery	30	_	07							~0	70				
Natural Moisture Content	42.6	-	46.9							<0.1	%	PM4/PM0			
Hexavalent Chromium #	<0.3	-	<0.3							<0.3	mg/kg	TM38/PM20			
Sulphate as SO4 (2:1 Ext) <sup>#</sup>	-	0.0628	-							<0.0015	g/l	TM38/PM20			
Free Cyanide	<0.5	-	<0.5							<0.5	mg/kg	TM89/PM45			
Total Cyanide #	<0.5	-	<0.5							<0.5	mg/kg	TM89/PM45			
Complex Cyanide	<0.5	-	<0.5							<0.5	mg/kg	TM89/PM45			
Thiocyanate	1.1	-	1.4							<0.6	mg/kg	TM107/PM119			
оH <sup>#</sup>	-	7 52	_							<0.01	nH unite	TM73/PM11			
P11	_	1.52	_							-0.01	Priunito				

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Anthony Lewis-Bates

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	3	WS17-15	0.30	75	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD
18/779	3	WS17-16	0.30	84	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Anthony Lewis-Bates

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 18/779	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

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Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

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ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

#### **JE Job No:** 18/779

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TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes

## Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	22nd June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 54
Location :	A1B2CH
Date samples received :	25th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 25th May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**

Lucas Halliwell Project Co-ordinator

Client Name: Reference:	Central Allia 3043	ance Pre	Constructi	on Service	s Ltd		Report :	Solid					
Location: Contact: JE Job No.:	A1B2CH Richard Har 18/779	rdwick					Solids: V=	60g VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
J E Sample No.	1146-1148										ľ		
Sample ID	BH17/50												
oumpie ib	Billioo												
Depth	1.20-1.40										Please se	e attached n	otes for all
COC No / misc											abbrevia	ations and ad	cronyms
Containers	VJT												
Sample Date	24/05/2018												
Sample Type	Soil												
Sample Type	3011												
Batch Number	54										LOD/LOR	Units	Method
Date of Receipt	25/05/2018												110.
Arsenic <sup>#</sup>	9.3										<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	0.2										<0.1	mg/kg	TM30/PM15
Chromium"	124.1										<0.5	mg/kg	TM30/PM18
Copper	43										<1	mg/kg	TM30/PM14
Mercury <sup>#</sup>	<0.1										<0.1	ma/ka	TM30/PM15
Nickel <sup>#</sup>	18.2										<0.7	mg/kg	TM30/PM15
Selenium #	1										<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	61										<5	mg/kg	TM30/PM18
PAH MS													
Naphthalene #	0.10										<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.04										<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene"	<0.04										<0.04	mg/kg	
Anthracene #	<0.04										<0.03	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.27										<0.03	ma/ka	TM4/PM8
Pyrene <sup>#</sup>	0.24										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	0.19										<0.06	mg/kg	TM4/PM8
Chrysene #	0.20										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.35										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	0.14										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.11										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.11										<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.1										<0.6	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.25										<0.05	ma/ka	TM4/PW8
PAH Surrogate % Recoverv	94										<0	%	TM4/PM8
Natural Moisture Content	9.1										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Free Cyanida	<0.5										<0 F	malka	
Total Cyanida #	<0.5										<0.5	mg/kg	TM89/PM4
Complex Cvanide	<0.5										<0.5	mg/kg	TM89/PM4
Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM119
	1 1			1	1	1	1	1	1		1		1

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	54	BH17/50	1.20-1.40	1148	20/06/2018	General Description (Bulk Analysis)	soil/stones
					20/06/2018	Asbestos Fibres	NAD
					20/06/2018	Asbestos Fibres (2)	NAD
					20/06/2018	Asbestos ACM	NAD
					20/06/2018	Asbestos ACM (2)	NAD
					20/06/2018	Asbestos Type	NAD
					20/06/2018	Asbestos Type (2)	NAD
					20/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	54	BH17/50	1.20-1.40	1146-1148	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid
## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Richard Hardwick
29th December, 2017
3043
Test Report 17/19465 Batch 7
A1B2CH
13th December, 2017
Final report
1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Two samples were received for analysis on 13th December, 2017 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.



Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043						Report : Solid								
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub				
Contact:	Richard H	ardwick													
JE Job No.:	17/19465										_				
J E Sample No.	89-92										ĺ				
Sample ID	BH17-14														
Depth	0.20										Please se	e attached r	notes for all		
COC No / misc	:										abbrevia	ations and a	cronyms		
Containers	JT														
Sample Date	11/12/2017														
Sample Tune	0-1														
Sample Type	3011										ļ,				
Batch Number	7										LOD/LOR	Units	Method		
Date of Receipt	13/12/2017												NO.		
Arsenic <sup>#</sup>	15.5										<0.5	mg/kg	TM30/PM15		
Cadmium <sup>#</sup>	0.3										<0.1	mg/kg	TM30/PM15		
Chromium <sup>#</sup>	57.9										<0.5	mg/kg	TM30/PM15		
Copper"	47										<1	mg/kg	TM30/PM15		
Lead	-0.1										<0.1	mg/kg	TM30/PM15		
Nickel <sup>#</sup>	44.4										<0.1	ma/ka	TM30/PM15		
Selenium <sup>#</sup>	2										<1	mg/kg	TM30/PM15		
Zinc <sup>#</sup>	162										<5	mg/kg	TM30/PM15		
PAH MS															
Naphthalene #	0.08										<0.04	mg/kg	TM4/PM8		
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8		
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8		
Fluorene #	<0.04										<0.04	mg/kg	TM4/PM8		
Phenanthrene "	0.28										<0.03	mg/kg			
Anthracene	<0.04										<0.04	mg/kg			
Pyrene <sup>#</sup>	0.33										<0.03	ma/ka	TM4/PM8		
Benzo(a)anthracene <sup>#</sup>	0.19										<0.06	mg/kg	TM4/PM8		
Chrysene <sup>#</sup>	0.22										<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	0.35										<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene <sup>#</sup>	0.17										<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene#	0.14										<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene #	0.15										<0.04	mg/kg	TM4/PM8		
PAH 16 Total	2.2										<0.6	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	0.25										<0.05	mg/kg			
PAH Surrogate % Recovery	0.10										<0.02	ттд/кд %	TM4/PM8		
	33										~~	70			
Natural Moisture Content	29.8										<0.1	%	PM4/PM0		
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20		
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM45		
Total Cyanide #	<0.5										<0.5	mg/kg	TM89/PM45		
Complex Cyanide	<0.5										<0.5	mg/kg	TM89/PM45		
T													THEORY		
Iniocyanate	<0.6										<0.6	mg/kg	1M107/PM119		

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

AMO

Ryan Butterworth Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/19465	7	BH17-14	0.20	92	19/12/2017	General Description (Bulk Analysis)	soil.stones
					19/12/2017	Asbestos Fibres	NAD
					19/12/2017	Asbestos Fibres (2)	NAD
					19/12/2017	Asbestos ACM	NAD
					19/12/2017	Asbestos ACM (2)	NAD
					19/12/2017	Asbestos Type	NAD
					19/12/2017	Asbestos Type (2)	NAD
					19/12/2017	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 17/19465	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/19465

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

(	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

## **JE Job No:** 17/19465

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# JONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780

Central Alliance Pre Construction Services Ltd Central Alliance, Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ



Attention :	Richard Hardwick
Date :	18th April, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 12
Location :	A1B2CH
Date samples received :	21st February, 2018
Status :	Final report
Issue :	1

Seven samples were received for analysis on 21st February, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	Central Alliance Pre Construction Services Ltd 3043					Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC jai	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard H	lardwick												
JE Job No.:	18/779													
J E Sample No.	292-295	296-299												
Sample ID	BH17-75	BH17-75												
Depth	0.70	1.50									Please se	e attached n	otes for all	
COC No / misc											abbrevia	ations and a	cronyms	
Containers	JТ	JТ												
Sample Date	19/02/2018	19/02/2018												
Sample Type	Soil	Soil												
Batch Number	12	12												
Date of Receipt	21/02/2018	21/02/2018									LOD/LOR	Units	Method No.	
Arsenic <sup>#</sup>	6.3	5.9									<0.5	ma/ka	TM30/PM15	
Cadmium <sup>#</sup>	0.1	<0.1									<0.1	ma/ka	TM30/PM15	
Chromium <sup>#</sup>	67.5	59.0									<0.5	mg/kg	TM30/PM15	
Copper <sup>#</sup>	26	28									<1	mg/kg	TM30/PM15	
Lead <sup>#</sup>	51	38									<5	mg/kg	TM30/PM15	
Mercury <sup>#</sup>	<0.1	0.1									<0.1	mg/kg	TM30/PM15	
Nickel <sup>#</sup>	31.9	46.9									<0.7	mg/kg	TM30/PM15	
Selenium <sup>#</sup>	<1	1									<1	mg/kg	TM30/PM15	
Zinc <sup>#</sup>	93	92									<5	mg/kg	TM30/PM15	
PAH MS														
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Phenanthrene <sup>#</sup>	0.09	0.21									<0.03	mg/kg	TM4/PM8	
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Fluoranthene <sup>#</sup>	0.06	0.16									<0.03	mg/kg	TM4/PM8	
Pyrene <sup>#</sup>	0.05	0.13									<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene#	<0.06	0.08									<0.06	mg/kg	TM4/PM8	
Chrysene #	0.05	0.09									<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	<0.07	0.16									<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	<0.04	0.06									<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene#	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene *	<0.04	<0.04									<0.04	mg/kg	IM4/PM8	
Benzo(ghi)perylene *	<0.04	0.05									<0.04	mg/kg	TM4/PM8	
PAH 16 Total	<0.6	0.9									<0.6	mg/kg	TM4/PM8	
	<0.05	0.12									<0.05	mg/kg		
	<0.02	0.04									<0.02	111g/kg		
PAIT Suffogate % Recovery	05	51									<0	70	TIVI4/FIVIO	
Natural Moisture Content	21.3	24.2									<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20	
Free Cyanide	<0.5	<0.5									<0.5	mg/kg	TM89/PM45	
Total Cyanide <sup>#</sup>	<0.5	<0.5									<0.5	mg/kg	TM89/PM45	
Complex Cyanide	<0.5	<0.5									<0.5	mg/kg	TM89/PM45	
Thiocyanate	<0.6	1.8									<0.6	mg/kg	TM107/PM119	
	1	1	1	1	1		I			1	1 1		1	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	12	BH17-75	0.70	295	09/04/2018	General Description (Bulk Analysis)	Soil/Stone
					09/04/2018	Asbestos Fibres	NAD
					09/04/2018	Asbestos Fibres (2)	NAD
					09/04/2018	Asbestos ACM	NAD
					09/04/2018	Asbestos ACM (2)	NAD
					09/04/2018	Asbestos Type	NAD
					09/04/2018	Asbestos Type (2)	NAD
					09/04/2018	Asbestos Level Screen	NAD
18/779	12	BH17-75	1.50	299	09/04/2018	General Description (Bulk Analysis)	Soil/Stone
					09/04/2018	Asbestos Fibres	NAD
					09/04/2018	Asbestos Fibres (2)	NAD
					09/04/2018	Asbestos ACM	NAD
					09/04/2018	Asbestos ACM (2)	NAD
					09/04/2018	Asbestos Type	NAD
					09/04/2018	Asbestos Type (2)	NAD
					09/04/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	12	BH17-75	0.70	292-295	Cyanide, PAH	Sample holding time exceeded
18/779	12	BH17-75	1.50	296-299	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

## SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 32
Location :	A1B2CH
Date samples received :	30th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eleven samples were received for analysis on 30th April, 2018 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid						
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard H	lardwick												
JE Job No.:	18/779													
J E Sample No.	687-689	705-707	711-713											
Sample ID	BH17/44	WS17/18	WS17/19											
Depth	0.70	0.70	0.50								Plaasa sa	e attached n	otes for all	
COC No / misc											abbrevi	ations and a	cronyms	
Contoinon														
Containers	VJI	VJI	VJI											
Sample Date	26/04/2018	26/04/2018	26/04/2018											
Sample Type	Soil	Soil	Soil											
Batch Number	32	32	32								LOD/LOR	Units	Method	
Date of Receipt	30/04/2018	30/04/2018	30/04/2018										NO.	
Arsenic <sup>#</sup>	5.0	7.5	6.1								<0.5	mg/kg	TM30/PM1	
Cadmium #	0.2	0.1	0.9								<0.1	mg/kg	TM30/PM1	
Chromium <sup>#</sup>	31.0	74.7	46.3								<0.5	mg/kg	TM30/PM1	
Copper <sup>#</sup>	16	34	37								<1	mg/kg	TM30/PM1	
Lead <sup>#</sup>	35	50	42								<5	mg/kg	TM30/PM1	
Mercury <sup>#</sup>	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM1	
Nickel <sup>#</sup>	13.1	44.6	32.6								<0.7	mg/kg	TM30/PM1	
Selenium <sup>#</sup>	1	2	1								<1	mg/kg	TM30/PM1	
Zinc <sup>#</sup>	65	104	212								<5	mg/kg	TM30/PM1	
PAH MS														
Naphthalene #	0.10	0.11	0.14								<0.04	mg/kg	TM4/PM8	
Acenaphthylene	0.13	<0.03	0.18								<0.03	mg/kg	TM4/PM8	
Acenaphthene #	0.16	<0.05	0.31								<0.05	mg/kg	TM4/PM8	
Fluorene #	0.15	<0.04	0.29								<0.04	mg/kg	TM4/PM8	
Phenanthrene <sup>#</sup>	1.81	0.33	3.24								<0.03	mg/kg	TM4/PM8	
Anthracene #	0.48	<0.04	0.82								<0.04	mg/kg	TM4/PM8	
Fluoranthene <sup>#</sup>	3.52	0.34	5.81								<0.03	mg/kg	TM4/PM8	
Pyrene <sup>#</sup>	2.96	0.30	4.45								<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	1.94	0.22	3.15								<0.06	mg/kg	TM4/PM8	
Chrysene #	1.58	0.24	2.64								<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	3.26	0.38	5.02								<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene <sup>#</sup>	1.70	0.15	2.52								<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	1.19	0.13	1.71								<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	0.41	<0.04	0.56								<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	1.08	0.13	1.42								<0.04	mg/kg	TM4/PM8	
PAH 16 Total	20.5	2.3	32.3								<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	2.35	0.27	3.61								<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.91	0.11	1.41								<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	87	90	95								<0	%	TM4/PM8	
EPH (C8-C40) <sup>#</sup>	392	-	480								<30	mg/kg	TM5/PM8	
Natural Moisture Content	14.7	18.4	19.0								<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM2	
Sulphate as SO4 (2:1 Ext) #	0.0911	-	0.0355								<0.0015	g/l	TM38/PM2	
Free Cyanide	<0.5	<0.5	<0.5								<0.5	mg/kg	TM89/PM4	
Total Cyanide #	<0.5	<0.5	<0.5								<0.5	mg/kg	TM89/PM4	
Complex Cyanide	<0.5	<0.5	<0.5								<0.5	mg/kg	TM89/PM4	
Organic Matter	4.2	-	4.2								<0.2	%	TM21/PM2	

