



Mark Jowitt
Wrexham County Borough Council
Housing and Economy Department
Ruthin Road
Wrexham
LL13 7TH

Our Ref: 70079705 / 11901(2)
10 August 2023
PUBLIC

Dear Mark,

Re: Remediation Strategy for Land off Heol Offa, Johnstown, Wrexham, LL14 2BD

1. INTRODUCTION

PREAMBLE

Wrexham County Borough Council (the Client) commissioned WSP UK Limited (WSP) to produce a remediation strategy for the remediation of asbestos on land at 83/85 Heol Offa, Johnstown, Wrexham (nearby postcode LL14 2BD), henceforth referred to as the site. A site location plan is included as Figure 1, Appendix A.

This document comprises a combined Remediation Options Appraisal (ROA) and Remediation Strategy (RS), providing an appraisal of the available options for remediation of the soil. This letter report follows current guidance for contamination land assessment and management. The ROA and RS are required to discharge planning conditions, under planning application P/2021/1018.

BACKGROUND

WSP have previously produced the following report for the site:

- WSP (2021) Land at Heol Offa, Johnstown, Wrexham, dated: February 2021, ref: 70079705-11723(1) (WSP Phase II).

This letter report should be read in conjunction with the above report. The January 2021 WSP Phase II investigation identified the presence of asbestos fibres within one sample (WS103) of Made Ground (out of five submitted) which laboratory analysis identified as Chrysotile at a recorded concentration of <0.001% (less than the limit of detection). The report concluded that given the generic nature of Made Ground, the presence of additional asbestos could not be ruled out. A potentially viable contaminant linkage was therefore identified, and remedial works considered necessary.

Following submission of the February 2021 report, WSP were instructed to undertake hand pitting works (November 2021) to determine the extent of Made Ground type and its chemical/asbestos characteristics. Information from the original WSP works and this additional hand pitting were used to inform this ROA / RS.

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LIMITATIONS & RELIANCE

Appendix B presents WSP Standard Terms and Conditions and the assumptions and limitations for works of this type.

2. SITE INFORMATION

The site is approximately 0.09 hectares (ha) in size and located in the suburb of Johnstown, approximately 5km southwest of Wrexham. The site is situated in a defined residential area and is primarily surrounded by bungalow and semi-detached traditional housing, with the exception of allotments bordering the site to the northeast.

It is understood the site is proposed for redevelopment into a residential end use comprising 6no. flats over 2-storeys with car parking and landscaped areas. The proposed site plan (ref: HOJ-AW-X-X-DR-A-069001-Option 01-Proposed Site Plan) is included in Appendix A.

FIELDWORKS

Site works have been completed in general accordance with BS5930:2015 'Code of Practice for Site Investigation' and BS10175:2011 'Investigation of Potentially Contaminated Sites – Code of Practice'. All fieldworks were completed under the full-time supervision of a WSP engineer.

A summary of the fieldworks is provided in Table 1 and an exploratory hole location plan is included as Figure 2, in Appendix A. Exploratory hole logs are included in Appendix C and a hand pit photolog is presented in Appendix D.

Table 1: Summary of Fieldworks

Task	Date	Details
Service Clearance	08 January 2021	A full set of service plans were procured prior to the site works. A third-party subcontractor completed service tracing across the site prior to positioning the boreholes and soakaway pits in suitable locations.
Window Sample Drilling (WS101 to WS104)	08 January 2021	All positions were hand dug to 1.5m bgl and then drilled using a windowless sampling technique with standard penetration tests at 1.0m intervals. All four boreholes were installed within groundwater / ground gas monitoring wells.
Soakaway testing (SA101)	25 January 2021	A trial pit was excavated using a JCB 3CX with a toothless bucket. Upon reaching 2.0m in depth a standpipe was placed in the pit and it was backfilled with gravel to prevent collapse when filled with water. The BRE 365 methodology states that the trial pit should be filled with a volume of water and the water level monitored until the water had 'soaked away' to level a specific water level. The volume of water used to infill and the water level at the end of the test were calculated using BRE 365 guidance. The trial pit was filled with water, however the water did not soakaway as required for the test to completed and after a period of monitoring the trial pit was backfilled.
Monitoring	January 2021	Groundwater level gauging and ground gas monitoring were completed on three occasions to provide preliminary ground gas information. Groundwater volumes were not sufficient to allow for sample collection.
Service Clearance	09 November 2021	A full set of service plans were procured prior to the site works. A third-party subcontractor completed service tracing across the site prior to positioning the hand pits in suitable locations.

Task	Date	Details
Excavation of hand pits	09 November 2021	Excavation of 20 hand pits to up to 0.60m bgl (or the base of Made Ground whichever comes first). All hand pits were backfilled with arisings following logging (according to Eurocode 7 – BS 5930) and sampling by WSP.

LABORATORY ANALYSIS

Selected soil samples were submitted for analysis at ALS laboratories which uses United Kingdom Accreditation Service (UKAS) and Environment Agency Monitoring Certification Scheme (MCERTS) accredited method, where applicable.

The soil chemical testing and leachate analysis is listed in Table 2 (insufficient groundwater volumes preventing groundwater sampling). Analytical results are included in Appendix E.

Table 2: Soil Analytical Suite

Phase of Fieldwork	Chemical Analyte	No. of soil Samples Analysed	No. of leachate Samples Analysed
January 2021	Metals suite (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)	6	2
	Polyaromatic hydrocarbons (PAH) Speciated 16	6	2
	Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG)	2	-
	Asbestos Identification	5	-
November 2021	Asbestos Identification	30	-
	Asbestos Quantification	1	-

GROUND CONDITIONS AND ASBESTOS DISTRIBUTION

The strata sequence is summarised in Table 3. Exploratory hole logs are included as Appendix C and further detail on the strata is given below.

Table 3: Summary of Strata Encountered

Strata Name	Window Sample & Soakaway Excavation		Hand Pit Excavation	
	Depth to Base (m bgl) *	Thickness (m)	Depth to Base (m bgl) *	Thickness (m)
Made Ground	0.17 – 0.60	0.17 – 0.60	0.20 – 0.70	0.20 – 0.70
Glaciofluvial Deposits	1.40 - >5.00	1.00 – 4.83	0.40 – >1.02	0.05 – 0.42

*Metres Below Ground Level (m bgl)

Made Ground was recorded at the surface in all locations and predominantly comprises grass over sandy clay over clayey gravelly sandy Made Ground.

Hand pits to the west of the site (Area A in Insert 1) recorded shallow Made Ground (excluding HP20 which identified 550mm of Made Ground) which contained sandstone, concrete and coal gravel to 350mm bgl (HP18 and HP19). Hand pits to the east of the site (Area B in Insert 1), recorded the deepest Made Ground (700mm bgl at HP03) and contained a significantly higher volume of anthropogenic material including brick, plastic, metal, tile, and glass. Groundwater was not recorded in any of the hand pits. Superficial deposits were recorded underlying the Made Ground.

FIELD OBSERVATIONS OF ASBESTOS

One possible Asbestos Containing Material (ACM) observation was noted during the supplementary hand pit works at HP05 in Made Ground <0.6m bgl. Following laboratory testing on the suspected ACM and surrounding Made Ground soil, it was confirmed by ALS laboratories that the sample did not contain asbestos.

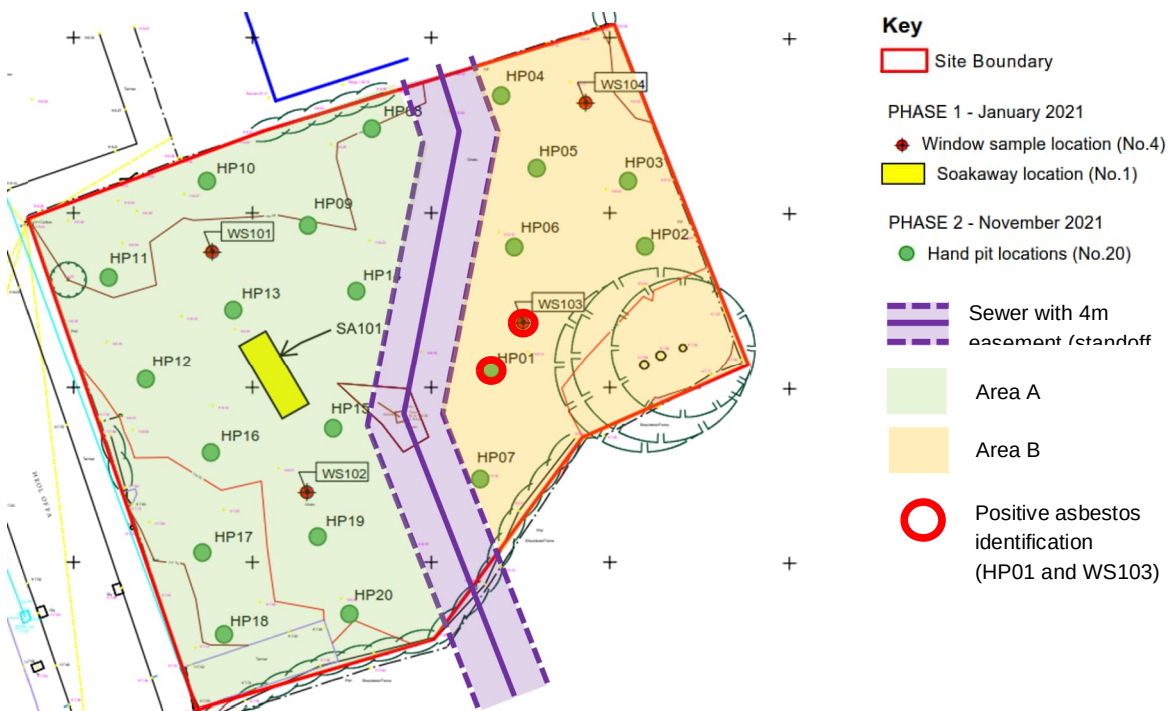
ALS LABORATORIES - ASBESTOS IDENTIFICATION AND QUANTIFICATION

Asbestos has been detected in 2no. of 34no. soil samples scheduled for asbestos identification;

- ACM debris consisting of Chrysotile was identified in Made Ground soils at WS103 between 0.3 – 0.55m bgl in January 2021. This was quantified to <0.001% (Phase Contrast Microscopy, abbreviated to PCOM) and <0.001% (Gravimetric).
- ACM fragment of Chrysotile was identified in Made Ground soils at HP01 between 0.4 – 0.5m bgl in November 2021. This was quantified to <0.001% (PCOM) and 0.0048% (Gravimetric).

Both positive asbestos identifications were identified in Made Ground soils excavated to the east of the site, within Area B where the proposed shared garden is to be located. This is demonstrated on Insert 1.

Insert 1: Extent of Ground Conditions and Asbestos Delineation



3. REMEDIATION APPROACH

SUMMARY OF INVESTIGATION DATA

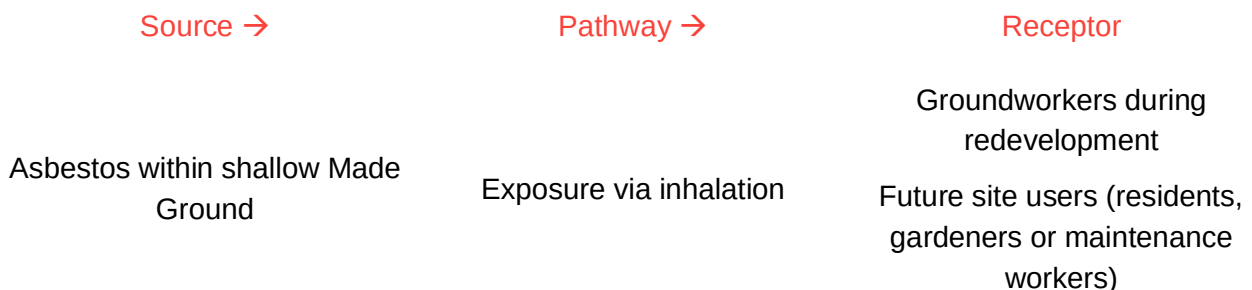
With respect to asbestos recorded at the site the following aspects are considered pertinent to the consideration of the remediation options:

- Made Ground was visually very different in both depth and description between the east and west of the site (roughly divided by the sewer main with 4m easement).
- Made Ground within the west of the site contain little or no anthropogenic material and was generally shallower.
- Made Ground in the east of the site contained notable volumes of anthropogenic material and was deeper (up to 700mm bgl).
- Asbestos was only recorded in Made Ground samples collected from the east of the site.

CONCEPTUAL SITE MODEL – CONTAMINANT LINKAGE

The site will be redeveloped into a residential end use with landscaped/ shared garden areas located in Area B.

In the context of the redevelopment the conceptual site model following the WSP Phase 2 and additional delineation hand pitting has identified the following potentially viable contaminant linkage:



REMEDIATION OBJECTIVE

To address the asbestos recorded in the Made Ground the remediation objective is to break contaminant linkages identified.

REMEDIATION OPTIONS APPRAISAL (ROA)

The following two options are considered to be reasonably practicable within the confines of the site:

- **OPTION 1) REMOVAL TOP 300MMM OF SOIL, INSTALLATION OF A MEMBRANE AND INFILL WITH CLEAN IMPORTED MATERIAL**

Removal of Made Ground soils to at least 300mm bgl in Area B for offsite disposal, followed by installation of a no-dig membrane and replacement by clean imported (or site-won, if available from Area A and suitable) sub-soil and topsoil. The WSP Phase II indicated the asbestos has been quantified as <0.001%, except for one value of 0.0048%, so would be

below the threshold for classification as hazardous waste (0.1%) for landfilling purposes. The imported soil would need to comprise 100mm topsoil and 200mm of subsoil.

➤ **OPTION 2) INSTALLATION OF MEMBRANE & COVER LAYER**

If Made Ground soils are left in situ, Area B would require the installation of an asbestos demarcation no dig membrane and provision of a clean imported (or site-won, if available and suitable) soil cover layer to break the exposure pathway. A 300mm thickness (100mm topsoil and 200mm subsoil) is considered appropriate for areas of planting and grass verges.

RECOMMENDED APPROACH

For final design and practicalities of site levels option 1 is likely to be the preferred option.

It is important to note that for either strategies, if site-won soils are considered suitable for on-site re-use then an appropriate protocol such as an Environment Agency U1 Waste Exemption (suitable for soil reuse volumes of less than 1,000tonnes) or the CL:AIRE's 'Definition of Waste: Development Industry Code of Practice (DoWCoP) to demonstrate that the soils are not waste.

The potential risks of exposure of groundworkers during the remediation should be managed under an asbestos management strategy as should all acute risks. The remediation strategy only addresses the chronic risks and therefore addresses the potential risk to future site users.

REMEDIATION STRATEGY

The following general approach to remediation is recommended regarding the commission of Option 1 Removal and Provision of Cover Layer, as detailed above;

- Removal of Made Ground soils in the east of the site, within Area B, to at least 0.3m bgl. This work should be undertaken under a watching brief.
- The base and edges of the excavation should be inspected and if any unexpected contamination is identified, it should be tested to demonstrate its suitability to remain on site or removed to a suitably licensed landfill facility.
- Installation of a no-dig membrane across the area.
- Infilling the excavated area with clean imported (or site-won, if available and suitable) sub-soil and topsoil, to a minimum thickness of 300mm.
- In the scenario where soil is reused from Area A, sampling and analysis of soil should be undertaken to demonstrate its suitability. The following suite of contaminants should be undertaken at a rate of 1 per 50m³.
 - o Asbestos, metals (arsenic, cadmium, chromium, lead, mercury, nickel, selenium and zinc, polyaromatic hydrocarbons (speciated 16) and total petroleum hydrocarbon criteria working group (TPH CWG).

The soil assessment criteria for the suitability for usage is presented in Appendix F.

- Following placement of the no-dig membrane and cover system, an appropriate number of hand-dug verification pits are to be carefully excavated within landscaped areas and extended through the placed topsoil and sub-soil to the no-dig membrane. Care should be taken not to puncture or damage the no-dig membrane during the hand pitting works. The



purpose of these holes is to confirm that the required cover thickness has been achieved. A comprehensive and clear photographic record of the measurements for each landscaped area will be required.

- A validation report detailing the materials used, and assessment of the material depth should be produced and forwarded to the local authority for approval. In addition, laboratory analysis results compared to the suitability criteria.

CLOSE

We trust this ROA and RS meet your requirements. Any queries please direct them to neil.balderstone@wsp.com or dave.watts@wsp.com.

Yours Sincerely

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UKAWB
601)

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Tony Brown
Technical Director
WSP

App A: Figures
App B: Standard Terms and Conditions
App C: Exploratory Logs
App D: Photographic Log
App E: Laboratory Analytical Data
App F: Soil Suitability Criteria