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid							
Location:	A1B2CH						Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub								
Contact:	Richard H	ardwick													
JE Job No.:	18/779														
J E Sample No.	687-689	705-707	711-713												
Sample ID	BH17/44	WS17/18	WS17/19												
Depth	0.70	0.70	0.50								Please se	e attached n	otes for all		
COC No / misc											abbrevi	abbreviations and acronyms			
Containers	ТLV	ТLV	ТLV												
Sample Date	26/04/2018	26/04/2018	26/04/2018												
Sample Ture	20/04/2010	20/04/2010	20/04/2010												
Sample Type	501	501	Soli												
Batch Number	32	32	32								LOD/LOR	Units	Method		
Date of Receipt	30/04/2018	30/04/2018	30/04/2018										110.		
Thiocyanate	<0.6	<0.6	<0.6								<0.6	mg/kg	TM107/PM119		
-11#	8 00		9.50								<0.01		TM72/DM11		
рн	0.90	-	0.50								<0.01	pri units	1 IVI7 3/PIVIT I		

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	32	BH17/44	0.70	689	04/06/2018	General Description (Bulk Analysis)	Soil/Stone
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD
18/779	32	WS17/18	0.70	707	04/06/2018	General Description (Bulk Analysis)	Soil/Stone
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD
18/779	32	WS17/19	0.50	713	04/06/2018	General Description (Bulk Analysis)	Soil/Stone
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	32	BH17/44	0.70	687-689	Cyanide, EPH, PAH, Sulphate	Sample holding time exceeded
18/779	32	WS17/18	0.70	705-707	Cyanide, PAH	Sample holding time exceeded
18/779	32	WS17/19	0.50	711-713	Cyanide, EPH, PAH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

## SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Date :12th February, 2018Your reference :3043Our reference :Test Report 18/779 Batch 4Location :A1B2CHDate samples received :24th January, 2018Status :Final reportIssue :1	Attention :	Anthony Lewis-Bates
Your reference :3043Our reference :Test Report 18/779 Batch 4Location :A1B2CHDate samples received :24th January, 2018Status :Final reportIssue :1	Date :	12th February, 2018
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Status : Final report   Issue : 1	Date samples received :	24th January, 2018
Issue : 1	Status :	Final report
	Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 24th January, 2018 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	lliance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Anthony L	ewis-Bate	S									
JE Job No.:	18/779											
J E Sample No.	100-102	103-105	112-114	115-117								
Sample ID	WS17-13	WS17-13	WS17-14	WS17-14								
Depth	0.30	0.50	0.50	1.00						Diagon on	o ottoobod n	otoo for all
COC No / misc										abbrevi	ations and a	cronyms
COC NO7 misc												
Containers	VJT	VJT	VJT	VJT								
Sample Date	22/01/2018	22/01/2018	22/01/2018	22/01/2018								
Sample Type	Soil	Soil	Soil	Soil								
Batch Number	4	4	4	4						LOD/LOR	Units	Method
Date of Receipt	24/01/2018	24/01/2018	24/01/2018	24/01/2018								NO.
Arsenic <sup>#</sup>	6.4	-	6.5	-						<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	0.2	-	0.2	-						<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	66.4	-	58.8	-						<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	17	-	18	-						<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	39	-	34	-						<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	-	<0.1	-						<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	20.8	-	35.2	-						<0.7	mg/kg	TM30/PM15
Selenium #	<1	-	<1	-						<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	76	-	78	-						<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene #	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-	<0.03	-						<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-	<0.05	-						<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.19	-	0.04	-						<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.20	-	<0.03	-						<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	0.16	-	<0.03	-						<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.12	-	<0.06	-						<0.06	mg/kg	TM4/PM8
Chrysene #	0.08	-	<0.02	-						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.13	-	<0.07	-						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	0.06	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene *	<0.04	-	<0.04	-						<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.9	-	<0.6	-						<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.09	-	<0.05	-						<0.05	mg/kg	
Benzo(k)fluoranthene	0.04	-	<0.02	-						<0.02	mg/kg	
PAH Surrogate % Recovery	96	-	87	-						<0	%	TM4/PM8
Natural Moisture Content	19.1	-	31.1	-						<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	-	<0.3	-						<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	0.0225	-	0.0295						<0.0015	g/l	TM38/PM20
, ,												
Free Cyanide	<0.5	-	<0.5	-						<0.5	mg/kg	TM89/PM45
Total Cyanide #	<0.5	-	<0.5	-						<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5	-	<0.5	-						<0.5	mg/kg	TM89/PM45
Thiocyanate	<0.6	-	<0.6	-						<0.6	mg/kg	TM107/PM119
оH #		8 40		8 25						<0.01	nH unite	TM73/DM11
PLI	-	0.40	-	0.55						LO.01	pri units	1101/ 0/1-1011

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Anthony Lewis-Bates

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	4	WS17-13	0.30	102	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD
18/779	4	WS17-14	0.50	114	05/02/2018	General Description (Bulk Analysis)	Soil/Stone
					05/02/2018	Asbestos Fibres	NAD
					05/02/2018	Asbestos Fibres (2)	NAD
					05/02/2018	Asbestos ACM	NAD
					05/02/2018	Asbestos ACM (2)	NAD
					05/02/2018	Asbestos Type	NAD
					05/02/2018	Asbestos Type (2)	NAD
					05/02/2018	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Anthony Lewis-Bates

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
					No deviating sample report results for job 18/779	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

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Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

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All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

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% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

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Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

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Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

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A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

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Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

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DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
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ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes

## Method Code Appendix

## **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# JONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780

Central Alliance Pre Construction Services Ltd Central Alliance, Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ



Attention :	Richard Hardwick
Date :	18th April, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 11
Location :	A1B2CH
Date samples received :	21st February, 2018
Status :	Final report
Issue :	1

Ten samples were received for analysis on 21st February, 2018 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central A	lliance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Reference:	3043											
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick										
JE JOD NO	10/119									1		
J E Sample No.	248-251	260-263	272-275									
Sample ID	TP17-01	TP17-03B	TP17-04A									
Denth	0.50	0.30	0.30									
	0.50	0.30	0.30							Please se abbrevia	e attached n ations and a	otes for all cronyms
COC No / misc												,
Containers	JT	JT	JT									
Sample Date	19/02/2018	20/02/2018	19/02/2018									
Sample Type	Soil	Soil	Soil									
Batch Number	11	11	11								Unite	Method
Date of Receipt	21/02/2018	21/02/2018	21/02/2018							LOD/LOIX	Offita	No.
Arsenic <sup>#</sup>	13.9	4.5	18.2							<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	0.3	<0.1	0.2							<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	68.0	76.8	72.3							<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	43	18	35							<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	86	21	74							<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1							<0.1	ma/ka	TM30/PM15
Nickel <sup>#</sup>	30.5	22.9	26.8							<0.7	ma/ka	TM30/PM15
Selenium #	1	<1	1							<1	ma/ka	TM30/PM15
Zino#	120	64	120							<5	mg/kg	TM30/PM15
2110	120	04	120							10	ing/itg	
PAH MS												
Naphthalene <sup>#</sup>	< 0.04	<0.04	< 0.04							< 0.04	ma/ka	TM4/PM8
Acenaphthylene	< 0.03	< 0.03	< 0.03							< 0.03	ma/ka	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05							<0.05	ma/ka	TM4/PM8
Eluoropo #	<0.04	<0.00	<0.00							<0.00	mg/kg	TM4/PM8
Dhananthrana <sup>#</sup>	0.46	<0.04	0.42							<0.04	mg/kg	TM4/PM8
Anthroppone #	<0.40	<0.03	<0.04							<0.03	mg/kg	
	0.50	-0.02	0.17							<0.04	mg/kg	
	0.39	-0.03	0.17							<0.03	mg/kg	
Pyrene	0.47	<0.03	0.14							<0.03	mg/kg	
Benzo(a)anthracene	0.41	<0.06	0.15							<0.06	mg/kg	TIVI4/PIVI8
Chrysene "	0.33	<0.02	0.17							<0.02	mg/kg	11/14/P1/18
Benzo(bk)fluoranthene *	0.64	<0.07	0.19							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene *	0.27	<0.04	0.05							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.16	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.19	<0.04	0.05							<0.04	mg/kg	TM4/PM8
PAH 16 Total	3.5	<0.6	1.3							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.46	<0.05	0.14							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.18	<0.02	0.05							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	84	94							<0	%	TM4/PM8
Natural Moisture Content	17.8	24.2	25.3							<0.1	0/_	
Natural Moisture Content	17.0	24.2	25.5							<0.1	70	FIVI4/FIVIU
Hexavalent Chromium#	<03	<03	<03							<03	ma/ka	TM38/PM20
	<0.3	×0.3	<0.3							<0.5	iiig/kg	TINIOU/FIVIZU
Eree Cvanide	-0.5	-0.5	-0.5							<0.5	ma/ka	
Tatal Quarity #	<0.5	<0.5	<0.5							C.U>	mg/kg	TM90/DM45
Complex Cuenida	<0.5	<0.5	<0.5							<0.5	mg/kg	TM90/DM45
Complex Cyanide	<0.5	<0.5	<0.5							<u.5< td=""><td>тід/КД</td><td>1 IVI89/PM45</td></u.5<>	тід/КД	1 IVI89/PM45
Thiocvanate	<0.6	16	1.8							<0.6	ma/ka	TM107/PM110
moyunato	<b>\U.U</b>	1.0	1.0							<b>CO.O</b>	y/ky	
Central Alliance Pre Construction Services Ltd												
--												
3043												
A1B2CH												
Richard Hardwick												

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	11	TP17-01	0.50	251	11/04/2018	General Description (Bulk Analysis)	Soil/Stones
					11/04/2018	Asbestos Fibres	NAD
					11/04/2018	Asbestos Fibres (2)	NAD
					11/04/2018	Asbestos ACM	NAD
					11/04/2018	Asbestos ACM (2)	NAD
					11/04/2018	Asbestos Type	NAD
					11/04/2018	Asbestos Type (2)	NAD
					11/04/2018	Asbestos Level Screen	NAD
18/779	11	TP17-03B	0.30	263	11/04/2018	General Description (Bulk Analysis)	Soil/Stones
					11/04/2018	Asbestos Fibres	NAD
					11/04/2018	Asbestos Fibres (2)	NAD
					11/04/2018	Asbestos ACM	NAD
					11/04/2018	Asbestos ACM (2)	NAD
					11/04/2018	Asbestos Type	NAD
					11/04/2018	Asbestos Type (2)	NAD
					11/04/2018	Asbestos Level Screen	NAD
18/779	11	TP17-04A	0.30	275	11/04/2018	General Description (Bulk Analysis)	Soil/Stones
					11/04/2018	Asbestos Fibres	NAD
					11/04/2018	Asbestos Fibres (2)	NAD
					11/04/2018	Asbestos ACM	NAD
					11/04/2018	Asbestos ACM (2)	NAD
					11/04/2018	Asbestos Type	NAD
					11/04/2018	Asbestos Type (2)	NAD
					11/04/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	11	TP17-01	0.50	248-251	Cyanide, PAH	Sample holding time exceeded
18/779	11	TP17-03B	0.30	260-263	Cyanide, PAH	Sample holding time exceeded
18/779	11	TP17-04A	0.30	272-275	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# JONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

Tel: +44 (0) 1244 833780

Central Alliance Pre Construction Services Ltd Central Alliance, Alliance House South Park Way Wakefield 41 Business Park Wakefield WF2 0XJ



Attention :	Richard Hardwick
Data :	19th April 2019
Date :	Touri April, 2016
Your reference :	3043
Our reference :	Test Report 18/779 Batch 13
Location :	A1B2CH
Date samples received :	22nd February, 2018
Status :	Final report
Issue :	1

Eight samples were received for analysis on 22nd February, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Al	tral Alliance Pre Construction Services Ltd 3					Report : Solid							
Location:	A1B2CH						Solids: V=	60a VOC ia	r .l=250a al	ass iar T=r	lastic tub			
Contact:	Richard H	ardwick					20.100. 1-1	ico jai	., <b></b>					
JE Job No.:	18/779													
J E Sample No.	336-339										Ì			
Sample ID	BH17-21													
Denth	1.50													
COC No / mino											Please see abbrevia	e attached n ations and a	otes for all cronyms	
COC NO/ MISC														
Containers	JT													
Sample Date	20/02/2018													
Sample Type	Soil													
Batch Number	13												Mothod	
Date of Receipt	22/02/2018										LOD/LOR	Units	No.	
Arconic#	1.6										<0.5	ma/ka	TM30/PM14	
Arsenic Codmium #	0.1										<0.5	mg/kg	TM30/PM14	
Cadmium #	16.8										<0.1	mg/kg	TM30/PM14	
Coppor <sup>#</sup>	8										<0.5	mg/kg	TM30/PM14	
Copper	15										<5	mg/kg	TM30/PM1	
Moreup,#	<0.1										<0.1	mg/kg	TM30/PM1	
Niekol#	5.6										<0.7	mg/kg	TM30/PM14	
NICKEI	-1										<0.7	mg/kg	TM20/PM1	
Selenium	<1 51										<1	mg/kg	TM20/PM11	
ZINC	51										<0	mg/kg	TWISO/FINITS	
PAH MS														
Naphthalene <sup>#</sup>	< 0.04										< 0.04	ma/ka	TM4/PM8	
Acenaphthylene	<0.03										< 0.03	ma/ka	TM4/PM8	
Acenaphthene #	<0.05										<0.05	ma/ka	TM4/PM8	
Fluorene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8	
Phenanthrene <sup>#</sup>	0.03										<0.04	ma/ka	TM4/PM8	
Anthracene #	<0.04										<0.04	ma/ka	TM4/PM8	
Fluoranthene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8	
Pyrene <sup>#</sup>	<0.00										<0.00	ma/ka	TM4/PM8	
Benzo(a)anthracene <sup>#</sup>	<0.00										<0.06	ma/ka	TM4/PM8	
Chrysene#	<0.02										<0.02	ma/ka	TM4/PM8	
Benzo/bk)fluoranthene#	<0.02										<0.02	ma/ka	TM4/PM8	
Benzo(a)pyrene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8	
Indepo(123cd)pyrene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8	
Dibenzo(ab)anthracene#	<0.04										<0.04	ma/ka	TM4/PM9	
Benzo(ghi)pervlene #	<0.04										<0.04	ma/ka	ТM4/РМ9	
PAH 16 Total	<0.6										<0.6	ma/ka		
Benzo(b)fluoranthene	<0.0										<0.05	ma/ka	TM4/PM8	
Benzo(k)fluoranthene	<0.00										<0.00	ma/ka	TM4/PM8	
PAH Surrogate % Recovery	103										<0	%	TM4/PM8	
											10	70		
Natural Moisture Content	14.5										<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20	
	-													
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM4	
Total Cvanide <sup>#</sup>	<0.5										<0.5	mg/kg	TM89/PM4	
Complex Cyanide	<0.5										<0.5	mg/kq	TM89/PM4	
	-													
Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM11	
				1	1		1							

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	13	BH17-21	1.50	339	29/03/2018	General Description (Bulk Analysis)	Soil/Stone
					29/03/2018	Asbestos Fibres	NAD
					29/03/2018	Asbestos Fibres (2)	NAD
					29/03/2018	Asbestos ACM	NAD
					29/03/2018	Asbestos ACM (2)	NAD
					29/03/2018	Asbestos Type	NAD
					29/03/2018	Asbestos Type (2)	NAD
					29/03/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	13	BH17-21	1.50	336-339	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 16
Location :	A1B2CH
Date samples received :	7th March, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eight samples were received for analysis on 7th March, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Al	ntral Alliance Pre Construction Services Ltd						Report : Solid					
Location:	A1B2CH						Solids: V=60g VOC jar .I=250g glass jar T=plastic tub						
Contact:	Richard H	ardwick					Condo. V-	00g 100 ja	i, 0–2009 gi	uoo jui, 1-p			
JE Job No.:	18/779												
J E Sample No.	400-403										ľ		
	100 100												
Sample ID	BH17-26												
Depth	2.50												
COC No / mino											Please se abbrevia	e attached n ations and a	otes for all cronyms
COC NO/ MISC													
Containers	JT												
Sample Date	05/03/2018												
Sample Type	Soil												
Batch Number	16												Mathad
Date of Receipt	07/03/2018										LOD/LOR	Units	No.
Amonio#	4 9										<0.5	ma/ka	TM30/PM14
Arsenic Codmium <sup>#</sup>	-0.1										<0.5	mg/kg	TM30/PM1
Chromium <sup>#</sup>	31.0										<0.1	ma/ka	TM30/PM1
Copper <sup>#</sup>	51										<1	ma/ka	TM30/PM1
Lead <sup>#</sup>	23										<5	ma/ka	TM30/PM1
Mercurv <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	38.1										<0.7	mg/kg	TM30/PM1
Selenium #	2										<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	68										<5	mg/kg	TM30/PM1
PAH MS													
Naphthalene #	0.18										<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene <sup>#</sup>	<0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.67										<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.08										<0.03	mg/kg	TM4/PM8
Pyrene *	0.11										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene "	0.09										<0.06	mg/kg	
Chrysene "	0.12										<0.02	mg/kg	
Benzo(bk)iluoraritrierie	<0.00										<0.07	mg/kg	
Indepo(123cd)pyrene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	ma/ka	TM4/PM8
Benzo(ghi)pervlene #	0.04										<0.04	mg/kq	TM4/PM8
PAH 16 Total	1.4										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.06										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.02										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	105										<0	%	TM4/PM8
EPH (C8-C40) #	160										<30	mg/kg	TM5/PM8
Natural Moisture Content	9.8										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.9489										<0.0015	g/l	TM38/PM20
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM4
Total Cyanide *	<0.5										<0.5	mg/kg	TM89/PM4
Complex Cyanide	<0.5										<0.5	mg/kg	1 M89/PM4
Organia Matter	0.2										.0.0	0/	TMO4/DMO
Organic Matter	9.3										<0.2	%	TWI21/PM24

Client Name: Reference:	Central Alliance 3043	Pre Constructi	Construction Services Ltd				Report : Solid						
Location: Contact:	A1B2CH Richard Hardwic	:k				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
JE JOD NO.:	18/779									1			
J E Sample No.	400-403												
Sample ID	BH17-26												
Depth	2.50									Diagon on	a attached p	otoo for all	
COC No / misc										abbrevi	ations and ac	cronyms	
Containers	JT												
Sample Date	05/03/2018												
Oample Date	03/03/2018												
Sample Type	501									ļ		<u> </u>	
Batch Number	16									LOD/LOR	Units	Method	
Date of Receipt	07/03/2018											140.	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119	
оH <sup>#</sup>	6.55									<0.01	pH units	TM73/PM11	
pri	0.00									20.01	pri unito		
											I		
	1		1	1	1	1	1			, I		1	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	16	BH17-26	2.50	403	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	16	BH17-26	2.50	400-403	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 40
Location :	A1B2CH
Date samples received :	11th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Five samples were received for analysis on 11th May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	Central Alliance Pre Construction Services Ltd 3043						Report : Solid					
Location:	A1B2CH						Solids: V=	60q VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick							.,3 3.				
JE Job No.:	18/779												
J E Sample No	870-872										l		
o E Gampie No.	070-072												
Sample ID	BH17/69												
Denth	1.00												
											Please se abbrevia	e attached n ations and a	otes for all cronyms
COC No / misc													
Containers	VJT												
Sample Date	09/05/2018												
Sample Type	Soil												
Batch Number	40										ſ		
Batch Number	40										LOD/LOR	Units	Method No
Date of Receipt	11/05/2018												
Arsenic <sup>#</sup>	2.4										<0.5	mg/kg	TM30/PM1
Cadmium <sup>#</sup>	0.6										<0.1	mg/kg	TM30/PM1
Chromium <sup>#</sup>	39.3										<0.5	mg/kg	TM30/PM1
Copper <sup>#</sup>	14										<1	mg/kg	TM30/PM18
Lead <sup>#</sup>	55										<5	mg/kg	TM30/PM18
Mercury #	<0.1										<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	8.4										<0.7	mg/kg	TM30/PM1
Selenium <sup>#</sup>	<1										<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	57										<5	mg/kg	TM30/PM18
PAH MS													
Naphthalene *	<0.04										<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8
Acenaphthene"	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene "	<0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene"	0.08										<0.03	mg/kg	TM4/PM8
Anthracene "	<0.04										<0.04	mg/kg	
Fluoranthene "	0.05										<0.03	mg/kg	
Pyrene "	0.03										<0.03	mg/kg	
Benzo(a)anthracene	<0.06										<0.06	mg/kg	
Chrysene "	0.03										<0.02	mg/kg	
Benzo(bk)fluorantnene "	<0.07										<0.07	mg/kg	
Benzo(a)pyrene	<0.04										<0.04	mg/kg	
Dihanza(ab)anthraana #	<0.04										<0.04	mg/kg	
Benzo(dhi)pervlene #	<0.04										<0.04	ma/ka	
PAH 16 Total	<0.6										<0.6	ma/ka	
Benzo(b)fluoranthene	<0.0										<0.0	ma/ka	TM4/PM9
Benzo(k)fluoranthene	<0.02										<0.02	ma/ka	TM4/PM8
PAH Surrogate % Recovery	92										<0	%	TM4/PM8
Natural Moisture Content	14.6										<0.1	%	PM4/PM0
	-										_		
Hexavalent Chromium #	<0.3										<0.3	ma/ka	TM38/PM20
												39	
Free Cyanide	<0.5										<0.5	ma/ka	TM89/PM4
Total Cvanide <sup>#</sup>	<0.5										<0.5	ma/ka	TM89/PM4
Complex Cyanide	<0.5										<0.5	ma/ka	TM89/PM4
												-99	
Thiocyanate	<0.6										<0.6	mg/kq	TM107/PM11
	-												
													1

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

ronmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	40	BH17/69	1.00	872	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	40	BH17/69	1.00	870-872	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 17
Location :	A1B2CH
Date samples received :	4th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Seven samples were received for analysis on 4th April, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid						
Location:	A1B2CH						Solids: V=	60g VOC iai	r. J=250a al	ass iar. T=p	lastic tub			
Contact:	Richard Ha	rdwick							,	, , , , , , , , , , , , , , , , , , ,				
JE Job No.:	18/779													
J E Sample No	426-431										l			
o E Gampie No.	420-401													
Sample ID	BH17/05A													
Depth	0.70										Disesses			
COC No / miss											abbrevi;	ations and ac	cronyms	
COC NO7 misc														
Containers	VJT													
Sample Date	27/03/2018													
Sample Type	Soil													
Batch Number	17													
											LOD/LOR	Units	Method No.	
Date of Receipt	04/04/2018													
Arsenic <sup>#</sup>	6.2										<0.5	mg/kg	TM30/PM18	
Cadmium*	0.1										<0.1	mg/kg	TM30/PM1	
Chromium #	70.6										<0.5	mg/kg	TM30/PM18	
Copper <sup>#</sup>	33										<1	mg/kg	TM30/PM18	
Lead <sup>#</sup>	51										<5	mg/kg	TM30/PM18	
Mercury #	<0.1										<0.1	mg/kg	TM30/PM18	
Nickel <sup>#</sup>	38.4										<0.7	mg/kg	TM30/PM1	
Selenium <sup>#</sup>	1										<1	mg/kg	TM30/PM1	
Zinc <sup>#</sup>	92										<5	mg/kg	TM30/PM1	
PAH MS														
Naphthalene #	0.09										<0.04	mg/kg	TM4/PM8	
Acenaphthylene	0.09										<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8	
Fluorene #	0.06										<0.04	mg/kg	TM4/PM8	
Phenanthrene *	0.81										<0.03	mg/kg	TM4/PM8	
Anthracene #	0.18										<0.04	mg/kg	TM4/PM8	
Fluoranthene <sup>#</sup>	1.34										<0.03	mg/kg	TM4/PM8	
Pyrene *	1.03										<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	0.71										<0.06	mg/kg	TM4/PM8	
Chrysene *	0.71										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	1.00										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	0.40										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	0.28										<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene *	0.08										<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene *	0.28										<0.04	mg/kg	TM4/PM8	
PAH 16 Total	7.1										<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.72										<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.28										<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	75										<0	%	TM4/PM8	
Natural Moisture Content	25.1										<0.1	%	PM4/PM0	
													TMOO/DLAS	
Hexavalent Chromium #	<0.3										<0.3	mg/kg	1M38/PM20	
													-	
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM4	
Total Cyanide #	<0.5										<0.5	mg/kg	TM89/PM4	
Complex Cyanide	<0.5										<0.5	mg/kg	TM89/PM4	
Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM119	
	. 1				•		•							

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	17	BH17/05A	0.70	430	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	17	BH17/05A	0.70	426-431	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 18
Location :	A1B2CH
Date samples received :	10th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 10th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Bruce Leslie Project Co-ordinator
Client Name:	Central Al	ntral Alliance Pre Construction Services Ltd						Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub				
Contact:	Richard H	ardwick													
JE Job No.:	18/779														
J E Sample No.	457-459										İ				
											1				
Sample ID	BH17/09														
Depth	1.50										Please se	e attached n	otes for all		
COC No / misc											abbrevia	ations and a	cronyms		
Containers	JΤ														
Sample Date	04/04/2018														
Oumpie Date	04/04/2010														
Sample Type	Soli										ļ,				
Batch Number	18										LOD/LOR	Units	Method		
Date of Receipt	10/04/2018												No.		
Arsenic <sup>#</sup>	6.4										<0.5	mg/kg	TM30/PM1		
Cadmium <sup>#</sup>	0.1										<0.1	mg/kg	TM30/PM1		
Chromium <sup>#</sup>	57.3										<0.5	mg/kg	TM30/PM18		
Copper #	25										<1	mg/kg	TM30/PM1		
Lead <sup>#</sup>	44										<5	mg/kg	TM30/PM18		
Mercury <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM1		
Nickel <sup>#</sup>	32.6										<0.7	mg/kg	TM30/PM1		
Selenium"	2										<1	mg/kg	TM30/PM1		
	95										<0	mg/kg	TIVI30/PIVIT:		
PAH MS															
Naphthalene <sup>#</sup>	0.07										<0.04	ma/ka	TM4/PM8		
Acenaphthylene	< 0.03										< 0.03	ma/ka	TM4/PM8		
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8		
Fluorene <sup>#</sup>	<0.04										<0.04	mg/kg	TM4/PM8		
Phenanthrene <sup>#</sup>	0.24										<0.03	mg/kg	TM4/PM8		
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8		
Fluoranthene <sup>#</sup>	0.05										<0.03	mg/kg	TM4/PM8		
Pyrene <sup>#</sup>	0.06										<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	<0.06										<0.06	mg/kg	TM4/PM8		
Chrysene #	0.08										<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	<0.07										<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene *	<0.04										<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene "	<0.04										<0.04	mg/kg			
Benzo(dhi)port/ono#	<0.04										<0.04	mg/kg			
PAH 16 Total	<0.04										<0.04	ma/ka	TM4/PM8		
Benzo(b)fluoranthene	<0.05										<0.05	mg/kq	TM4/PM8		
Benzo(k)fluoranthene	<0.02										<0.02	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	95										<0	%	TM4/PM8		
EPH (C8-C40) #	105										<30	mg/kg	TM5/PM8		
Natural Moisture Content	13.3										<0.1	%	PM4/PM0		
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20		
Sulphate as SO4 (2:1 Ext) #	0.1226										<0.0015	g/l	TM38/PM20		
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM4		
Total Cyanide *	<0.5										<0.5	mg/kg	TM89/PM4		
Complex Cyanide	<0.5										<0.5	mg/kg	1 M89/PM4		
Organic Matter	4.5										-0.2	0/.	TM21/PM2		
	4.3										<0.Z	/0			