Appendix A

Figures

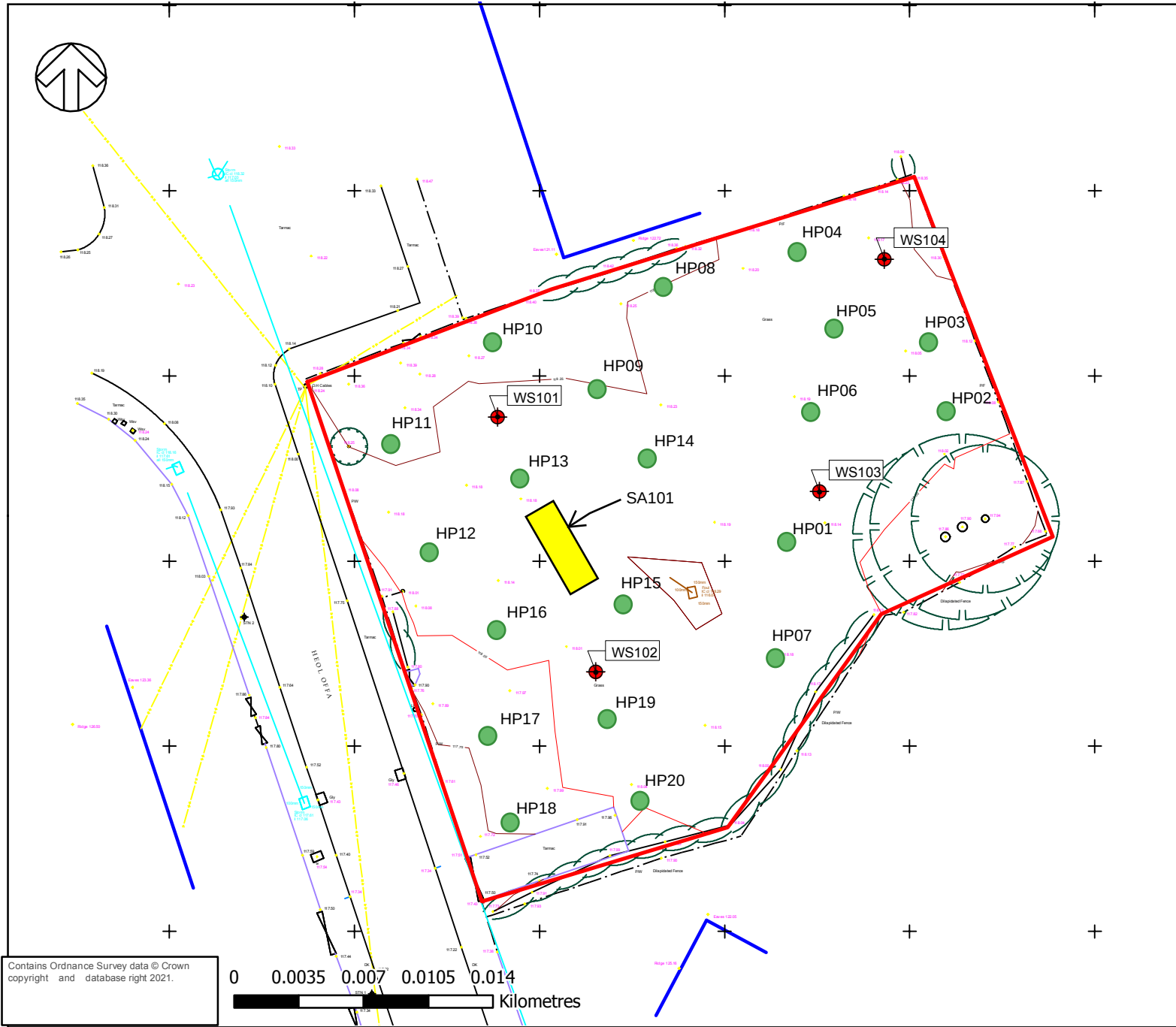




Date Modified:

Drawn By:

File:



Key

Site Boundary

PHASE 1 - January 2021

● Window sample location (No.4)

Soakaway location (No.1)

PHASE 2 - November 2021

● Hand pit locations (No.20)



TITLE:

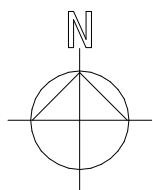
70079705 HEOL OFFA

FIGURE No:

FIGURE 2

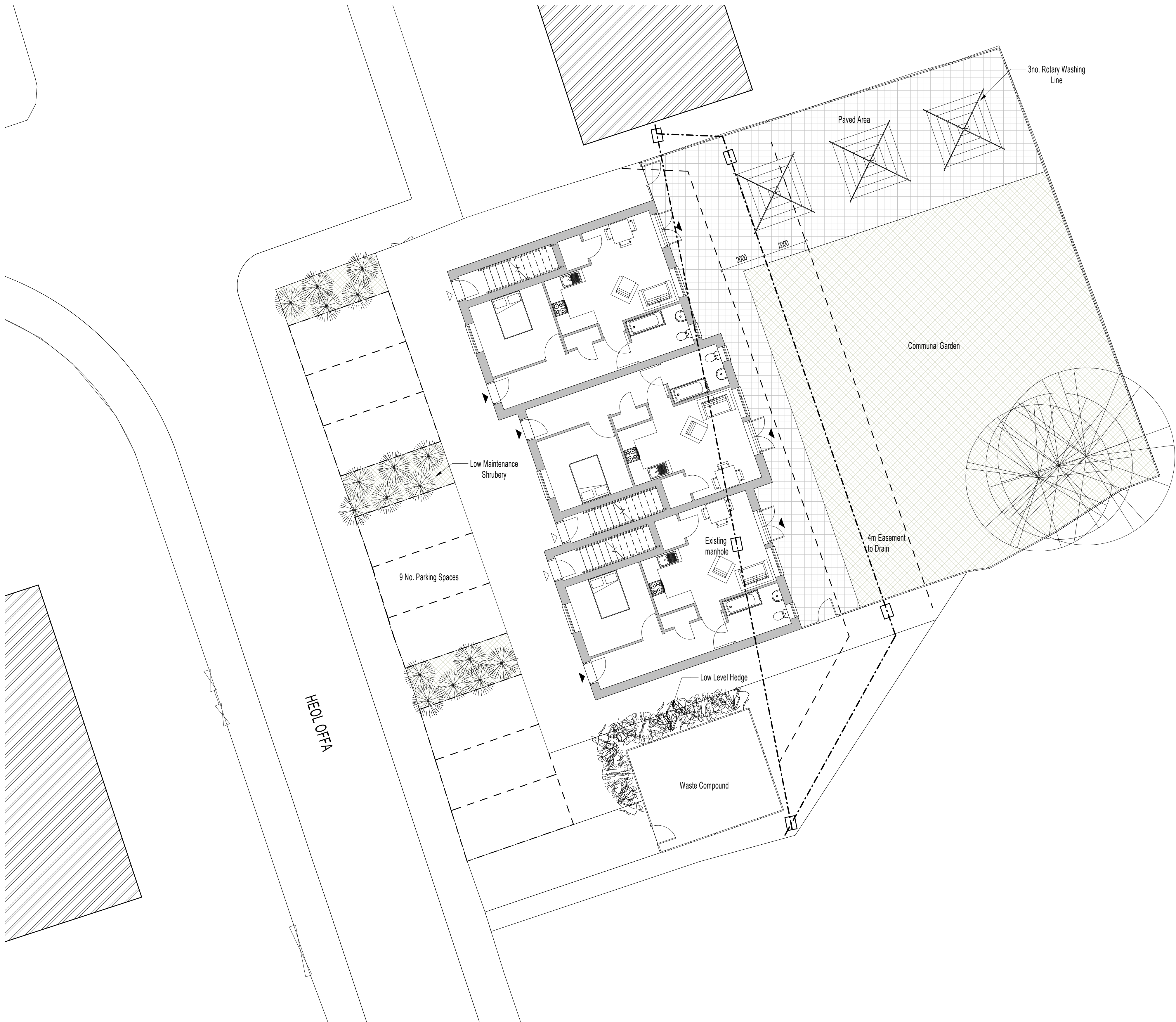
EXPLORATORY HOLE

LOCATION PLAN



Construction (Design and Management) Regulations
Design risk assessments are carried out throughout the design stage of this project in accordance with company procedures and manuals. Where reasonably possible all areas of risk applicable to design and end use of the construction have been identified and then eliminated, mitigated or recorded as a residual risk. Note that general risks of which a competent designer or contractor should be aware are not included. This drawing is to be read in conjunction with the Pre-construction Information and all related documents prepared in accordance with the current Construction (Design and Management) Regulations 2015 and all applicable Health and Safety legislation as currently amended.

- ▲ GROUND FLOOR ENTRANCE
△ FIRST FLOOR ENTRANCE



P05	Bathroom Layout Updated AJ KOH	22/12/2020
P04	Revised Layout AJ KOH	22/12/2020
P03	Communal Garden Added AJ DH	15/12/2020
P02	Revised Layout AJ DH	11/12/2020
P01	Initial Issue AJ DH	02/12/2020
REV.	DESCRIPTION DRAWN BY CHECKED BY APPROVED BY	DATE
RIBA PLAN OF WORK 2013 WORKSTAGE	LEVEL OF MODEL DEFINITION (LoD)	
Stage 3 - Developed Design	LoD 3 - Approximate Model	
PURPOSE OF ISSUE - SUITABLE FOR ...	BS1192 STATUS	
Planning Submission	Status A - Approved	



CARDIFF 029 2052 8140
LONDON 0207 138 3560
WREXHAM 01978 357 887

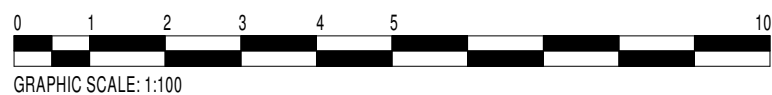
www.lawray.co.uk

CLIENT
WREXHAM COUNTY BOROUGH COUNCIL

PROJECT TITLE
HEOL OFFA JOHNSTOWN

DRAWING TITLE
PROPOSED SITE PLAN

PROPOSED SITE PLAN 1:100



GRAPHIC SCALE: 1:100

PROJECT No 19427 SCALE @ A1
As indicated

DRAWING No	PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REVISION
19427/01	HOJ-LAW-X-X-DR-	A-069001	P05					

DO NOT SCALE
Any discrepancy or query concerning this drawing should be referred to the Architect
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Reg. Co. No. 2724178, VAT Reg. No. 134 2148 06

Appendix B

Terms and Conditions



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
 - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
 - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

- 24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
- 25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

- 26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

- 27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
- 28. The data is presented and will be compared with assessment criteria.