Client Name: Reference:	Central Alliance P 3043	re Constructi	ion Service	⊧s Ltd	Report : Solid							
Location: Contact:	A1B2CH Richard Hardwick				Solids: V=6	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
	457 450		T	T	<b>1</b>		<u> </u>	<b>1</b>	1			
J E Sample No.	457-459								1			
Sample ID	BH17/09											
Depth	1.50								Please se	e attached n	otes for all	
COC No / misc									abbrevia	ations and ac	cronyms	
Containers	JT								1			
Sample Date	04/04/2018								1			
Sample Type	Soil								1			
Batch Number	18										Mathod	
Date of Receipt	10/04/2018								LOD/LOR	Units	No.	
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119	
рН *	8.53								<0.01	pH units	TM73/PM11	
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Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	18	BH17/09	1.50	459	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	18	BH17/09	1.50	457-459	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 19
Location :	A1B2CH
Date samples received :	10th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 10th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Al	lliance Pre	Constructi	on Service	es Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60a VOC ia	r .l=250a al	ass iar T=n	lastic tub		
Contact:	Richard H	lardwick				Condo. v=	009 100 ju	i, 0–2009 gi	uoo jui, 1-p			
JE Job No.:	18/779											
J E Sample No	476-478									l		
o E oumpie no.	410 410											
Sample ID	BH17/60											
Depth	1.00											
COC No/misc										abbrevia	ations and a	cronyms
Containers	JT											
Sample Date	06/04/2018											
Sample Type	Soil											
Batch Number	19											Mothod
Date of Receipt	10/04/2018									LOD/LOR	Units	No.
4 rsenic #	9.2									<0.5	ma/ka	TM30/PM1
Cadmium <sup>#</sup>	0.2									<0.5	mg/kg	TM30/PM1
Chromium <sup>#</sup>	34.6									<0.5	ma/ka	TM30/PM1
Copper <sup>#</sup>	39									<1	mg/kg	TM30/PM1
Lead <sup>#</sup>	38									<5	mg/kg	TM30/PM1
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	38.3									<0.7	mg/kg	TM30/PM1
Selenium <sup>#</sup>	2									<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	96									<5	mg/kg	TM30/PM1
PAH MS												
Naphthalene #	0.17									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.07									<0.05	mg/kg	TM4/PM8
Fluorene #	0.08									<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.58									<0.03	mg/kg	TM4/PM8
Anthracene #	0.06									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.39									<0.03	mg/kg	TM4/PM8
Pyrene #	0.29									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.18									<0.06	mg/kg	TM4/PM8
Chrysene *	0.19									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene *	0.30									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene	0.13									<0.04	mg/kg	
Indeno(123cd)pyrene	0.09									<0.04	mg/kg	
Benzo(dhi)pervlene	0.04									<0.04	mg/kg	
PAH 16 Total	26									<0.04	ma/ka	TM4/PM9
Benzo(b)fluoranthene	0.22									<0.05	ma/ka	TM4/PM8
Benzo(k)fluoranthene	0.08									<0.02	ma/ka	TM4/PM8
PAH Surrogate % Recovery	90									<0	%	TM4/PM8
<b>G F</b>												
EPH (C8-C40) #	161									<30	mg/kg	TM5/PM8
Natural Moisture Content	10.1									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.7127									<0.0015	g/l	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Total Cyanide #	<0.5									<0.5	mg/kg	TM89/PM4
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Organic Matter	12.4									<0.2	%	TM21/PM24
					1							

Client Name: Reference:	Central Alliance F 3043	Pre Constructi	on Service	s Ltd	Report : Solid							
Location: Contact:	A1B2CH Richard Hardwick	¢			Solids: V=6	60g VOC jai	r, J=250g gl	ass jar, T=p	lastic tub			
JE Job No.:	18/779								h			
J E Sample No.	476-478											
Sample ID	BH17/60											
Depth	1.00								Please se	e attached nu	otes for all	
COC No / misc									abbrevi	ations and ac	ronyms	
Containers	JT											
Sample Date	06/04/2018											
Sample Type	Soil											
Batch Number	19										Mathad	
Date of Receipt	10/04/2018								LOD/LOR	Units	No.	
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119	
рН <sup>#</sup>	7.73								<0.01	pH units	TM73/PM11	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	19	BH17/60	1.00	478	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	19	BH17/60	1.00	476-478	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	5th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 22
Location :	A1B2CH
Date samples received :	18th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Nine samples were received for analysis on 18th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central All 3043	liance Pre	Constructi	on Service	s Ltd	Report : Solid								
Location:	A1B2CH					Solids: V=	60g VOC ia	r. J=250a al	ass iar. T=p	lastic tub				
Contact:	Richard H	ardwick						.,3 3.	J, · · P					
JE Job No.:	18/779													
I E Sample No	532-535									1				
o E dampie No.	332-333													
Sample ID	BH17/77													
Depth	0.80													
20p	0.00									Please se abbrevia	e attached n ations and a	otes for all cronyms		
COC No / misc												,		
Containers	VJT													
Sample Date	07/04/2018													
Sample Type	Soil													
Batch Number	22													
Daten Number	22									LOD/LOR	Units	Method No.		
Date of Receipt	18/04/2018													
Arsenic	9.3									<0.5	mg/kg	TM30/PM62		
Cadmium	0.1									<0.1	mg/kg	TM30/PM62		
Chromium	26.7									<0.5	mg/kg	TM30/PM62		
Copper	156									<1	mg/kg	TM30/PM62		
Lead	78									<5	mg/kg	TM30/PM62		
Mercury	<0.1									<0.1	mg/kg	TM30/PM62		
Nickel	37.8									<0.7	mg/kg	TM30/PM62		
Selenium	<1									<1	mg/kg	TM30/PM62		
Zinc	139									<5	mg/kg	TM30/PM62		
PAH MS														
Naphthalene #	0.08									<0.04	mg/kg	TM4/PM8		
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8		
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8		
Fluorene #	<0.04									<0.04	mg/kg	TM4/PM8		
Phenanthrene <sup>#</sup>	0.29									<0.03	mg/kg	TM4/PM8		
Anthracene #	0.05									<0.04	mg/kg	TM4/PM8		
Fluoranthene <sup>#</sup>	0.39									<0.03	mg/kg	TM4/PM8		
Pyrene <sup>#</sup>	0.29									<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	0.25									<0.06	mg/kg	TM4/PM8		
Chrysene #	0.21									<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	0.35									<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene <sup>#</sup>	0.15									<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene #	0.07									<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene #	<0.04									<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene #	0.08									<0.04	mg/kg	TM4/PM8		
PAH 16 Total	2.2									<0.6	mg/kg	TM4/PM8		
Benzo(b)fluoranthene	0.25									<0.05	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	0.10									<0.02	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	83									<0	%	TM4/PM8		
Natural Moisture Content	16.7									<0.1	%	PM4/PM0		
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20		
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM45		
Total Cyanide #	<0.5									<0.5	mg/kg	TM89/PM45		
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45		
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119		
	1				1	1	1			1		1		

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	22	BH17/77	0.80	535	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	Fibre Bundles
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos Type	Chrysotile
					04/06/2018	Asbestos Level Screen	less than 0.1%

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	22	BH17/77	0.80	532-535	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 $^{\circ}\text{C}.$			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	5th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 34
Location :	A1B2CH
Date samples received :	2nd May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eight samples were received for analysis on 2nd May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid					
Location:	A1B2CH						Solids: V=	60g VOC jaı	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Hardv	vick											
JE Job No.:	18/779										-		
J E Sample No.	741-743												
Sample ID	BH17/035												
Denth	1.00												
COC No (mino	1.00										Please se abbrevia	e attached ne ations and ac	otes for all cronyms
COC No / misc													2
Containers	VJT												
Sample Date	27/04/2018												
Sample Type	Soil												
Batch Number	34												Method
Date of Receipt	02/05/2018										LOD/LOR	Units	No.
Arsenic	4.2										<0.5	ma/ka	TM30/PM62
Cadmium	0.1										<0.1	mg/kg	TM30/PM62
Chromium	14.9										<0.5	mg/kg	TM30/PM62
Copper	21										<1	mg/kg	TM30/PM62
Lead	33										<5	mg/kg	TM30/PM62
Mercury	0.5										<0.1	mg/kg	TM30/PM62
Nickel	19.1										<0.7	mg/kg	TM30/PM62
Selenium	<1										<1	mg/kg	TM30/PM62
Zinc	67										<5	mg/kg	TM30/PM62
PAH MS													
Nanhthalana <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8
Acenaphthylene	<0.03										<0.03	ma/ka	TM4/PM8
Acenaphthene #	<0.05										<0.05	ma/ka	TM4/PM8
Fluorene <sup>#</sup>	<0.04										<0.04	ma/ka	TM4/PM8
Phenanthrene <sup>#</sup>	0.07										<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.04										<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	0.04										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06										<0.06	mg/kg	TM4/PM8
Chrysene #	0.04										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<0.04										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04										<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	89										<0	%	TM4/PM8
Natural Moisture Content	22.2										<0.1	%	PM4/PM0
													Theory (D) (C)
Hexavalent Chromium *	<0.3										<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM45
Total Cyanide #	<0.5										<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5										<0.5	mg/kg	TM89/PM45
Thiopyopoto	-0.6										-0.6	ma/ka	TM107/DM444
mocyanate	<0.0										۵.۵>	тіу/ку	TWITE//FWITE

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	34	BH17/035	1.00	743	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	Fibre Bundles
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos Type	Chrysotile
					04/06/2018	Asbestos Level Screen	less than 0.1%

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	34	BH17/035	1.00	741-743	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 $^{\circ}\text{C}.$			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 23
Location :	A1B2CH
Date samples received :	20th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 20th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Al	Intral Alliance Pre Construction Services Ltd					Report : Solid						
Location:	A1B2CH						Solids: V=	60a VOC ia	r. J=250a al	ass iar. T=p	lastic tub		
Contact:	Richard H	ardwick							, - <u>-</u> 009 gi	, ·-p			
JE Job No.:	18/779												
J E Sample No.	555-557										Ì		
Sample ID	WS17/20												
Depth	0.90										Please se	e attached n	otes for all
COC No / misc											abbrevia	ations and ad	cronyms
Containers	VIT												
Containers	• • •												
Sample Date	18/04/2018												
Sample Type	Solid												
Batch Number	23												Method
Date of Receipt	20/04/2018										LOD/LOR	Units	No.
Arsenic	5.2										<0.5	mg/kg	TM30/PM15
Cadmium	<0.1										<0.1	mg/kg	TM30/PM1
Chromium	50.0										<0.5	mg/kg	TM30/PM15
Copper	14										<1	mg/kg	TM30/PM18
Lead	6										<5	mg/kg	TM30/PM18
Mercury	<0.1										<0.1	mg/kg	TM30/PM15
Nickel	24.0										<0.7	mg/kg	TM30/PM15
Selenium	<1										<1	mg/kg	TM30/PM18
Zinc	100										<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene	<0.04										<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8
Acenaphthene	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene	< 0.04										<0.04	mg/kg	TM4/PM8
	0.04										<0.03	mg/kg	
Anthracene	<0.04										<0.04	mg/kg	
Pyrene	0.03										<0.03	mg/kg	
Benzo(a)anthracene	<0.04										<0.06	ma/ka	TM4/PM8
Chrysene	0.03										<0.02	ma/ka	TM4/PM8
Benzo(bk)fluoranthene	< 0.07										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene	<0.04										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene	<0.04										<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	104										<0	%	TM4/PM8
EPH (C8-C40)	62										<30	mg/kg	TM5/PM8
Natural Moisture Content	7.7										<0.1	%	PM4/PM0
Hexavalent Chromium	<0.3										<0.3	mg/kg	TM38/PM20
Supnate as SO4 (2:1 Ext)	0.0680										<0.0015	g/I	TM38/PM20
Eroo Cuonido	-0.5										-0.5	ma/	
	<0.5										<0.5	mg/kg	TM80/PM4
Complex Cvanide	<0.5										<0.5	mg/kg	TM89/PM4
Somplex Syanide	<b>\U.J</b>										-0.0	y/ky	11100/111140
Organic Matter	0.4										<0.2	%	TM21/PM24
S.gamo Mattor	0.4										-0.2	70	

Client Name: Reference:	Central Alliance Pre 3043	e Construction Services Ltd				Report : Solid						
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Hardwick											
LE Samula No.	555 557									l I		
J E Sample No.	555-557											
Sample ID	WS17/20											
Depth	0.90									Please se	e attached n	otes for all
COC No / misc										abbrevi	ations and ac	cronyms
Containers	VJT											
Sample Date	18/04/2018											
Sample Type	Solid											
Batch Number	23											Mathad
Date of Receipt	20/04/2018									LOD/LOR	Units	No.
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119
рН	9.23									<0.01	pH units	TM73/PM11
	1	1	1	1	1	1	1				, <sup>,</sup>	1

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	23	WS17/20	0.90	557	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

**Notification of Deviating Samples** 

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 18/779						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.
### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.			AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.			AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 29
Location :	A1B2CH
Date samples received :	25th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eleven samples were received for analysis on 25th April, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043						Report : Solid						
Location:	A1B2CH						Solids: V=	60q VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick							,				
JE Job No.:	18/779												
J E Sample No.	639-641										1		
Sample ID	W\$17/07												
Depth	0.70										Please se	e attached n	otes for all
COC No / misc											abbievia	allons and a	lonyms
Containers	VJT												
Sample Date	20/04/2018												
Sample Type	Soil												
	001												
Batch Number	29										LOD/LOR	Units	Method
Date of Receipt	25/04/2018												NO.
Arsenic <sup>#</sup>	4.6										<0.5	mg/kg	TM30/PM1
Cadmium <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM18
Chromium <sup>#</sup>	62.1										<0.5	mg/kg	TM30/PM1
Copper <sup>#</sup>	9										<1	mg/kg	TM30/PM1
Lead <sup>#</sup>	26										<5	mg/kg	TM30/PM18
Mercury <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM18
Nickel <sup>#</sup>	13.4										<0.7	mg/kg	TM30/PM1
Selenium #	2										<1	mg/kg	TM30/PM1
Zinc*	54										<5	mg/kg	TM30/PM18
DALLMO													
PAH MS	-0.04										-0.04	malka	
Naphthalene	<0.04										<0.04	mg/kg	
Acenaphinylene	<0.05										<0.05	mg/kg	
Eluorene #	<0.03										<0.03	ma/ka	TM4/PM8
Phenanthrene <sup>#</sup>	<0.03										<0.03	ma/ka	TM4/PM8
Anthracene #	< 0.04										< 0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	<0.03										<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	<0.03										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06										<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<0.04										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	<0.04										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04										<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	104										<0	%	TM4/PM8
5511 (00 0 ···· #													
EPH (C8-C40)"	<30										<30	mg/kg	TM5/PM8
Notural Majotura Cantant	22.0										-0.4	0/	
Natural Moisture Content	23.2										<0.1	%	PINI4/PINI0
Hoveyalant Chromium #	-0.3										<0.2	ma/ka	TM38/PM24
Hexavalent Chromium	<0.3										<0.015	mg/kg	TM29/PM20
Supriate as SO4 (2:1 EXt)	0.0040										<0.0013	9/1	1 WIGO/F WIZU
Free Cvanide	<0.5										<0.5	ma/ka	TM89/PM44
Total Cvanide #	<0.5										<0.5	ma/ka	TM89/PM4
Complex Cyanide	<0.5										<0.5	ma/ka	TM89/PM4
												5.5	
Organic Matter	2.5										<0.2	%	TM21/PM24
-													

Client Name: Reference:	Central Alliance F 3043	Pre Constructi	on Service	s Ltd	Report : Solid									
Location: Contact: JE Job No.:	A1B2CH Richard Hardwick 18/779	ĸ			Solids: V=6	60g VOC jai	r, J=250g gla	ass jar, T=p	lastic tub					
J F Sample No.	639-641								l					
Sample ID	WS17/07													
Depth	0.70								Disses					
COC No / misc									abbrevia	Please see attached notes for all abbreviations and acronyms				
Containers	VJT							i						
Sample Date	20/04/2018													
Sample Type	Soil													
Batch Number	29										Method			
Date of Receipt	25/04/2018							l I	LOD/LOR	Units	No.			
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119			
#	6.04								-0.01	al Lucita	TM70/DM44			
рН″	6.94								<0.01	pH units	TM73/PM11			
							1			1				

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	29	WS17/07	0.70	641	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	29	WS17/07	0.70	639-641	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 30
Location :	A1B2CH
Date samples received :	27th April, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 27th April, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**

Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Al 3043	lliance Pre	Constructi	on Service	s Ltd	Report : Solid						
Location:	A1B2CH					Solids: V=	60g VOC jaı	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	lardwick										
JE Job No.:	18/779											
J E Sample No.	666-668	669-671										
Sample ID	WS17/012	WS17/009										
Depth	0.50	0.40								Diagon an	o ottoobod n	atos for all
COC No / misc										abbrevia	ations and a	cronyms
Containers	VJT	VJT										
Sample Date	24/04/2018	24/04/2018										
Sample Type	Soil	Soil										
Batch Number	30	30										Method
Date of Receipt	27/04/2018	27/04/2018								LOD/LOR	Units	No.
Arsenic <sup>#</sup>	6.2	2.9								<0.5	ma/ka	TM30/PM15
Cadmium <sup>#</sup>	0.1	<0.1								<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	88.3	95.9								<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	28	21								<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	36	44								<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	33.6	33.3								<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	1	1								<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	91	66								<5	mg/kg	TM30/PM18
PAH MS												
Naphthalene #	0.08	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.62	0.21								<0.03	mg/kg	TM4/PM8
Anthracene #	0.07	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.62	0.07								<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	0.52	0.09								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.27	0.07								<0.06	mg/kg	TM4/PM8
Chrysene #	0.34	0.09								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.59	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.27	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.17	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene *	0.07	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene *	0.19	0.05								<0.04	mg/kg	TM4/PM8
PAH 16 Total	3.8	<0.6								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.42	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.17	<0.02								<0.02	mg/kg	
PAH Surrogate % Recovery	96	89								<0	%	11014/121018
Notural Maiatura Contant	16.1	12.0								-0.1	0/	
Natural Moisture Content	10.1	12.9								<0.1	70	FINI4/FINIU
Hoxovalant Chromium <sup>#</sup>	<03	<03								<0.3	ma/ka	TM38/PM20
	<0.5	<0.5								<0.5	iiig/kg	T WIGO/F IVIZO
Free Cvanide	<0.5	<0.5								<0.5	ma/ka	TM89/PM4
Total Cvanide #	<0.5	<0.5								<0.5	ma/ka	TM89/PM45
Complex Cvanide	<0.5	<0.5								<0.5	ma/ka	TM89/PM4
Thiocyanate	<0.6	<0.6								<0.6	mg/kg	TM107/PM119
											5.5	

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	30	WS17/012	0.50	668	04/06/2018	General Description (Bulk Analysis)	Soil/Stone
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD
18/779	30	WS17/009	0.40	671	04/06/2018	General Description (Bulk Analysis)	Soil/Stone
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	30	WS17/012	0.50	666-668	Cyanide, PAH	Sample holding time exceeded
18/779	30	WS17/009	0.40	669-671	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	5th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 36
Location :	A1B2CH
Date samples received :	3rd May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Ten samples were received for analysis on 3rd May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central All 3043	iance Pre	Constructi	on Service	s Ltd	Report : Solid						
Location:	A1B2CH					Solids: V=	60q VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Ha	ardwick						,3 3	J, · · P			
JE Job No.:	18/779											
J E Sample No	783-785									l		
o E Gampie No.	103-103											
Sample ID	BH17/28											
Depth	1.0											
000 No (min										Please se abbrevia	e attached n ations and a	otes for all cronyms
COC No / misc												2
Containers	VJT											
Sample Date	01/05/2018									1		
Sample Type	Soil											
Batch Number	26											
Baten Number	30									LOD/LOR	Units	Method No.
Date of Receipt	03/05/2018											
Arsenic	9.1									<0.5	mg/kg	TM30/PM62
Cadmium	0.1									<0.1	mg/kg	TM30/PM62
Chromium	18.4									<0.5	mg/kg	TM30/PM62
Copper	42									<1	mg/kg	TM30/PM62
Lead	48									<5	mg/kg	TM30/PM62
Mercury	<0.1									<0.1	mg/kg	TM30/PM62
Nickel	33.4									<0.7	mg/kg	TM30/PM62
Selenium	1									<1	mg/kg	TM30/PM62
Zinc	79									<5	mg/kg	TM30/PM62
2.11.10												
PAH MS												
Naphthalene "	0.25									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.03									<0.03	mg/kg	
Acenaphthene "	<0.05									<0.05	mg/kg	
Fluorene	0.04									<0.04	mg/kg	
Phenanthrene "	0.87									<0.03	mg/kg	
Anthracene	0.09									<0.04	mg/kg	
Puropa #	0.60									<0.03	mg/kg	
Pyrene	0.01									<0.03	mg/kg	
Benzo(a)anthracene	0.40									<0.00	mg/kg	
Cillyselle Bonzo/bk\fluoranthono#	0.42									<0.02	mg/kg	
Benzo(bk)indoraritirerie	0.35									<0.07	mg/kg	
Indepo(123cd)pyrene <sup>#</sup>	0.00									<0.04	ma/ka	TM4/PM8
Dibenzo(ab)anthracene #	0.08									<0.04	ma/ka	TM4/PM8
Benzo(ghi)pervlene #	0,21									<0.04	ma/ka	TM4/PM8
PAH 16 Total	4.7									<0.6	ma/ka	TM4/PM8
Benzo(b)fluoranthene	0.48									<0.05	ma/ka	TM4/PM8
Benzo(k)fluoranthene	0.19									<0.02	mg/kq	TM4/PM8
PAH Surrogate % Recovery	87									<0	%	TM4/PM8
Natural Moisture Content	9.8									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Total Cyanide <sup>#</sup>	<0.5									<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

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Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	36	BH17/28	1.0	785	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	Fibre Bundles
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos Type	Chrysotile
					04/06/2018	Asbestos Level Screen	less than 0.1%

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
36	BH17/28	1.0	783-785	Cyanide, PAH	Sample holding time exceeded
	Batch	Batch     Sample ID       36     BH17/28       36     BH17/28       36     Gamma       37     Gamma       38     Gamma       39     Gamma       39     Gamma <th>Batch     Sample ID     Depth       36     BH17/28     1.0       36     BH17/28     1.0       36     BH17/28     1.0       37     1.0     1.0       38     BH17/28     1.0       39     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       37     1.0     1.0       38     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       30     1.0     1.0</th> <th>BatchSample IDDepthJ E Sample No.36BH17/281.0783-78536J I I I I I I I I I I I I I I I I I I I</th> <th>Bath Sample ID Depth JE Sample No.   36 BH17/28 1.0 783-785 Cyanide, PAH   4 4.44 4.44 4.44   5 4.44 4.44 4.44   6 4.44 4.44 4.44   7 4.44 4.44 4.44   8 4.44 4.44 4.44   9 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44   15 4.44 4.44   14 4.44 4.44   15 4.44 4.44   15 4.44   16 4.44   17</th>	Batch     Sample ID     Depth       36     BH17/28     1.0       36     BH17/28     1.0       36     BH17/28     1.0       37     1.0     1.0       38     BH17/28     1.0       39     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       36     1.0     1.0       37     1.0     1.0       38     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       39     1.0     1.0       30     1.0     1.0	BatchSample IDDepthJ E Sample No.36BH17/281.0783-78536J I I I I I I I I I I I I I I I I I I I	Bath Sample ID Depth JE Sample No.   36 BH17/28 1.0 783-785 Cyanide, PAH   4 4.44 4.44 4.44   5 4.44 4.44 4.44   6 4.44 4.44 4.44   7 4.44 4.44 4.44   8 4.44 4.44 4.44   9 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44 4.44   15 4.44 4.44 4.44   14 4.44 4.44   15 4.44 4.44   14 4.44 4.44   15 4.44 4.44   15 4.44   16 4.44   17

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**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

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TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 $^{\circ}\text{C}.$			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Richard Hardwick
7th June, 2018
3043
Test Report 18/779 Batch 38
A1B2CH
5th May, 2018
Final report
1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eight samples were received for analysis on 5th May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043						Report : Solid						
Location:	A1B2CH						Solids: V=	60q VOC jaı	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	ardwick							,	, , , , , , , , , , , , , , , , , , ,			
JE Job No.:	18/779												
J E Sample No.	831-833												
Sample ID	BH17-068												
Donth	1.00												
Deptil	1.00										Please se abbrevi	e attached n ations and a	otes for all
COC No / misc											abbievi		Jonymo
Containers	VJT												
Sample Date	03/05/2018												
Sample Type	Soil												
	001												
Batch Number	38										LOD/LOR	Units	Method
Date of Receipt	05/05/2018												INO.
Arsenic <sup>#</sup>	7.4										<0.5	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	47.3										<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	41										<1	mg/kg	TM30/PM18
Lead <sup>#</sup>	32										<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	39.4										<0.7	mg/kg	TM30/PM15
Selenium #	2										<1	mg/kg	TM30/PM15
Zinc*	84										<5	mg/kg	TM30/PM15
2.11.10													
PAH MS	0.01										0.04		Th ( / D) (0
Naphthalene "	0.21										<0.04	mg/kg	
Acenaphthylene #	<0.03										<0.03	mg/kg	
Acenaphthene	0.13										<0.05	mg/kg	
Phononthrono <sup>#</sup>	1.28										<0.04	ma/ka	TM4/PM8
	0.21										<0.03	ma/ka	TM4/PM8
Fluoranthene <sup>#</sup>	1.29										<0.03	ma/ka	TM4/PM8
Pvrene <sup>#</sup>	0.98										< 0.03	ma/ka	TM4/PM8
Benzo(a)anthracene <sup>#</sup>	0.61										<0.06	mg/kg	TM4/PM8
Chrysene <sup>#</sup>	0.52										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.81										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.40										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.28										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.11										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.26										<0.04	mg/kg	TM4/PM8
PAH 16 Total	7.2										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.58										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.23										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90										<0	%	TM4/PM8
EPH (C8-C40) #	181										<30	mg/kg	TM5/PM8
Natural Moisture Content	17.5										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.7204										<0.0015	g/l	TM38/PM20
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM45
Total Cyanide *	<0.5										<0.5	mg/kg	FM89/PM48
Complex Cyanide	<0.5										<0.5	mg/kg	1 M89/PM45
Organia Matter	44.5										.0.0	0/	TMO4/DMA
organic watter	11.5										<0.2	70	1111/21/1711/124

Client Name: Reference:	Central Alliance F 3043	Pre Constructi	on Service	s Ltd	Report : Solid						
Location: Contact:	A1B2CH Richard Hardwick				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
JE Job No.:	18/779	1	1	n	1	n					
J E Sample No.	831-833										
Sample ID	BH17-068										
Depth	1.00								Diagon on	o ottoobod p	otoo for all
COC No / misc									abbrevi	ations and ac	cronyms
Containers	VIT										
Sampla Data	03/05/2018										
Oampie Date	03/03/2018										
Sample Type	Soli										<u> </u>
Batch Number	38								LOD/LOR	Units	Method
Date of Receipt	05/05/2018										140.
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119
оц #	8.01								<0.01	nH units	TM73/PM11
pri	0.01								20.01	pri unito	
	1 1		1							1	1

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	38	BH17-068	1.00	833	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	38	BH17-068	1.00	831-833	Cyanide, EPH, PAH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

### Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes
## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 41
Location :	A1B2CH
Date samples received :	11th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Five samples were received for analysis on 11th May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Client Name:	Central Alliance Pre Construction Services Ltd 3043						Report : Solid							
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard H	ardwick						0 ,						
JE Job No.:	18/779													
J E Sample No.	882-884										1			
Sample ID	WS17/21													
Depth	0.70										Please se	e attached n	otes for all	
COC No / misc											abbrevia	ations and ad	cronyms	
Containers	VIT													
Containers	001													
Sample Date	08/05/2018													
Sample Type	Soil													
Batch Number	41												Method	
Date of Receipt	11/05/2018										LOD/LOR	Units	No.	
Arsenic <sup>#</sup>	6.0										<0.5	mg/kg	TM30/PM1	
Cadmium <sup>#</sup>	0.1										<0.1	mg/kg	TM30/PM1	
Chromium <sup>#</sup>	50.5										<0.5	mg/kg	TM30/PM1	
Copper <sup>#</sup>	22										<1	mg/kg	TM30/PM1	
Lead <sup>#</sup>	24										<5	mg/kg	TM30/PM1	
Mercury <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM1	
Nickel <sup>#</sup>	33.5										<0.7	mg/kg	TM30/PM1	
Selenium <sup>#</sup>	<1										<1	mg/kg	TM30/PM1	
Zinc <sup>#</sup>	98										<5	mg/kg	TM30/PM1	
PAH MS														
Naphthalene #	0.06										<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8	
Acenaphthene "	<0.05										<0.05	mg/kg		
Fluorene "	<0.04										<0.04	mg/kg		
Anthracono #	<0.04										<0.03	mg/kg		
Fluoranthene <sup>#</sup>	0.16										<0.03	ma/ka	TM4/PM8	
Pvrene <sup>#</sup>	0.13										< 0.03	ma/ka	TM4/PM8	
Benzo(a)anthracene #	0.08										<0.06	mg/kg	TM4/PM8	
Chrysene #	0.11										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	0.16										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene <sup>#</sup>	0.08										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	0.06										<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	0.06										<0.04	mg/kg	TM4/PM8	
PAH 16 Total	1.1										<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.12										<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.04										<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	88										<0	%	TM4/PM8	
	05												TN (5/D) (0	
EPH (C8-C40)*	85										<30	mg/kg	TM5/PM8	
Natural Moisture Content	17.8										<0.1	%		
	17.0										\$0.1	70		
Hexavalent Chromium #	<0.3										<0.3	ma/ka	TM38/PM20	
Sulphate as SO4 (2:1 Ext) #	0.0498										<0.0015	a/l	TM38/PM20	
												5.		
Free Cyanide	<0.5										<0.5	mg/kq	TM89/PM4	
Total Cyanide <sup>#</sup>	<0.5										<0.5	mg/kg	TM89/PM4	
Complex Cyanide	<0.5										<0.5	mg/kg	TM89/PM4	
Organic Matter	7.2										<0.2	%	TM21/PM24	