Appendix C

Exploratory Logs

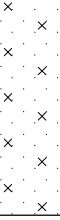
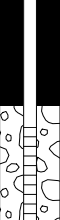
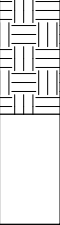


 WSP The Victoria, 150-182 The Quays Salford Quays, M50 3SP Telephone: +44 (0)161 886 2400		WINDOW SAMPLE LOG		Hole No. WS101	
Project Heol Offa, Johnstown		Sheet 1 of 1			
Job No 70069705		Client Wrexham County Borough Council		Date 08-01-21 08-01-21	
Contractor / Driller RP Drilling		Method/Plant Used Window Sample Rig		Logged By EL	
		Co-Ordinates (NGR) E 330347.75 N 345927.77		Ground Level (m AOD) 118.19	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. 50 mm
0.15-0.17	ES	.		62			118.04	0.15	Grass over, very soft, dark brown, slightly sandy CLAY. (MADE GROUND - topsoil)		MG	
0.17-0.30	ES	.					118.02	0.17	Dark grey - blackish, slightly clayey, silty fine to medium SAND. Appearance of clinker. Slight hydrocarbon odour. (MADE GROUND)		MG	
								(1.43)	Loose orangish light brown, slightly silty, slightly gravelly, clayey fine to medium SAND. Gravel is fine to coarse, subangular to subrounded of natural lithologies including sandstone and mudstone. Frequent cobbles of natural lithologies and pockets of firm clay. (GLACIOFLUVIAL DEPOSITS)		GFDU	
1.40-1.60	ES	.					116.59	1.60	1.30 m bgl Fine gravel of coal. 1.40 - 1.60 m bgl Black vertical staining. No odour, likely organic.			
1.80-2.00	D	.							Medium dense orangish (golden) light brown, slightly clayey, slightly gravelly, silty fine SAND with pockets of soft clay. Gravel is fine of coal. (GLACIOFLUVIAL DEPOSITS)			
2.00	(C)	2,2,2 2,1,2 N=7.										
2.80-3.00	D	.										
3.00	(C)	2,1,2 3,2,3 N=10.							3.00 - 5.00 m bgl Becoming gravelly. Gravel is fine to coarse, subangular to subrounded of natural lithologies including sandstone and mudstone.		GFDU	
4.00	(C)	3,2,2 3,3,3 N=11.										
5.00	(C)	2,1,1 1,2,1 N=5.					113.19	5.00	Terminated at 5m bgl and installed.		END	

Hole Diameter			Recovery			Water Strikes					
Depth	Diameter (mm)	Remarks	Core Top (m)	Core Base (m)	% Recovery	Date	Time	Strike	Minutes	Standing	Casing
						08-01-21		4.50			
						General Remarks Inspection pit excavated to a depth of 1.5m bgl. Windowless sampling commenced from base of pit to 5m bgl. Terminated in Glaciofluvial Deposits. Slight hydrocarbon odour between 0.15 - 0.17m bgl within Made Ground strata. Groundwater encountered at 4.5m bgl. Borehole installed with monitoring well upon completion (response zone 1m - 3m bgl), base of well collapsed preventing deeper installation.					
Scale 1:34.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

17 WSP WINDOW SAMPLE LOG WS LOGS_V1.GPJ WSPTEMPLATE7.00.GDT 4/2/21

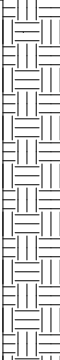
 WSP The Victoria, 150-182 The Quays Salford Quays, M50 3SP Telephone: +44 (0)161 886 2400		WINDOW SAMPLE LOG				Hole No. WS102						
		Project Heol Offa, Johnstown				Sheet 1 of 1						
Job No 70069705		Client Wrexham County Borough Council				Date 08-01-21 08-01-21						
Contractor / Driller RP Drilling		Method/Plant Used Window Sample Rig		Logged By EL		Co-Ordinates (NGR) E 330353.05 N 345914.01		Ground Level (m AOD) 117.96				
SAMPLES & TESTS						STRATA						
Depth	Type	Test Result	PID (ppmV)	HSV (kNm ²)	P Pen (kNm ²)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Install / Backfill Dia. 50 mm
							117.56	0.40	Grass over, dark brown, slightly clayey, silty fine SAND. Rare concrete cobble. (MADE GROUND - topsoil)		MG	
1.00-1.30	ES	.						(1.00)	Loose (inferred) orangish light brown, slightly clayey, slightly gravelly, silty fine to medium SAND. Gravel is fine to coarse, subangular to subrounded of natural lithologies including sandstone and mudstone. Frequent cobbles of natural lithologies and pockets of firm clay. (GLACIOFLUVIAL DEPOSITS)		GFDU	
1.25-1.40	D	.		35			116.56	1.40	1.35 - 1.40 m bgl Fine gravel of coal.			
									Soft reddish brown, slightly silty, slightly sandy CLAY. (GLACIOFLUVIAL DEPOSITS)			
2.00	(C)	2,1,2 1,2,3 N=8.		14					2.50 m bgl Fine gravel of coal.			
2.50-2.60	ES	.							2.50 - 5.00 m bgl Becomes silty.			
3.00	(C)	1,1,1 1,2,2 N=6.						(3.60)			GT	
3.50-4.00	D	.										
4.00	(C)	2,1,0 1,2,3 N=6.							4.30 - 4.60 m bgl Becoming slightly gravelly. Gravel is fine to medium, subangular to subrounded of natural lithologies.			
5.00	(C)	8,12,26 24 N=50/ 135mm.					112.96	5.00	Drill rig refused at 5m bgl. Location terminated at 5m bgl and installed.		END	
Hole Diameter			Recovery			Water Strikes						
Depth	Diameter (mm)	Remarks	Core Top (m)	Core Base (m)	% Recovery	Date	Time	Strike	Minutes	Standing	Casing	
						08-01-21		3.00				
						General Remarks Inspection pit excavated to a depth of 1.5m bgl. Windowless sampling commenced from base of pit to 5m bgl. Terminated in Glacial Till Deposits. No visual or olfactory evidence of contamination. Groundwater encountered at 3.0m bgl. Borehole installed with monitoring well upon completion (response zone 1m - 3m bgl).						
Scale 1:34.375			Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP The Victoria, 150-182 The Quays Salford Quays, M50 3SP Telephone: +44 (0)161 886 2400		WINDOW SAMPLE LOG		Hole No. WS103	
Project Heol Offa, Johnstown		Sheet 1 of 1			
Job No 70069705		Client Wrexham County Borough Council		Date 08-01-21 08-01-21	
Contractor / Driller RP Drilling		Method/Plant Used Window Sample Rig		Logged By EL	
		Co-Ordinates (NGR) E 330365.14 N 345923.77		Ground Level (m AOD) 118.08	

SAMPLES & TESTS							STRATA					Install / Backfill
Depth	Type	Test Result	PID (ppmV)	HSV (kNm2)	P Pen (kNm2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. 50 mm
0.30-0.55	ES	.		29			117.53	0.55	Grass over, dark brown, slightly clayey, silty fine SAND. (MADE GROUND - topsoil) 0.20 m bgl Dense rootlets.		MG	
1.00-1.30	ES	.					116.68	1.40	0.50 - 0.55 m bgl Becoming medium sand with occasional sandstone cobbles. Dark brown - orangish, slightly clayey, slightly gravelly, silty medium SAND with pockets of soft clay. Gravel is fine to coarse, subangular to subrounded of natural lithologies. (GLACIOFLUVIAL DEPOSITS)		GFDU	
2.00	(C)	1,2,2 2,2,1 N=7.					116.23	1.85	Dark grey - brown, slightly clayey, slightly gravelly, silty fine to medium SAND. Gravel is fine to medium, subangular to subrounded of natural lithologies including sandstone. (GLACIOFLUVIAL DEPOSITS) 1.70 m bgl Sandstone cobble.		GFDU	
							115.68	2.40	Loose black fine SAND and fine to medium GRAVEL of coal. Potentially a Coal band. (GLACIOFLUVIAL DEPOSITS)		GFDU	
3.00	(C)	2,2,3 2,2,3 N=10.					115.08	3.00	Medium dense orangish (golden) light brown, slightly clayey, slightly gravelly, silty fine SAND. Gravel is fine of coal. (GLACIOFLUVIAL DEPOSITS)		GFDU	
									Terminated at 3m bgl and installed.		END	

Hole Diameter			Recovery			Water Strikes					
Depth	Diameter (mm)	Remarks	Core Top (m)	Core Base (m)	% Recovery	Date	Time	Strike	Minutes	Standing	Casing
						General Remarks					
						Inspection pit excavated to a depth of 1.5m bgl. Windowless sampling commenced from base of pit to 3m bgl. Terminated in Glaciofluvial Deposits. No visual or olfactory evidence of contamination. No groundwater encountered. Borehole installed with monitoring well upon completion (response zone 1m - 3m bgl), base of well collapsed preventing deeper installation.					
Scale 1:34.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP01
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.15-0.25	ES							0.05	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
							(0.45)	Dark greyish brown slightly silty clayey gravelly fine and medium SAND. Gravel is fine and medium angular to subangular of various lithologies sandstone, mudstone, coal, plastic, foil and fine rootlets. (MADE GROUND) 0.05 - 0.1 Large boulder of concrete.		GMG		
0.40-0.50	ES							0.50				
							0.55	Light orangish brown clayey slightly gravelly fine and medium SAND. Gravel is medium and coarse angular to subrounded of various lithologies quartz and mudstone. (GLACIAL DEPOSITS) End of hand pit.		GFDU END		
					</							

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.55mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP02	
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1	
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21	
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR)	Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.20-0.30	ES							(0.10) 0.10	Very soft dark brown slightly sandy CLAY with grass over and roots (TOPSOIL). (MADE GROUND)		CMG	
								Dark greyish brown slightly silty clayey gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, concrete, glass, quartz, plastic. (MADE GROUND)		GMG		
0.40-0.50	ES											(0.50) 0.60
								0.65	Light orangish brown clayey slightly gravelly fine and medium SAND. Gravel is fine and medium subrounded of various lithologies quartz, mudstone and sandstone. (GLACIAL DEPOSITS)		GFDU	
									End of hand pit.		END	
												
												
												
												
												
												
												
												

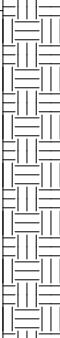
Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.65mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP03	
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1	
Job No 70079705		Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.		Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR)
Ground Level (m AOD)				

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.05-0.10	ES							0.05	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
0.20-0.30	ES							(0.65)	Dark reddish brown very gravelly slightly silty clayey fine and medium SAND with rare cobbles of concrete. Gravel is fine to coarse angular to subrounded of various lithologies sandstone, mudstone, limestone, brick, concrete, glass and plastic. (MADE GROUND) 0.05 - 0.10 Reinforced glass 0.10 - 0.25 Plastic sheeting		GMG	
								(0.10) 0.80	Light orangish brown clayey slightly gravelly fine and medium SAND. Gravel is fine subangular to subrounded of various lithologies quartz and mudstone. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.8mbgl. No V/O No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP04
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							(0.09) 0.09	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
0.30-0.40	ES							(0.51) 0.60	Dark brown very gravelly slightly silty clayey fine and medium SAND with occasional cobbles of sandstone and concrete. Gravel is fine to coarse angular to subrounded of various lithologies sandstone, mudstone, limestone, mortar, coal and concrete. (MADE GROUND)		GMG	
								(0.42) 1.02	Soft dark orangish brown sandy slightly gravelly CLAY. Gravel is medium and coarse subangular to subrounded of various lithologies sandstone and mudstone. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 1.02mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP05	
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1	
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21	
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR)	Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							0.05	Very soft dark brown sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
0.30-0.50	ES							(0.55)	Dark greyish brown gravelly slightly clayey fine and medium SAND with rare cobbles of sandstone and , rare metal bar (0.13m long). Gravel is fine to coarse angular to subrounded of various lithologies sandstone, mudstone, limestone, brick, tile and mortar. (MADE GROUND) 0.05 - 0.6 Possible acm-white and fibrous		GMG	
								0.60	Light orangish brown slightly clayey slightly gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone and mudstone. (GLACIAL DEPOSIT)		GF DU	
								0.75	End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.75mbgl. No odour. Potential acm in made ground. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

17 WSP BH LOG HAND PIT LOGS - EL.GPJ WSPTEMPLATE7.00.GDT 12/11/21

 WSP Telephone:	BOREHOLE LOG		Hole No. HP07
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.20-0.30	ES							(0.10) 0.10	Very soft dark reddish brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.20) 0.30	Dark brown slightly gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, quartz and terracotta pot fragment. (MADE GROUND)		GMG	
								(0.10) 0.40	Light orangish brown clayey gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone and mudstone. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	
				</								

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.4mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP08	
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1	
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21	
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR)	Ground Level (m AOD)

SAMPLES & TESTS							STRATA						
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thick-ness)	Description	Legend	Geology	Dia. Install / Backfill mm	
0.10-0.20	ES							0.07	Very soft dark brown sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND) 0.05 - 0.05 5mm diameter plastic tube		CMG		
								(0.33)	Dark greyish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, concrete, mudstone, quartz, coal, metal, brick, plastic and fabric. (MADE GROUND)		GMG		
0.30-0.40	ES							0.40	Light orangish brown slightly clayey very gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone. (GLACIAL DEPOSIT)		GFDU		
								(0.23)					
								0.63	End of hand pit.		END		

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.63mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

17 WSP BH LOG HAND PIT LOGS - EL.GPJ WSPTEMPLATE7.00.GDT 12/11/21

 WSP Telephone:	BOREHOLE LOG		Hole No. HP09
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							(0.09) 0.09	Very soft dark brown sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.11) 0.20	Dark greyish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, concrete and coal. (MADE GROUND)		GMG	
								(0.33) 0.53	Light orangish brown slightly clayey gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone and coal. (GLACIAL DEPOSIT)		GT	
									End of hand pit.		END	

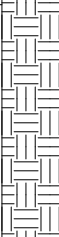
Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.53mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP12
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							(0.08) 0.08	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.22) 0.30	Dark greyish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, plastic fragment, coal, concrete and quartz. (MADE GROUND)		GMG	
								(0.10) 0.40	Light orangish brown clayey gravelly fine and medium SAND with rare cobbles of sandstone. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone and coal. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.4mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP15
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P.Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.20-0.30	ES							(0.09) 0.09	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.21) 0.30	Dark greyish brown gravelly clayey slightly silty fine and medium SAND with rare cobbles concrete. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, ash, coal, black combustible ashy product, concrete and brick. (MADE GROUND) 0.20 - 0.25 Greyish black ashy horizon		GMG	
								(0.30) 0.60	Light orangish brown clayey gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone and coal. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.6mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP17	
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1	
Job No 70079705		Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.		Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR)
		Ground Level (m AOD)		

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							0.05	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.15)	Dark reddish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, quartz and concrete. (MADE GROUND)		GMG	
								0.20	Light orangish brown clayey gravelly fine and medium SAND with rare cobbles of quartz. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, coal and quartz. (GLACIAL DEPOSIT)		GFDU	
								(0.40)				
								0.60	End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.6mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP18
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							(0.08) 0.08	Very soft dark brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
0.20-0.30	ES							(0.27) 0.35	Dark reddish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, coal, roof tile and quartz. (MADE GROUND)		GMG	
								(0.25) 0.60	Light orangish brown clayey gravelly fine and medium SAND with rare cobbles of sandstone. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, coal and quartz. (GLACIAL DEPOSIT)		GFDU	
									End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.6mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

 WSP Telephone:	BOREHOLE LOG		Hole No. HP20
	Project Heol Offa GRR Asbestos Delineation		Sheet 1 of 1
Job No 70079705	Client Wrexham County Borough Council		Date 09-11-21 09-11-21
Contractor / Driller RP Drilling Ltd.	Method/Plant Used Insulated hand tools	Logged By E. Hale	Co-Ordinates (NGR) Ground Level (m AOD)

SAMPLES & TESTS							STRATA					
Depth	Type	Test Result	PID (ppmV)	HSV (kN/m2)	P. Pen (kN/m2)	Water	Elev. (mAOD)	Depth (Thickness)	Description	Legend	Geology	Dia. Install / Backfill mm
0.10-0.20	ES							0.06	Very soft dark reddish brown slightly sandy CLAY with grass over and rootlets (TOPSOIL). (MADE GROUND)		CMG	
								(0.49)	Dark reddish brown gravelly clayey slightly silty fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, coal, concrete and quartz. (MADE GROUND)		GMG	
0.40-0.50	ES							0.55	Orangish brown clayey gravelly fine and medium SAND. Gravel is fine to coarse subangular to subrounded of various lithologies sandstone, mudstone, coal and quartz. (GLACIAL DEPOSIT)		GFDU	
								(0.15)				
								0.70	End of hand pit.		END	

Boring Progress						Water Strikes					
Date	Time	Depth	Casing Depth	Dia. (mm)	Water Depth	Date	Time	Strike	Minutes	Standing	Casing
Chiselling				Water Added		General Remarks Inspection pit terminated at 0.7mbgl. No V/O. No Groundwater.					
From	To	Hours	Tool	From	To						
Scale 1:9.375		Notes: All dimensions in metres. Logs should be read in accordance with the provided Key. Descriptions are based on visual and manual identification.									

Appendix D

Photographic Log





Photo 1: HP01 arisings recovered from 0 to 0.55mbgl. Depth below ground increases from right to left of image.

WSP



Photo 2: HP02 arisings recovered from 0 to 0.65mbgl. Depth below ground increases from left to right of image.

WSP



Photo 3: HP02 topsoil to 0.1mbgl containing roots.

WSP



Photo 4: HP03 recovered arisings from 0 to 0.8m bgl. Depth below ground increases from left to right of image.

WSP



Photo 5: HP03 features of interest: Top left- reinforced glass found from 0.05 to 0.1mbgl. Top right- rare cobbles of concrete found in made ground (0.05 to 0.7mbgl). Bottom- Plastic sheeting seen in hand pit walls 0.1 to 0.25mbgl.

wsp



Photo 6: HP04 arisings recovered from 0 to 1.02mbgl. Depth below ground increases from right to left of image.

wsp



Photo 7: HP04 hand pit wall shows occasional concrete or sandstone cobbles seen in made ground between 0.09 and 0.6mbgl.

WSP



Photo 8: HP05 arisings recovered from 0 to 0.75mbgl. Depth below ground increases from right to left of image.

WSP



Photo 9: HP05 features of interest recovered in made ground (0.05 to 0.6mbgl): left-roof tile fragments. Right-metal bar 0.13m long.

WSP



Photo 10: HP06 arisings recovered from 0 to 0.6mbgl. Depth below ground increases from left to right of the image.

WSP



Photo 11: HP06 features of interest in made ground (0.05 to 0.55mgb): top left- plastic wrapping, top right-brittle plastic plant pot, bottom left-black combustible material, bottom right-glass fragments.

WSP



Photo 12: HP07 arisings recovered from 0 to 0.4mgb-l-shallow made ground (0.1 to 0.3mgb). Depth below ground increases from left to right of image.

WSP



Photo 13: HP07 shallow made ground, natural material clearly visible at base of hand pit.

WSP



Photo 14: HP08 arisings recovered from 0 to 0.63mbgl. Depth below ground increases from right to left of image.

WSP



Photo 15: HP08 features of interest: left- 5mm diameter plastic tubing found near surface (0.05mbgl). In the made ground (0.07 to 0.4mbgl): top right- fabric, bottom right-metal bar.