Client Name: Reference:	Central Alliance 3043	Pre Constructi	on Service	s Ltd	Report : Solid							
Location:	A1B2CH				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard Hardwid	ck										
JE JOD NO.:	18/779								L L			
J E Sample No.	882-884											
Sample ID	WS17/21											
Depth	0.70								Please se	e attached n	otes for all	
COC No / misc									abbrevi	ations and ac	cronyms	
Containers	V.IT											
Sample Date	08/05/2018											
Sample Ture	00/03/2010											
Sample Type	301											
Batch Number	41								LOD/LOR	Units	Method No	
Date of Receipt	11/05/2018											
Thiocyanate	<0.6								<0.6	mg/kg	TM107/PM119	
pH <sup>#</sup>	8.06								<0.01	pH units	TM73/PM11	
										P		

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterwor

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	41	WS17/21	0.70	884	04/06/2018	General Description (Bulk Analysis)	Soil/Stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	41	WS17/21	0.70	882-884	Cyanide, EPH, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

#### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	7th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 42
Location :	A1B2CH
Date samples received :	12th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Seven samples were received for analysis on 12th May, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Al 3043	liance Pre	Constructi	on Service	s Ltd	Report :	Solid							
Location:	A1B2CH					Solids: V=	60g VOC jai	r, J=250g gl	, J=250g glass jar, T=plastic tub					
Contact:	Richard H	ardwick												
JE Job No.:	18/779													
J E Sample No.	897-899	912-914												
Sample ID	BH17/76	BH17/41												
Depth	0.50	2.50								Please se	e attached n	otes for all		
COC No / misc										abbrevia	ations and ad	cronyms		
Containers	VJT	VJT												
Sample Date	11/05/2018	11/05/2018												
Sample Type	Soil	Soil												
Batch Number	42	42										Method		
Date of Receipt	12/05/2018	12/05/2018								LOD/LOR	Units	No.		
Arsenic <sup>#</sup>	10.5	5.7								<0.5	mg/kg	TM30/PM15		
Cadmium <sup>#</sup>	0.3	<0.1								<0.1	mg/kg	TM30/PM15		
Chromium <sup>#</sup>	45.9	87.5								<0.5	mg/kg	TM30/PM15		
Copper <sup>#</sup>	52	21								<1	mg/kg	TM30/PM15		
Lead <sup>#</sup>	96	16								<5	mg/kg	TM30/PM15		
Mercury #	<0.1	<0.1								<0.1	mg/kg	TM30/PM15		
Nickel <sup>#</sup>	36.4	33.9								<0.7	mg/kg	TM30/PM15		
Selenium <sup>#</sup>	1	1								<1	mg/kg	TM30/PM15		
Zinc <sup>#</sup>	138	66								<5	mg/kg	TM30/PM15		
PAH MS														
Naphthalene #	0.17	0.14								<0.04	mg/kg	TM4/PM8		
Acenaphthylene	0.10	<0.03								<0.03	mg/kg	TM4/PM8		
Acenaphthene #	<0.05	<0.05								<0.05	mg/kg	TM4/PM8		
Fluorene #	0.06	0.06								<0.04	mg/kg	TM4/PM8		
Phenanthrene <sup>#</sup>	1.12	0.39								<0.03	mg/kg	TM4/PM8		
Anthracene #	0.19	<0.04								<0.04	mg/kg	TM4/PM8		
Fluoranthene <sup>#</sup>	1.80	0.15								<0.03	mg/kg	TM4/PM8		
Pyrene #	1.51	0.15								<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	1.13	0.10								<0.06	mg/kg	TM4/PM8		
Chrysene #	1.08	0.11								<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	2.44	0.11								<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene #	1.24	0.05								<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene#	0.79	<0.04								<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene *	0.27	<0.04								<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene <sup>#</sup>	0.73	0.06								<0.04	mg/kg	TM4/PM8		
PAH 16 Total	12.6	1.3								<0.6	mg/kg	TM4/PM8		
Benzo(b)fluoranthene	1.76	0.08								<0.05	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	0.68	0.03								<0.02	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	92	95								<0	%	TM4/PM8		
EPH (C8-C40) <sup>#</sup>	327	-								<30	mg/kg	TM5/PM8		
Natural Moisture Content	24.0	13.3								<0.1	%	PM4/PM0		
Hexavalent Chromium #	<0.3	<0.3								<0.3	mg/kg	TM38/PM20		
Sulphate as SO4 (2:1 Ext) #	0.0320	-								<0.0015	g/l	TM38/PM20		
											5			
Free Cyanide	<0.5	<0.5								<0.5	mg/kg	TM89/PM45		
Total Cyanide #	<0.5	<0.5								<0.5	mg/kg	TM89/PM45		
Complex Cyanide	<0.5	<0.5								<0.5	mg/kg	TM89/PM45		
Organic Matter	14.7	-								<0.2	%	TM21/PM24		

Client Name: Reference:	Central Al 3043	lliance Pre	Constructi	on Service	s Ltd		Report : Solid										
Location: Contact:	A1B2CH Richard H	lardwick					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	=plastic tub						
3E 305 NO	10/119										l I						
J E Sample No.	897-899	912-914															
Sample ID	BH17/76	BH17/41															
Depth	0.50	2.50									Please se	Please see attached notes for a					
COC No / misc											abbrevi	ations and ac	cronyms				
Containers	VJT	VJT															
Sample Date	11/05/2018	11/05/2018															
Sample Type	Soil	Soil															
Batch Number	42	42										Unite	Method				
Date of Receipt	12/05/2018	12/05/2018									LOD/LOK	OTILS	No.				
Thiocyanate	<0.6	<0.6									<0.6	mg/kg	TM107/PM119				
~Ч <sup>#</sup>	8 21	_									-0.01	nH unite	TM73/PM11				
рн	0.21	-									<0.01	pri units	11017 3/ F 1011 1				
	1	1	1	1	1	1		1									

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	42	BH17/76	0.50	899	02/06/2018	General Description (Bulk Analysis)	soil-stones
					02/06/2018	Asbestos Fibres	NAD
					02/06/2018	Asbestos Fibres (2)	NAD
					02/06/2018	Asbestos ACM	NAD
					02/06/2018	Asbestos ACM (2)	NAD
					02/06/2018	Asbestos Type	NAD
					02/06/2018	Asbestos Type (2)	NAD
					02/06/2018	Asbestos Level Screen	NAD
18/779	42	BH17/41	2.50	914	02/06/2018	General Description (Bulk Analysis)	soil-stones
					02/06/2018	Asbestos Fibres	NAD
					02/06/2018	Asbestos Fibres (2)	NAD
					02/06/2018	Asbestos ACM	NAD
					02/06/2018	Asbestos ACM (2)	NAD
					02/06/2018	Asbestos Type	NAD
					02/06/2018	Asbestos Type (2)	NAD
					02/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	42	BH17/76	0.50	897-899	Cyanide, EPH, PAH	Sample holding time exceeded
18/779	42	BH17/41	2.50	912-914	Cyanide, PAH	Sample holding time exceeded

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**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

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If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

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TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 44
Location :	A1B2CH
Date samples received :	17th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eleven samples were received for analysis on 17th May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**

Lucas Halliwell Project Co-ordinator

Client Name: Central Alliance Pre Construction Services Ltd Report : Solid Reference: 3043						Solid	blid					
Location:	A1B2CH					Solids: V=	60q VOC jai	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Ha	ardwick						,	, , , , , , , , , , , , , , , , , , ,			
JE Job No.:	18/779											
LE Sample No	042-044									l		
J E Sample No.	942-944											
Sample ID	BH17/02											
Depth	0.70									Disesses		
COC No / miss										abbrevi;	e attached n ations and a	cronyms
COC NO/ MISC												
Containers	VJT											
Sample Date	15/05/2018									1		
Sample Type	Soil											
Batch Number	44											
										LOD/LOR	Units	Method No.
Date of Receipt	17/05/2018											
Arsenic <sup>#</sup>	6.8									<0.5	mg/kg	TM30/PM18
Cadmium*	<0.1									<0.1	mg/kg	TM30/PM18
Chromium #	48.0									<0.5	mg/kg	TM30/PM18
Copper <sup>#</sup>	26									<1	mg/kg	TM30/PM18
Lead <sup>#</sup>	34									<5	mg/kg	TM30/PM18
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	47.5									<0.7	mg/kg	TM30/PM1
Selenium <sup>#</sup>	1									<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	93									<5	mg/kg	TM30/PM1
PAH MS												
Naphthalene #	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene *	0.06									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene *	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene *	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene <sup>#</sup>	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97									<0	%	TM4/PM8
Natural Moisture Content	28.7									<0.1	%	PM4/PM0
											-	Theorem
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Total Cyanide #	<0.5									<0.5	mg/kg	TM89/PM4
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119
			1	1	1	1				1 1		1

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	44	BH17/02	0.70	944	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	44	BH17/02	0.70	942-944	РАН	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

#### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Richard Hardwick
27th June, 2018
3043
Test Report 18/779 Batch 51
A1B2CH
24th May, 2018
Final report
1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Ten samples were received for analysis on 24th May, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.



Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid							
Location: Contact:	A1B2CH Richard H	lardwick					Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub								
JE Job No.:	18/779														
J E Sample No.	1098-1100	1110-1112													
Sample ID	BH17/48C	BH17/48C													
Depth	0.70	4.00													
COC No / misc											Please se abbrevi	e attached n ations and a	otes for all cronyms		
Containers	VJI	VJI													
Sample Date	23/05/2018	23/05/2018													
Sample Type	Soil	Soil													
Batch Number	51	51										Unito	Method		
Date of Receipt	24/05/2018	24/05/2018									LOD/LOR	Units	No.		
Arsenic <sup>#</sup>	4.1	33.0									<0.5	mg/kg	TM30/PM15		
Cadmium <sup>#</sup>	<0.1	<0.1									<0.1	mg/kg	TM30/PM15		
Chromium #	73.7	22.6									<0.5	mg/kg	TM30/PM15		
Copper <sup>#</sup>	32	59									<1	mg/kg	TM30/PM15		
Lead <sup>#</sup>	31	69									<5	mg/kg	TM30/PM15		
Mercury <sup>#</sup>	<0.1	<0.1									<0.1	mg/kg	TM30/PM15		
Nickel <sup>#</sup>	12.2	32.5									<0.7	mg/kg	TM30/PM15		
Selenium <sup>#</sup>	<1	4									<1	mg/kg	TM30/PM15		
Zinc <sup>#</sup>	56	54									<5	mg/kg	TM30/PM15		
PAH MS															
Naphthalene <sup>#</sup>	0.11	0.79									<0.04	mg/kg	TM4/PM8		
Acenaphthylene	0.12	0.04									<0.03	mg/kg	TM4/PM8		
Acenaphthene <sup>#</sup>	< 0.05	<0.05									<0.05	mg/kg	TM4/PM8		
Fluorene <sup>#</sup>	0.06	0.16									< 0.04	mg/kg	TM4/PM8		
Phenanthrene <sup>#</sup>	1.28	1.35									< 0.03	ma/ka	TM4/PM8		
Anthracene #	0.33	< 0.04									< 0.04	ma/ka	TM4/PM8		
Fluoranthene <sup>#</sup>	2.53	0.10									< 0.03	ma/ka	TM4/PM8		
Pvrene <sup>#</sup>	1.86	0.12									< 0.03	ma/ka	TM4/PM8		
Benzo(a)anthracene <sup>#</sup>	1.15	0.08									<0.06	ma/ka	TM4/PM8		
Chrysene <sup>#</sup>	0.93	0.00									<0.02	ma/ka	TM4/PM8		
Benzo(bk)fluoranthene#	2.01	<0.07									<0.02	ma/ka	TM4/PM8		
Bonzo(a)pyropo <sup>#</sup>	1.04	<0.01									<0.04	ma/ka			
Indeno(123cd)pyrono#	0.72	<0.04									<0.04	ma/ka	TM4/PM8		
Dibenzo(ab)anthracono#	0.12	<0.04									<0.04	ma/ka	TM2/DM0		
	0.10	<0.04									<0.04	mg/kg			
	12.0	20.04									<0.04	mg/kg			
Benzo(h)fluoranthono	1 45	2.0									<0.0	mg/kg			
Bonzo(k)fluoranthono	0.50	<0.02									<0.02	mg/kg			
	00.00	<0.02									<0.02	тту/ку ₀/			
PAR Surrogale % Recovery	90	00									<0	70	1 1014/ 1100		
Natural Moisture Content	13.0	9.7									<0.1	%	PM4/PM0		
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20		
Free Cyanide	<0.5	<0.5									<0.5	mg/kq	TM89/PM45		
Total Cvanide #	<0.5	<0.5									<0.5	ma/ka	TM89/PM45		
Complex Cvanide	<0.5	<0.5									<0.5	ma/ka	TM89/PM45		
												.99			
Thiocyanate	<0.6	<0.6									<0.6	ma/ka	TM107/PM119		
												5.5			

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	51	BH17/48C	0.70	1100	25/06/2018	General Description (Bulk Analysis)	Soil/Stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD
18/779	51	BH17/48C	4.00	1112	25/06/2018	General Description (Bulk Analysis)	Soil/Stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	51	BH17/48C	0.70	1098-1100	Cyanide, PAH	Sample holding time exceeded
18/779	51	BH17/48C	4.00	1110-1112	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

#### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

#### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

#### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

### Method Code Appendix

#### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

## LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	6th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 43
Location :	A1B2CH
Date samples received :	17th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Eight samples were received for analysis on 17th May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

#### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid						
Location:	A1B2CH						Solids: V=	60q VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard H	ardwick							.,3 3.					
JE Job No.:	18/779													
J E Sample No	921-923										l			
J E Sample No.	921-923													
Sample ID	BH17-01													
Depth	1.00													
000 No (min											Please se abbrevir	e attached n ations and a	otes for all cronyms	
COC No / misc														
Containers	VJT													
Sample Date	14/05/2018													
Sample Type	Soil										1			
Botoh Numbor	40										ſ			
Batch Number	43										LOD/LOR	Units	Method	
Date of Receipt	17/05/2018												110.	
Arsenic <sup>#</sup>	3.3										<0.5	mg/kg	TM30/PM18	
Cadmium <sup>#</sup>	<0.1										<0.1	mg/kg	TM30/PM1	
Chromium <sup>#</sup>	46.4										<0.5	mg/kg	TM30/PM1	
Copper <sup>#</sup>	25										<1	mg/kg	TM30/PM1	
Lead <sup>#</sup>	16										<5	mg/kg	TM30/PM1	
Mercury #	<0.1										<0.1	mg/kg	TM30/PM1	
Nickel <sup>#</sup>	39.8										<0.7	mg/kg	TM30/PM1	
Selenium <sup>#</sup>	1										<1	mg/kg	TM30/PM1	
Zinc <sup>#</sup>	77										<5	mg/kg	TM30/PM1	
PAH MS														
Naphthalene #	<0.04										<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04										<0.04	mg/kg	TM4/PM8	
Phenanthrene <sup>#</sup>	0.14										<0.03	mg/kg	TM4/PM8	
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8	
Fluoranthene#	0.18										<0.03	mg/kg	TM4/PM8	
Pyrene <sup>#</sup>	0.15										<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	0.13										<0.06	mg/kg	TM4/PM8	
Chrysene #	0.15										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene#	0.22										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	0.09										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene#	0.06										<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	0.08										<0.04	mg/kg	TM4/PM8	
PAH 16 Total	1.2										<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.16										<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.06										<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	96										<0	%	TM4/PM8	
Natural Moisture Content	29.0										<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20	
Free Cyanide	<0.5										<0.5	mg/kq	TM89/PM4	
Total Cvanide #	<0.5										<0.5	mg/kq	TM89/PM4	
Complex Cvanide	<0.5										<0.5	ma/ka	TM89/PM4	
												39		
Thiocyanate	<0.6										<0.6	ma/ka	TM107/PM11	
	-0.0										-0.0			

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	43	BH17-01	1.00	923	04/06/2018	General Description (Bulk Analysis)	soil-stones
					04/06/2018	Asbestos Fibres	NAD
					04/06/2018	Asbestos Fibres (2)	NAD
					04/06/2018	Asbestos ACM	NAD
					04/06/2018	Asbestos ACM (2)	NAD
					04/06/2018	Asbestos Type	NAD
					04/06/2018	Asbestos Type (2)	NAD
					04/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	43	BH17-01	1.00	921-923	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid
## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 46
Location :	A1B2CH
Date samples received :	19th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 19th May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**

Lucas Halliwell Project Co-ordinator

Client Name:	Central Al	lliance Pre	Constructi	on Service	es Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard H	lardwick										
JE Job No.:	18/779									_		
J E Sample No.	987-989											
Sample ID	BH17-73											
Depth	0.70									Please se	e attached n	otes for all
COC No / misc										abbrevi	ations and a	cronyms
Containers	VJT											
Sample Date	17/05/2018											
Sample Type	Soil											
	3011											
Batch Number	46									LOD/LOR	Units	Method No
Date of Receipt	19/05/2018											
Arsenic <sup>#</sup>	2.9									<0.5	mg/kg	TM30/PM18
Cadmium*	0.1									<0.1	mg/kg	TM30/PM1
Chromium "	75.7									<0.5	mg/kg	TM30/PM1
Copper"	29									<1	mg/kg	TM30/PM1
Moreun <sup>#</sup>	-0.1									<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	37.0									<0.7	ma/ka	TM30/PM1
Selenium <sup>#</sup>	2									<1	ma/ka	TM30/PM1
Zinc#	110									<5	ma/ka	TM30/PM1
											5 5	
PAH MS												
Naphthalene #	0.12									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.20									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.20									<0.05	mg/kg	TM4/PM8
Fluorene <sup>#</sup>	0.20									<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	3.04									<0.03	mg/kg	TM4/PM8
Anthracene #	0.74									<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	5.14									<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	3.76									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	2.18									<0.06	mg/kg	TM4/PM8
Chrysene *	2.20									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene *	4.18									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene "	2.04									<0.04	mg/kg	
Indeno(123cd)pyrene "	1.47									<0.04	mg/kg	
Dibenzo(an)anthracene "	0.42									<0.04	mg/kg	
PAH 16 Total	1.40 27 4									<0.04	mg/kg	
Benzo(b)fluoranthene	3.01									<0.0	ma/ka	TM4/PM8
Benzo(k)fluoranthene	1.17									<0.02	ma/ka	TM4/PM8
PAH Surrogate % Recovery	89									<0	%	TM4/PM8
<b>,</b>												
EPH >C8-C10 <sup>#</sup>	<5									<5	mg/kg	TM5/PM8
EPH >C10-C12#	<10									<10	mg/kg	TM5/PM8
EPH >C12-C16#	<10									<10	mg/kg	TM5/PM8
EPH >C16-C21 #	43									<10	mg/kg	TM5/PM8
EPH >C21-C40	247									<10	mg/kg	TM5/PM8
EPH >C8-C40	290									<30	mg/kg	TM5/PM8
Natural Moisture Content	17.0									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0397									<0.0015	g/l	TM38/PM20
Free Oueside										.0.5		TM00/DM44
Free Cyanide	<0.5	<u> </u>		<u> </u>	<u> </u>					<0.5	ing/kg	1 IVI89/PM4

Client Name: Reference:	Central All 3043	liance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Location:	A1B2CH Richard H	ardwick				Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
JE Job No.:	18/779	urumon										
J E Sample No.	987-989									ľ		
Sample ID	BH17-73											
Depth	0.70											
COC No / misc										Please se abbrevi	e attached no ations and ac	otes for all cronyms
Containers	T I. V											
Sample Date	17/05/2018											
Sample Type	Soil											
Batch Number	46											
Date of Receipt	19/05/2018									LOD/LOR	Units	Method No.
Total Cvanide #	<0.5									<0.5	ma/ka	TM89/PM45
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Organic Matter	3.9									<0.2	%	TM21/PM24
Thiocvanate	<0.6									<0.6	ma/ka	TM107/PM119
mooyanato	10.0									10.0		
pH <sup>#</sup>	8.57									<0.01	pH units	TM73/PM11

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	46	BH17-73	0.70	989	23/06/2018	General Description (Bulk Analysis)	soil.stones
					23/06/2018	Asbestos Fibres	NAD
					23/06/2018	Asbestos Fibres (2)	NAD
					23/06/2018	Asbestos ACM	NAD
					23/06/2018	Asbestos ACM (2)	NAD
					23/06/2018	Asbestos Type	NAD
					23/06/2018	Asbestos Type (2)	NAD
					23/06/2018	Asbestos Level Screen	NAD
						1	

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	46	BH17-73	0.70	987-989	Cyanide, EPH, PAH, pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
ТМ73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	29th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 60
Location :	A1B2CH
Date samples received :	31st May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Five samples were received for analysis on 31st May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

### **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Allia	ance Pre	Constructi	on Service	s Ltd	Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
Contact:	Richard Har	rdwick										
JE Job No.:	18/779											
J E Sample No.	1233-1235											
Sample ID	BH17/51											
Depth	1.00									Please se	e attached n	otes for all
COC No / misc										abbrevia	ations and a	cronyms
Containers	VIT											
Sample Date	30/05/2018											
Sample Type	Soil											
Batch Number	60										Unito	Method
Date of Receipt	31/05/2018									LOD/LOR	Units	No.
Arsenic <sup>#</sup>	5.2									<0.5	mg/kg	TM30/PM1
Cadmium <sup>#</sup>	0.2									<0.1	mg/kg	TM30/PM1
Chromium <sup>#</sup>	135.5									<0.5	mg/kg	TM30/PM1
Copper <sup>#</sup>	47									<1	mg/kg	TM30/PM1
Lead <sup>#</sup>	63									<5	mg/kg	TM30/PM1
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM1
Nickel <sup>#</sup>	22.0									<0.7	mg/kg	TM30/PM1
Selenium <sup>#</sup>	2									<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	143									<5	mg/kg	TM30/PM1
PAH MS												
Naphthalene #	0.11									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.16									<0.03	mg/kg	TM4/PM8
Acenaphthene "	0.19									<0.05	mg/kg	
Fluorene	2.59									<0.04	mg/kg	
	0.66									<0.03	ma/ka	TM4/PM8
Fluoranthene <sup>#</sup>	3.66									<0.03	ma/ka	TM4/PM8
Pvrene <sup>#</sup>	2.75									<0.03	ma/ka	TM4/PM8
Benzo(a)anthracene #	1.02									<0.06	mg/kg	TM4/PM8
Chrysene <sup>#</sup>	1.57									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	2.64									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	1.18									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.91									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.29									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.02									<0.04	mg/kg	TM4/PM8
PAH 16 Total	19.0									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.90									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.74									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97									<0	%	TM4/PM8
ivatural moisture Content	6.5									<0.1	%	PIVI4/PM0
Hoveyalant Chromium #	~0.2									<0.3	ma/ka	TM38/PM24
nexavalent Chromium "	<0.5									<0.3	шу/кд	11030/1910120
Free Cvanide	<0.5									-0.5	ma/ka	TM89/PM44
Total Cvanide #	<0.5									<0.5	ma/ka	TM89/PM4
Complex Cyanide	<0.5									<0.5	ma/ka	TM89/PM4
											39	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM11

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	60	BH17/51	1.00	1235	27/06/2018	General Description (Bulk Analysis)	soil/stones
					27/06/2018	Asbestos Fibres	NAD
					27/06/2018	Asbestos Fibres (2)	NAD
					27/06/2018	Asbestos ACM	NAD
					27/06/2018	Asbestos ACM (2)	NAD
					27/06/2018	Asbestos Type	NAD
					27/06/2018	Asbestos Type (2)	NAD
					27/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	60	BH17/51	1.00	1233-1235	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 48
Location :	A1B2CH
Date samples received :	23rd May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Four samples were received for analysis on 23rd May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance F 3043	re Construct	on Service	es Ltd		Report :	Solid					
Location:	A1B2CH					Solids: V=	60g VOC ja	r, J=250g gl	lass jar, T=p	lastic tub		
Contact:	Richard Hardwick											
JE Job No.:	18/779											
J E Sample No.	1032-1034											
Sample ID	BH17/71											
Depth	0.20-0.60									Disease		
COC No / misc										abbrevi	ations and a	cronyms
Contoiners												
Containers	VJI											
Sample Date	22/05/2018											
Sample Type	Soil											
Batch Number	48										Unito	Method
Date of Receipt	23/05/2018									LOD/LOR	Units	No.
Arsenic <sup>#</sup>	1.9									<0.5	mg/kg	TM30/PM1
Cadmium <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM1
Chromium <sup>#</sup>	121.2									<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	23									<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	21									<5	mg/kg	TM30/PM18
Mercury #	<0.1									<0.1	mg/kg	TM30/PM18
Nickel <sup>#</sup>	46.7									<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	1									<1	mg/kg	TM30/PM1
Zinc <sup>#</sup>	94									<5	mg/kg	TM30/PM18
PAH MS												
Naphthalene #	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene <sup>#</sup>	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene *	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene "	<0.04									<0.04	mg/kg	
Puropo <sup>#</sup>	<0.03									<0.03	mg/kg	
Pyrene	<0.05									<0.03	mg/kg	
Chrysene#	<0.00									<0.00	ma/ka	TM4/PM8
Benzo(bk)fluoranthene#	<0.02									<0.02	ma/ka	TM4/PM8
Benzo(a)pyrene #	<0.04									<0.04	ma/ka	TM4/PM8
Indeno(123cd)pyrene <sup>#</sup>	<0.04									<0.04	ma/ka	TM4/PM8
Dibenzo(ah)anthracene #	<0.04									< 0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88									<0	%	TM4/PM8
Natural Moisture Content	13.1									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Total Cyanide <sup>#</sup>	<0.5									<0.5	mg/kg	TM89/PM45
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM45
Thiocyanate	0.7									<0.6	mg/kg	TM107/PM119
	1 1	1	1	1	1	1	1	1	1			1

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	48	BH17/71	0.20-0.60	1034	25/06/2018	General Description (Bulk Analysis)	soil.stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	48	BH17/71	0.20-0.60	1032-1034	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 52
Location :	A1B2CH
Date samples received :	25th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 25th May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.



Phil Sommerton BSc Project Manager

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043							Report : Solid						
Location:	A1B2CH						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Richard Ha	ardwick						0,						
JE Job No.:	18/779													
J E Sample No.	1122-1124										1			
e _ cumpie nei														
Sample ID	BH17/39													
Depth	1.00													
000 No / mino											Please se abbrevia	e attached n ations and a	otes for all cronyms	
COC NO / MISC														
Containers	VJT													
Sample Date	23/05/2018													
Sample Type	Soil													
Batch Number	52													
											LOD/LOR	Units	Method No.	
Date of Receipt	25/05/2018													
Arsenic <sup>#</sup>	3.4										<0.5	mg/kg	TM30/PM18	
Cadmium <sup>#</sup>	0.1										<0.1	mg/kg	TM30/PM1	
Chromium *	85.2										<0.5	mg/kg	TM30/PM18	
Copper <sup>#</sup>	33										<1	mg/kg	TM30/PM1	
Lead <sup>#</sup>	38										<5	mg/kg	TM30/PM1	
Mercury *	<0.1										<0.1	mg/kg	TM30/PM1	
Nickel <sup>#</sup>	34.5										<0.7	mg/kg	TM30/PM18	
Selenium #	1										<1	mg/kg	TM30/PM1	
Zinc <sup>#</sup>	103										<5	mg/kg	TM30/PM1	
PAH MS														
Naphthalene *	0.54										<0.04	mg/kg	TM4/PM8	
Acenaphthylene	0.31										<0.03	mg/kg	TM4/PM8	
Acenaphthene #	0.81										<0.05	mg/kg	TM4/PM8	
Fluorene #	0.70										<0.04	mg/kg	TM4/PM8	
Phenanthrene #	16.98										<0.03	mg/kg	TM4/PM8	
Anthracene *	4.19										<0.04	mg/kg	TM4/PM8	
Fluoranthene *	31.96										<0.03	mg/kg	TM4/PM8	
Pyrene "	24.48										<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene "	15.01										<0.06	mg/kg	TM4/PM8	
Chrysene *	12.11										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene *	21.04										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene "	11.00										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene "	6.62										<0.04	mg/kg	1M4/PM8	
Dibenzo(ah)anthracene *	1.69										<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene "	5.99										<0.04	mg/kg	TM4/PM8	
PAH 16 IOTAL	153.4										<0.6	mg/kg	1M4/PM8	
	15.15										<0.05	mg/kg		
Benzo(K)fluoranthene	5.89										<0.02	mg/kg		
FAR Surrogate % Recovery	8/										<0	%	TIVI4/PIM8	
	44.0										0.4	0/	DM (DM)	
Natural Moisture Content	11.9										<0.1	%	PINI4/PINI0	
Hovovolont Characian #	-0.2										-0.0	ma/l	TM20/DM0	
riexavalent Chromium "	<0.3										<0.3	тід/кд	1 IVI38/PM20	
Eroo Quonida	-0.5										-0 F		TMPO/DMA	
Free Cyanide	<0.5										<0.5	mg/kg	TM89/PM4	
Total Cyanide "	<0.5										<0.5	mg/kg	TM89/PM4	
Complex Cyanide	<0.5										<0.5	mg/kg	1 M89/PM4	
This support													Thuczer	
mocyanate	<0.6										<0.6	mg/kg	TM107/PM119	
	1		1	1	1	1	1	1		1			1	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

#### Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	52	BH17/39	1.00	1124	23/06/2018	General Description (Bulk Analysis)	soil.stones
					23/06/2018	Asbestos Fibres	NAD
					23/06/2018	Asbestos Fibres (2)	NAD
					23/06/2018	Asbestos ACM	NAD
					23/06/2018	Asbestos ACM (2)	NAD
					23/06/2018	Asbestos Type	NAD
					23/06/2018	Asbestos Type (2)	NAD
					23/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	52	BH17/39	1.00	1122-1124	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

### SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

### DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

## ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

## Method Code Appendix

### **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

## Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 58
Location :	A1B2CH
Date samples received :	26th May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Six samples were received for analysis on 26th May, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name: Reference:	Central Alliance Pre Construction Services Ltd 3043				Report : Solid							
Location:	A1B2CH					Solids: V=	60g VOC ia	r. J=250a al	ass iar. T=p	lastic tub		
Contact:	Richard Ha	ardwick						,3 3.	J, · · P			
JE Job No.:	18/779											
LE Samula No	1202 1205									1		
J E Sample No.	1203-1205											
Sample ID	BH17/49											
Depth	3.20-4.20											
COC No (mino										Please se abbrevia	e attached n ations and a	otes for all cronyms
COC NO / MISC												
Containers	VΤ											
Sample Date	25/05/2018											
Sample Type	Soil											
Batch Number	59											
Baten Number	50									LOD/LOR	Units	Method No.
Date of Receipt	26/05/2018											
Arsenic <sup>#</sup>	0.6									<0.5	mg/kg	TM30/PM18
Cadmium <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM18
Chromium <sup>#</sup>	125.6									<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	24									<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	13									<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	41.9									<0.7	mg/kg	TM30/PM18
Selenium <sup>#</sup>	<1									<1	mg/kg	TM30/PM18
Zinc <sup>#</sup>	72									<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene #	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene *	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene *	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene *	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene *	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene *	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene *	<0.04									<0.04	mg/kg	IM4/PM8
PAH 16 Total	<0.6									<0.6	mg/kg	TM4/PM8
	<0.05									<0.05	mg/kg	
Ben20(K)fluoranthene	<0.02									<0.02	mg/kg	TM4/PM8
FAR Surrogate % Recovery	80									<0	%	1M4/PM8
	110									0.1	0/	DM (/DM)
ivatural moisture Content	14.9									<0.1	%	PM4/PM0
	0.0									0.0		TM00/DM0/
Hexavalent Chromium "	<0.3									<0.3	mg/kg	1 IVI38/PIM20
												Theorem
Free Cyanide	<0.5									<0.5	mg/kg	1M89/PM45
Total Cyanide "	<0.5									<0.5	mg/kg	1M89/PM45
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM48
											-	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

## Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	58	BH17/49	3.20-4.20	1204	25/06/2018	General Description (Bulk Analysis)	Soil/Stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD
Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	58	BH17/49	3.20-4.20	1203-1205	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

# SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

# SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

# NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

# **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

# **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

# Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	22nd June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 61
Location :	A1B2CH
Date samples received :	31st May, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Five samples were received for analysis on 31st May, 2018 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Lucas Halliwell Project Co-ordinator

Client Name: Reference:	Central Alli 3043	iance Pre	Constructi	on Service	s Ltd		Report : Solid							
Location:	A1B2CH						Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub							
Contact:	Richard Ha	ardwick												
JE Job No.:	18/779													
J E Sample No.	1245-1247										l			
Sample ID	BH17/36													
Denth	0.70										1			
	0.70										Please see abbrevia	e attached n ations and a	otes for all cronyms	
COC No / misc													2	
Containers	VJT										1			
Sample Date	30/05/2018										l			
Sample Type	Soil													
Batch Number	61												Method	
Date of Receipt	31/05/2018										LOD/LOR	Units	No.	
Arsenic	8.3										<0.5	ma/ka	TM30/PM62	
Cadmium	0.1										<0.1	mg/kg	TM30/PM62	
Chromium	19.7										<0.5	mg/kg	TM30/PM62	
Copper	34										<1	mg/kg	TM30/PM62	
Lead	48										<5	mg/kg	TM30/PM62	
Mercury	<0.1										<0.1	mg/kg	TM30/PM62	
Nickel	25.8										<0.7	mg/kg	TM30/PM62	
Selenium	2										<1	mg/kg	TM30/PM62	
Zinc	75										<5	mg/kg	TM30/PM62	
DALLMO														
PAH MS	0.25										-0.04	malka		
	0.25										<0.04	mg/kg	TM4/PM8	
Acenaphthene #	<0.05										<0.05	ma/ka	TM4/PM8	
Fluorene <sup>#</sup>	0.07										<0.04	mg/kg	TM4/PM8	
Phenanthrene <sup>#</sup>	1.52										<0.03	mg/kg	TM4/PM8	
Anthracene #	0.20										<0.04	mg/kg	TM4/PM8	
Fluoranthene <sup>#</sup>	1.96										<0.03	mg/kg	TM4/PM8	
Pyrene <sup>#</sup>	1.65										<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	0.93										<0.06	mg/kg	TM4/PM8	
Chrysene #	0.96										<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	1.54										<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene "	0.73										<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene	0.40										<0.04	mg/kg		
Benzo(ghi)pervlene #	0.48										<0.04	ma/ka	TM4/PM8	
PAH 16 Total	11.0										<0.6	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	1.11										<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.43										<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	93										<0	%	TM4/PM8	
Natural Moisture Content	13.5										<0.1	%	PM4/PM0	
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20	
Free Queside	0.5										-0.5			
Total Cyanide #	<0.5										<0.5	mg/kg	TM80/DM44	
Complex Cvanide	<0.5										<0.5	ma/ka	TM89/PM4	
- mpion oyumuo	.0.0										.0.0			
Thiocyanate	<0.6										<0.6	mg/kg	TM107/PM119	
	1 I			1	1	1	1	1	1	1	1 1		1	

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	61	BH17/36	0.70	1247	20/06/2018	General Description (Bulk Analysis)	soil-stones
					20/06/2018	Asbestos Fibres	Fibre Bundles
					20/06/2018	Asbestos ACM	NAD
					20/06/2018	Asbestos Type	Chrysotile
					20/06/2018	Asbestos Level Screen	less than 0.1%

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	61	BH17/36	0.70	1245-1247	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

#### SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

#### WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

#### **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

#### BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

# NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

## **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
Ν	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

# **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

# Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 65
Location :	A1B2CH
Date samples received :	2nd June, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 2nd June, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	ne: Central Alliance Pre Construction Services Ltd				Report : Solid							
Location:	A1B2CH					Solids: V=	60a VOC ia	r. J=250a al	ass iar. T=o	lastic tub		
Contact:	Richard H	ardwick					00910034	., e 2009 g.	acc jai, i -p			
JE Job No.:	18/779											
J E Sample No.	1294-1296									Ì		
•												
Sample ID	WS17/25											
Depth	0.70									l		
COC No / mino										Please see abbrevia	e attached n ations and a	otes for all cronyms
COC NO/ MISC												
Containers	VJT											
Sample Date	31/05/2018											
Sample Type	Soil											
Batch Number	65											Mathad
Data of Receipt	02/06/2019									LOD/LOR	Units	No.
Date of Receipt	02/00/2018									.0.5		TM20/DM44
Arsenic"	6.1									<0.5	mg/kg	TM30/PM1:
Cadmium	0.3									<0.1	mg/kg	TM30/PM1
Coppor <sup>#</sup>	62									<0.5	mg/kg	TM30/PM1
Lead <sup>#</sup>	120									<5	ma/ka	TM30/PM1
Mercury <sup>#</sup>	<0.1									<0.1	ma/ka	TM30/PM1
Nickel <sup>#</sup>	34.9									<0.7	ma/ka	TM30/PM1
Selenium #	1									<1	ma/ka	TM30/PM1
Zinc <sup>#</sup>	186									<5	mg/kg	TM30/PM1
											0.0	
PAH MS												
Naphthalene #	0.14									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.08									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.26									<0.05	mg/kg	TM4/PM8
Fluorene #	0.22									<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	3.47									<0.03	mg/kg	TM4/PM8
Anthracene #	1.07									<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	5.72									<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	4.26									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	3.13									<0.06	mg/kg	TM4/PM8
Chrysene #	1.75									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	3.56									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.94									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene*	1.19									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene *	0.34									<0.04	mg/kg	
Benzo(gni)perviene "	1.19									<0.04	mg/kg	
Renzo(h)fluorantheno	28.3									<0.0	mg/kg	
Benzo(k)fluoranthene	2.30									<0.03	mg/kg	
PAH Surrogate % Recovery	87									<0.02	%	TM4/PM8
Natural Moisture Content	13.7									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3									<0.3	mg/kg	TM38/PM20
Free Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Total Cyanide <sup>#</sup>	<0.5									<0.5	mg/kg	TM89/PM4
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM11

Central Alliance Pre Construction Services Ltd
3043
A1B2CH
Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	65	WS17/25	0.70	1296	25/06/2018	General Description (Bulk Analysis)	soil.stones
					25/06/2018	Asbestos Fibres	NAD
					25/06/2018	Asbestos Fibres (2)	NAD
					25/06/2018	Asbestos ACM	NAD
					25/06/2018	Asbestos ACM (2)	NAD
					25/06/2018	Asbestos Type	NAD
					25/06/2018	Asbestos Type (2)	NAD
					25/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	65	WS17/25	0.70	1294-1296	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

# SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

# SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

# NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

# **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

# **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

# LONES JONES ENVIRONMENTAL

# Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA

# Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Attention :	Richard Hardwick
Date :	27th June, 2018
Your reference :	3043
Our reference :	Test Report 18/779 Batch 67
Location :	A1B2CH
Date samples received :	2nd June, 2018
Status :	Final report
Issue :	1

Central Alliance Pre Construction Services Ltd

Central Alliance, Alliance House

Wakefield 41 Business Park

South Park Way

Wakefield WF2 0XJ

Three samples were received for analysis on 2nd June, 2018 of which one was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

# **Compiled By:**



Bruce Leslie Project Co-ordinator

Client Name:	Central Alliance Pre Construction Services Ltd 3043				Report : Solid							
Location:	A1B2CH					Solids: V=	60a VOC ia	r. J=250a al	ass iar. T=o	lastic tub		
Contact:	Richard H	ardwick					00910034	., e 2009 g.	acc jai, i -p			
JE Job No.:	18/779											
I E Sample No	1321-1323									Ì		
J E Sample No.	1321-1323											
Sample ID	WS17/28											
Denth	1.00											
Depin	1.00									Please se abbrevia	e attached n ations and a	otes for all cronyms
COC No / misc										abbroth		
Containers	VJT											
Sample Date	31/05/2018											
Sample Type	Soil											
Batch Number	67									LOD/LOR	Units	Method
Date of Receipt	02/06/2018											INO.
Arsenic <sup>#</sup>	4.9									<0.5	mg/kg	TM30/PM1
Cadmium <sup>#</sup>	<0.1									<0.1	mg/kg	TM30/PM18
Chromium <sup>#</sup>	62.8									<0.5	mg/kg	TM30/PM1
Copper <sup>#</sup>	19									<1	mg/kg	TM30/PM1
Lead <sup>#</sup>	31									<5	mg/kg	TM30/PM1
Mercury #	<0.1									<0.1	mg/kg	TM30/PM18
Nickel <sup>#</sup>	19.7									<0.7	mg/kg	TM30/PM18
Selenium <sup>#</sup>	<1									<1	mg/kg	TM30/PM18
Zinc <sup>#</sup>	60									<5	mg/kg	TM30/PM1
PAH MS												
Naphthalene #	0.15									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.47									<0.03	mg/kg	TM4/PM8
Anthracene #	0.15									<0.04	mg/kg	TM4/PM8
Fluoranthene <sup>#</sup>	0.74									<0.03	mg/kg	TM4/PM8
Pyrene <sup>#</sup>	0.63									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.37									<0.06	mg/kg	TM4/PM8
Chrysene #	0.30									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.58									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	0.30									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.21									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.06									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene <sup>#</sup>	0.22									<0.04	mg/kg	TM4/PM8
PAH 16 Total	4.2									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.42									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.16									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	85									<0	%	TM4/PM8
											~ /	<b>D</b>
Natural Moisture Content	14.3									<0.1	%	PM4/PM0
												Theory and
Hexavalent Chromium #	<0.3									<0.3	mg/kg	1M38/PM20
												-
Free Cyanide	<0.5									<0.5	mg/kg	FM89/PM4
Total Cyanide #	<0.5									<0.5	mg/kg	FM89/PM4
Complex Cyanide	<0.5									<0.5	mg/kg	TM89/PM4
											-	
Thiocyanate	<0.6									<0.6	mg/kg	TM107/PM119

Client Name:	Central Alliance Pre Construction Services Ltd
Reference:	3043
Location:	A1B2CH
Contact:	Richard Hardwick

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

# Ryan Butterworth

Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/779	67	WS17/28	1.00	1323	23/06/2018	General Description (Bulk Analysis)	soil.stones
					23/06/2018	Asbestos Fibres	NAD
					23/06/2018	Asbestos Fibres (2)	NAD
					23/06/2018	Asbestos ACM	NAD
					23/06/2018	Asbestos ACM (2)	NAD
					23/06/2018	Asbestos Type	NAD
					23/06/2018	Asbestos Type (2)	NAD
					23/06/2018	Asbestos Level Screen	NAD

Client Name: Central Alliance Pre Construction Services Ltd

Reference: 3043

Location: A1B2CH

**Contact:** Richard Hardwick

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/779	67	WS17/28	1.00	1321-1323	Cyanide, PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

**Notification of Deviating Samples** 

Matrix : Solid

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/779

# SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## **DEVIATING SAMPLES**

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

# SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

# NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

# **REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

# ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
СО	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
OC	Outside Calibration Range

# Method Code Appendix

# **JE Job No:** 18/779

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes

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