WSP



Photo 16: HP09 arisings recovered from 0 to 0.53mbgl. Depth below ground increases from top to bottom of image.

WSP



Photo 17: Shallow made ground (0.09 to 0.2mbgl) in HP09, natural material clearly visible in hand pit.

WSP



Photo 18: HP10 arisings recovered from 0 to 0.5mbgl. Depth below ground increases from left to right of image.

WSP



Photo 19: HP10 rare cobbles of brick in made ground (0.08 to 0.25mbgl).

WSP



Photo 20: HP11 arisings recovered from 0 to 0.5mbgl. Depth below ground increases from left to right of image.

WSP



Photo 21: HP11 shallow made ground (0.05 to 0.25mbgl) so natural material is visible in hand pit.

WSP



Photo 22: HP12 arisings recovered from 0 to 0.4mbgl. Depth below ground increases from left to right of image.

WSP



Photo 23: HP13 arisings recovered from 0 to 0.45mblg. Depth below ground increases from left to right of image.

WSP



Photo 24: HP13 orangish brown natural material visible below shallow (0.08 to 0.2mblg) made ground.

WSP



Photo 25: HP14 arisings recovered from 0 to 0.4mbgl. Depth below ground increases from left to right of image.



Photo 26: HP15 arisings recovered from 0 to 0.6mbgl. Depth below ground increases from left to right of image.





Photo 27: HP15 greyish black ashy horizon visible at 0.2 to 0.25mbgl within made ground (0.09 to 0.3mbgl). Orangish brown natural material visible below made ground (0.3 to 0.6mbgl).



Photo 28: HP16 arisings recovered from 0 to 0.47mbgl. Depth below ground increases from left to right of image.



Photo 29: HP17 arisings recovered from 0 to 0.6mbgl. Depth below ground increases from right to left of image.

WSP



Photo 30: HP18 arisings recovered from 0 to 0.6mbgl. Depth below ground increases from left to right of image.

WSP



Photo 31: HP19 arisings recovered from 0 to 0.55mbgl. Depth below ground increases from left to right of image.

WSP



Photo 32: HP19 features of interest: rare cobbles of concrete (left) and brick (right) found in made ground (0.06 to 0.35mbgl).

WSP



Photo 33: HP20 arisings recovered from 0 to 0.7mbgl. Depth below ground increases from right to left of image.

WSP



Photo 34: Spread of hand pit locations across site (soil samples taken at all locations).

WSP

Appendix E

Laboratory Analytical Data





WSP UK Limited
8 First Street
Manchester
Lancashire
M15 4RP

Attention: Emily Morgan

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CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CERTIFICATE OF ANALYSIS

Date of report Generation: 04 February 2021
Customer: WSP UK Limited
Sample Delivery Group (SDG): 210114-53
Your Reference: Heol Offa
Location: Heol Offa
Report No: 585634

This report has been revised and directly supersedes 585021 in its entirety.

We received 14 samples on Thursday January 14, 2021 and 13 of these samples were scheduled for analysis which was completed on Thursday February 04, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23575753	WS101		0.15 - 0.17	
23540918	WS101	ES	0.17 - 0.30	08/01/2021
23562981	WS101		1.40 - 1.60	08/01/2021
23562982	WS101		1.80 - 2.00	08/01/2021
23575754	WS101		2.80 - 3.00	
23540927	WS102	ES	1.00 - 1.30	08/01/2021
23562984	WS102		1.25 - 1.40	08/01/2021
23562980	WS102		2.50 - 2.60	08/01/2021
23562983	WS102		3.50 - 4.00	08/01/2021
23540905	WS103	ES	0.30 - 0.55	08/01/2021
23540911	WS103	ES	1.00 - 1.30	08/01/2021
23540880	WS104	ES	0.30 - 0.40	08/01/2021
23540888	WS104	ES	0.70 - 1.00	08/01/2021
23540900	WS104	ES	1.30 - 1.50	08/01/2021

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53 Client Reference: Heol Offa Report Number: 585634
Location: Heol Offa Order Number: 70079705 Superseded Report: 585021

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Anions by Kone (soil)

All

NDPs: 0
Tests: 8

Asbestos ID in Solid Samples

All

NDPs: 0
Tests: 5

Asbestos Quantification - Full

All

NDPs: 0
Tests: 1

CEN Readings

All

NDPs: 0
Tests: 2

Dissolved Metals by ICP-MS

All

NDPs: 0
Tests: 2

EPH CWG GC (S)

All

NDPs: 0
Tests: 2

Geotechnical Testing*

All

NDPs: 0
Tests: 5

GRO by GC-FID (S)

All

NDPs: 0
Tests: 2

Mercury Dissolved

All

NDPs: 0
Tests: 2

Metals in solid samples by OES

All

NDPs: 0
Tests: 6

PAH by GCMS

All

NDPs: 0
Tests: 6

PAH Spec MS - Aqueous (W)

All

NDPs: 0
Tests: 2

pH

All

NDPs: 0
Tests: 8

Sample description

All

NDPs: 0
Tests: 11

TPH CWG GC (S)

All

NDPs: 0
Tests: 2

23540900	WS 104	ES	1.30 - 1.50	250g Amber Jar (ALE210)	S		
23540888	WS 104	ES	0.70 - 1.00	250g Amber Jar (ALE210)	S		
23540880	WS 104	ES	0.30 - 0.40	250g Amber Jar (ALE210)	S		



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol Offa

Client Reference: Heol Offa
Order Number: 70079705

Report Number: 585634
Superseded Report: 585021

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
-----------	----------	------	-----------------	--------	-------------	--------	------------	-------------	-------

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
23540918	WS101	0.17 - 0.30	Dark Brown	Sandy Loam	Stones	Vegetation
23562981	WS101	1.40 - 1.60	Light Brown	Silt Loam	Stones	Vegetation
23575753	WS101	0.15 - 0.17	Dark Brown	Sandy Loam	Stones	Vegetation
23540927	WS102	1.00 - 1.30	Dark Brown	Loamy Sand	Stones	None
23562980	WS102	2.50 - 2.60	Light Brown	Silt Loam	Stones	None
23562983	WS102	3.50 - 4.00	Light Brown	Loamy Sand	Stones	Vegetation
23540905	WS103	0.30 - 0.55	Dark Brown	Loamy Sand	Stones	Vegetation
23540911	WS103	1.00 - 1.30	Dark Brown	Sandy Silt Loam	Stones	Vegetation
23540880	WS104	0.30 - 0.40	Dark Brown	Loamy Sand	Stones	Vegetation
23540888	WS104	0.70 - 1.00	Dark Brown	Loamy Sand	Stones	Vegetation
23540900	WS104	1.30 - 1.50	Light Brown	Loamy Sand	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol OffaClient Reference: Heol Offa
Order Number: 70079705Report Number: 585634
Superseded Report: 585021

TPH CWG (S)

Results Legend		Customer Sample Ref.	WS101	WS101			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sampled Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.15 - 0.17	0.17 - 0.30			
M	mCERTS accredited.		Soil/Solid (S)	Soil/Solid (S)			
aq	Aqueous / settled sample.		-	08/01/2021			
diss.filt	Dissolved / filtered sample.		-	-			
tot.unfilt	Total / unfiltered sample.		14/01/2021	14/01/2021			
*	Subcontracted - refer to subcontractor report for accreditation status.		210114-53	210114-53			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		23575753	23540918			
(F)	Trigger breach confirmed			ES			
1-4*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
GRO Surrogate % recovery**	%	TM089	87.6	112			
			\$				
Aliphatics >C5-C6	<0.01	TM089	0.0203	<0.01			
	mg/kg		\$				
Aliphatics >C6-C8	<0.01	TM089	0.0318	0.0219			
	mg/kg		\$				
Aliphatics >C8-C10	<0.01	TM089	0.116	0.0909			
	mg/kg		\$				
Aliphatics >C10-C12	<1	TM414	<1	<1			
	mg/kg		\$				
Aliphatics >C12-C16	<1	TM414	<1	<1			
	mg/kg		\$				
Aliphatics >C16-C21	<1	TM414	1.46	<1			
	mg/kg		\$				
Aliphatics >C16-C35	<1	TM414	8.66	3.48			
	mg/kg		\$				
Aliphatics >C21-C35	<1	TM414	7.2	3.07			
	mg/kg		\$				
Aliphatics >C35-C44	<1	TM414	<1	<1			
	mg/kg		\$				
Total Aliphatics >C10-C44	<5	TM414	9.55	<5			
	mg/kg		\$				
Total Aliphatics & Aromatics >C10-C44	<10	TM414	208	69			
	mg/kg		\$				
Aromatics >EC5-EC7	<0.01	TM089	<0.01	<0.01			
	mg/kg		\$				
Aromatics >EC7-EC8	<0.01	TM089	<0.01	<0.01			
	mg/kg		\$				
Aromatics >EC8-EC10	<0.01	TM089	0.0775	0.061			
	mg/kg		\$				
Aromatics > EC10-EC12	<1	TM414	<1	<1			
	mg/kg		\$				
Aromatics > EC12-EC16	<1	TM414	1.66	<1			
	mg/kg		\$				
Aromatics > EC16-EC21	<1	TM414	30.7	6.2			
	mg/kg		\$				
Aromatics > EC16-EC35	<1	TM414	173	56.1			
	mg/kg		\$				
Aromatics > EC21-EC35	<1	TM414	142	49.9			
	mg/kg		\$				
Aromatics >EC35-EC44	<1	TM414	23.9	8.61			
	mg/kg		\$				
Aromatics > EC40-EC44	<1	TM414	2.74	1.3			
	mg/kg		\$				
Total Aromatics > EC10-EC44	<5	TM414	199	64.8			
	mg/kg		\$				
Total Aliphatics & Aromatics >C5-C44	<10	TM414	208	64.9			
	mg/kg		\$				
Total Aliphatics >C5-C10	<0.05	TM089	0.168	0.113			
	mg/kg		\$				
Total Aromatics >EC5-EC10	<0.05	TM089	0.0775	0.061			
	mg/kg		\$				
GRO >C5-C10	<0.02	TM089	0.245	0.174			
	mg/kg		\$				



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53 Client Reference: Heol Offa Report Number: 585634
Location: Heol Offa Order Number: 70079705 Superseded Report: 585021

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERTS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*@ Sample deviation (see appendix)

Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
28/01/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
19/01/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
19/01/2021	Paul Poynton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
19/01/2021	James Richards	Soil containing ACM debris	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
19/01/2021	Paul Poynton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Asbestos Quantification - Full

Results Legend

ISO17025 accredited.
M mCERTS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*\$\$@ Sample deviation (see appendix)

		Additional Asbestos Components	Analysts Comments	Asbestos Quantification - Gravimetric - %	Asbestos Quantification - PCOM Evaluation	Asbestos Quantification - Total - %
Cust. Sample Ref.	WS103ES	None (#)	N/A	<0.001 (#)	<0.001 (#)	<0.001 (#)
Depth (m)	0.30 - 0.55					
Sample Type	SOLID					
Date Sampled	08/01/2021 00:00:00					
Date Received	14/01/2021 05:00:00					
SDG	210114-53					
Original Sample	23540905					
Method Number	TM304					



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol Offa

Client Reference: Heol Offa
Order Number: 70079705

Report Number: 585634
Superseded Report: 585021

CEN 10:1 SINGLE STAGE LEACHATE TEST

CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference	
Mass Sample taken (kg)	0.105
Mass of dry sample (kg)	0.090
Particle Size <4mm	>95%

Site Location	Heol Offa
Natural Moisture Content (%)	16.9
Dry Matter Content (%)	85.5

Case

SDG	210114-53
Lab Sample Number(s)	23540911
Sampled Date	08-Jan-2021
Customer Sample Ref.	WS103 ESZ
Depth (m)	1.00 - 1.30

Eluate Analysis	C ₂ Conc ⁿ in 10:1 eluate (mg/l)		A ₂ 10:1 conc ⁿ leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Mercury Dissolved (CVAf)	0.0000114	<0.00001	0.000114	<0.0001	-	-	-
Arsenic	0.000724	<0.0005	0.00724	<0.005	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	<0.001	<0.001	<0.01	<0.01	-	-	-
Copper	0.000829	<0.0003	0.00829	<0.003	-	-	-
Lead	0.00172	<0.0002	0.0172	<0.002	-	-	-
Nickel	0.000615	<0.0004	0.00615	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.0221	<0.001	0.221	<0.01	-	-	-
PAH Spec MS - Aqueous (W)							
Acenaphthene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Acenaphthylene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Anthracene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Benz(a)anthracene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Benzo(a)pyrene by GCMS	<0.000002	<0.000002	<0.00002	<0.00002	-	-	-
Benzo(b)fluoranthene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Benzo(ghi)perylene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Benzo(k)fluoranthene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Chrysene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Dibenzo(ah)anthracene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Fluoranthene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Fluorene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Indeno(123cd)pyrene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Naphthalene by GCMS	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
PAH 16 EPA Total by GCMS	<0.000082	<0.000082	<0.00082	<0.00082	-	-	-
Phenanthrene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Pyrene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-

Leach Test Information

Date Prepared	19-Jan-2021
pH (pH Units)	9.38
Conductivity (µS/cm)	31.60
Temperature (°C)	12.80
Volume Leachant (Litres)	0.885

Mcerts Certification does not apply to leachates

04/02/2021 09:56:53

09:56:26 04/02/2021



CERTIFICATE OF ANALYSIS

Validated

SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

CEN 10:1 SINGLE STAGE LEACHATE TEST

CEN ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		Site Location	Heol Offa
Mass Sample taken (kg)	0.105	Natural Moisture Content (%)	16.2
Mass of dry sample (kg)	0.090	Dry Matter Content (%)	86.1
Particle Size <4mm	>95%		

Case

SDG	210114-53
Lab Sample Number(s)	23540918
Sampled Date	08-Jan-2021
Customer Sample Ref.	WS101 ESZ
Depth (m)	0.17 - 0.30

Eluate Analysis	C ₂ Conc ⁿ in 10:1 eluate (mg/l)		A ₂ 10:1 conc ⁿ leached (mg/kg)				
	Result	Limit of Detection	Result	Limit of Detection			
Mercury Dissolved (CVAf)	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
Arsenic	0.0013	<0.0005	0.013	<0.005	-	-	-
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	-	-	-
Chromium	0.0014	<0.001	0.014	<0.01	-	-	-
Copper	0.00272	<0.0003	0.0272	<0.003	-	-	-
Lead	0.000439	<0.0002	0.00439	<0.002	-	-	-
Nickel	<0.0004	<0.0004	<0.004	<0.004	-	-	-
Selenium	<0.001	<0.001	<0.01	<0.01	-	-	-
Zinc	0.00108	<0.001	0.0108	<0.01	-	-	-
PAH Spec MS - Aqueous (W)							
Acenaphthene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Acenaphthylene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Anthracene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Benz(a)anthracene by GCMS	0.0000191	<0.000005	0.000191	<0.00005	-	-	-
Benzo(a)pyrene by GCMS	0.0000138	<0.000002	0.000138	<0.00002	-	-	-
Benzo(b)fluoranthene by GCMS	0.0000235	<0.000005	0.000235	<0.00005	-	-	-
Benzo(ghi)perylene by GCMS	0.0000183	<0.000005	0.000183	<0.00005	-	-	-
Benzo(k)fluoranthene by GCMS	0.0000112	<0.000005	0.000112	<0.00005	-	-	-
Chrysene by GCMS	0.0000144	<0.000005	0.000144	<0.00005	-	-	-
Dibenzo(ah)anthracene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Fluoranthene by GCMS	0.0000365	<0.000005	0.000365	<0.00005	-	-	-
Fluorene by GCMS	<0.000005	<0.000005	<0.00005	<0.00005	-	-	-
Indeno(123cd)pyrene by GCMS	0.0000192	<0.000005	0.000192	<0.00005	-	-	-
Naphthalene by GCMS	<0.00001	<0.00001	<0.0001	<0.0001	-	-	-
PAH 16 EPA Total by GCMS	0.0002	<0.000082	0.002	<0.00082	-	-	-
Phenanthrene by GCMS	0.0000137	<0.000005	0.000137	<0.00005	-	-	-
Pyrene by GCMS	0.0000304	<0.000005	0.000304	<0.00005	-	-	-

Leach Test Information

Date Prepared	19-Jan-2021
pH (pH Units)	8.79
Conductivity (µS/cm)	107.00
Temperature (°C)	12.20
Volume Leachant (Litres)	0.885

Mcerts Certification does not apply to leachates

04/02/2021 09:56:53

09:56:26 04/02/2021



CERTIFICATE OF ANALYSIS

Validated

SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
SUB		Subcontracted Test
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM243		Mixed Anions In Soils By Kone
TM304	HSE Contract research Report no 83/1996	Asbestos Quantification in Soil: Fibres identified by morphology only
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Environmental Hawarden (Method codes TM) or ALS Environmental Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol Offa

Client Reference: Heol Offa
Order Number: 70079705

Report Number: 585634
Superseded Report: 585021

Test Completion Dates

Lab Sample No(s)	23540918	23562981	23562982	23575753	23540927	23562980	23562983	23562984	23540905	23540911
Customer Sample Ref.	WS101	WS101	WS101	WS101	WS102	WS102	WS102	WS102	WS103	WS103
AGS Ref.	ES				ES				ES	ES
Depth	0.17 - 0.30	1.40 - 1.60	1.80 - 2.00	0.15 - 0.17	1.00 - 1.30	2.50 - 2.60	3.50 - 4.00	1.25 - 1.40	0.30 - 0.55	1.00 - 1.30
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	20-Jan-2021	20-Jan-2021			20-Jan-2021	20-Jan-2021	20-Jan-2021		20-Jan-2021	20-Jan-2021
Asbestos ID in Solid Samples	19-Jan-2021			28-Jan-2021	19-Jan-2021				19-Jan-2021	
Asbestos Quantification - Full									26-Jan-2021	
CEN 10:1 Leachate (1 Stage)	19-Jan-2021									19-Jan-2021
CEN Readings	20-Jan-2021									20-Jan-2021
Dissolved Metals by ICP-MS	21-Jan-2021									22-Jan-2021
EPH CWG GC (S)	18-Jan-2021			01-Feb-2021						
Geotechnical Testing*		04-Feb-2021	04-Feb-2021			04-Feb-2021	04-Feb-2021	04-Feb-2021		
GRO by GC-FID (S)	19-Jan-2021			30-Jan-2021						
Mercury Dissolved	21-Jan-2021									22-Jan-2021
Metals in solid samples by OES	20-Jan-2021			30-Jan-2021	20-Jan-2021				20-Jan-2021	
Moisture at 105C	19-Jan-2021									19-Jan-2021
PAH by GCMS	18-Jan-2021			26-Jan-2021	18-Jan-2021				18-Jan-2021	
PAH Spec MS - Aqueous (W)	22-Jan-2021									22-Jan-2021
pH	15-Jan-2021	18-Jan-2021			15-Jan-2021	18-Jan-2021	18-Jan-2021		15-Jan-2021	14-Jan-2021
Sample description	14-Jan-2021	18-Jan-2021		23-Jan-2021	14-Jan-2021	18-Jan-2021	18-Jan-2021		14-Jan-2021	14-Jan-2021
TPH CWG GC (S)	20-Jan-2021			01-Feb-2021						
VOC MS (S)	19-Jan-2021			29-Jan-2021						

Lab Sample No(s)	23540880	23540888	23540900
Customer Sample Ref.	WS104	WS104	WS104
AGS Ref.	ES	ES	ES
Depth	0.30 - 0.40	0.70 - 1.00	1.30 - 1.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)			20-Jan-2021
Asbestos ID in Solid Samples	19-Jan-2021		
Metals in solid samples by OES	20-Jan-2021	20-Jan-2021	
PAH by GCMS	20-Jan-2021	15-Jan-2021	
pH			14-Jan-2021
Sample description	14-Jan-2021	14-Jan-2021	14-Jan-2021



CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol Offa

Client Reference: Heol Offa
Order Number: 70079705

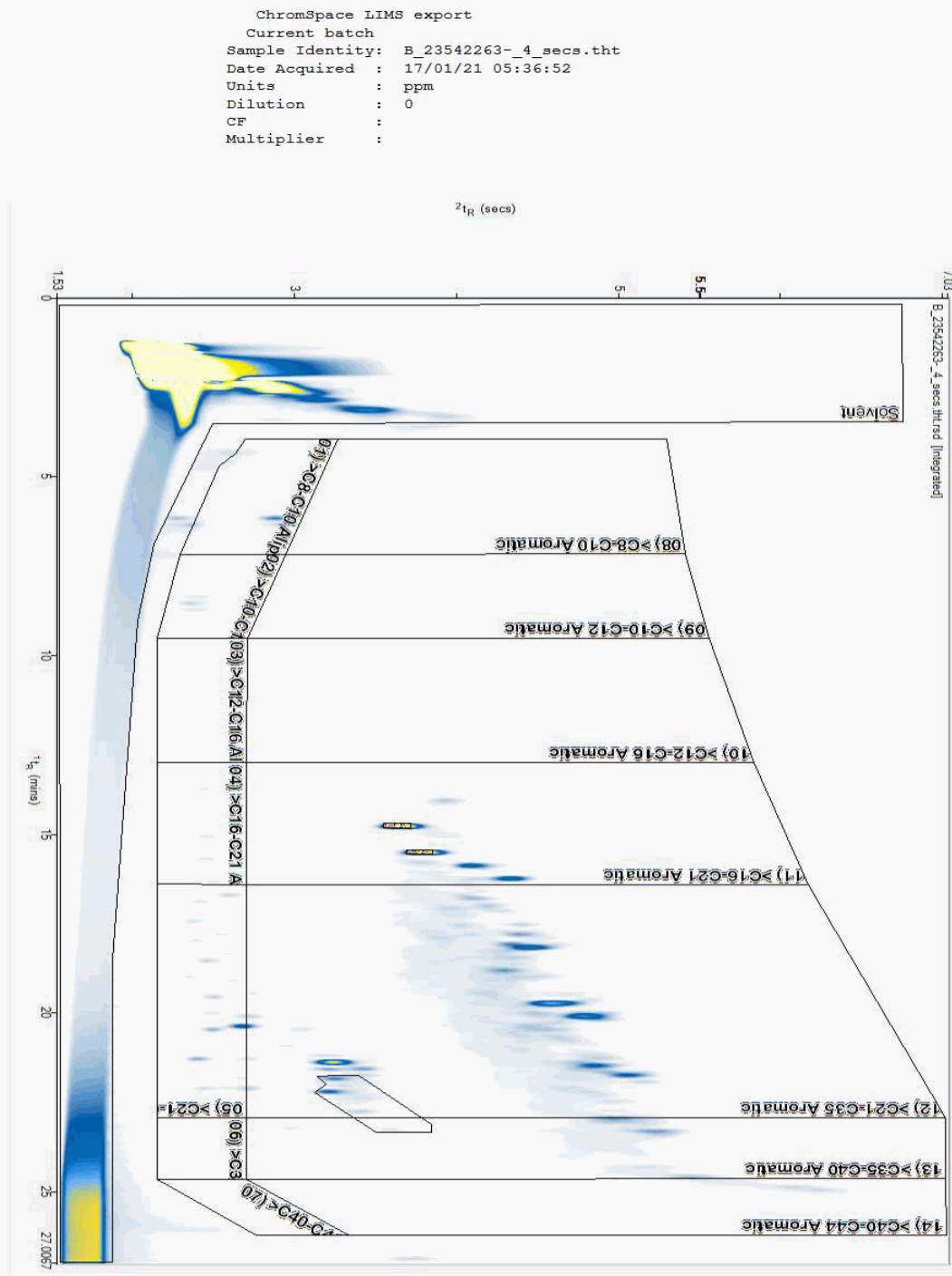
Report Number: 585634
Superseded Report: 585021

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23542263
Sample ID : WS101

Depth : 0.17 - 0.30





CERTIFICATE OF ANALYSIS

Validated

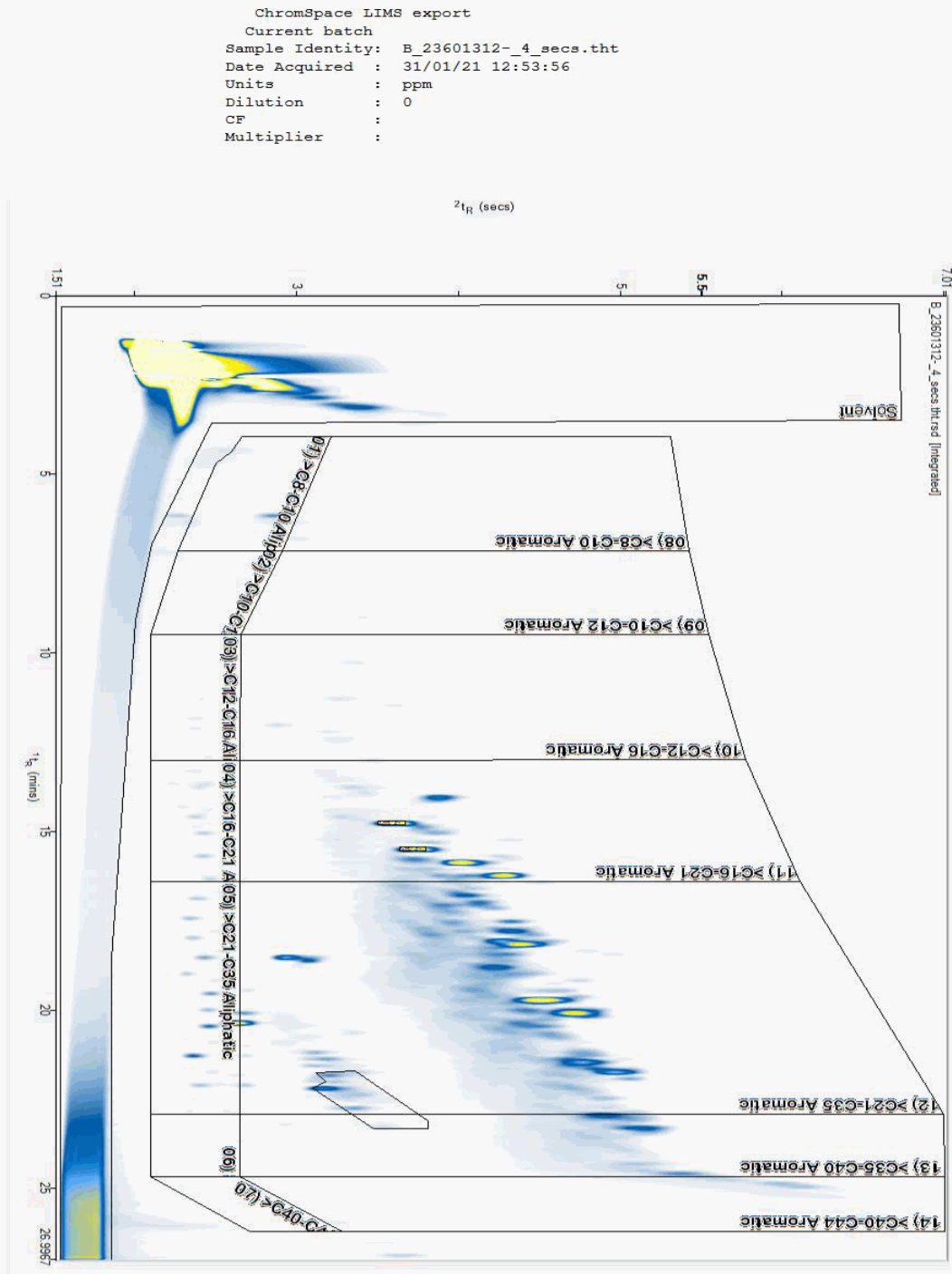
SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Chromatogram

Analysis: EPH CWG GC (S)

Sample No : 23601312
Sample ID : WS101

Depth : 0.15 - 0.17





CERTIFICATE OF ANALYSIS

Validated

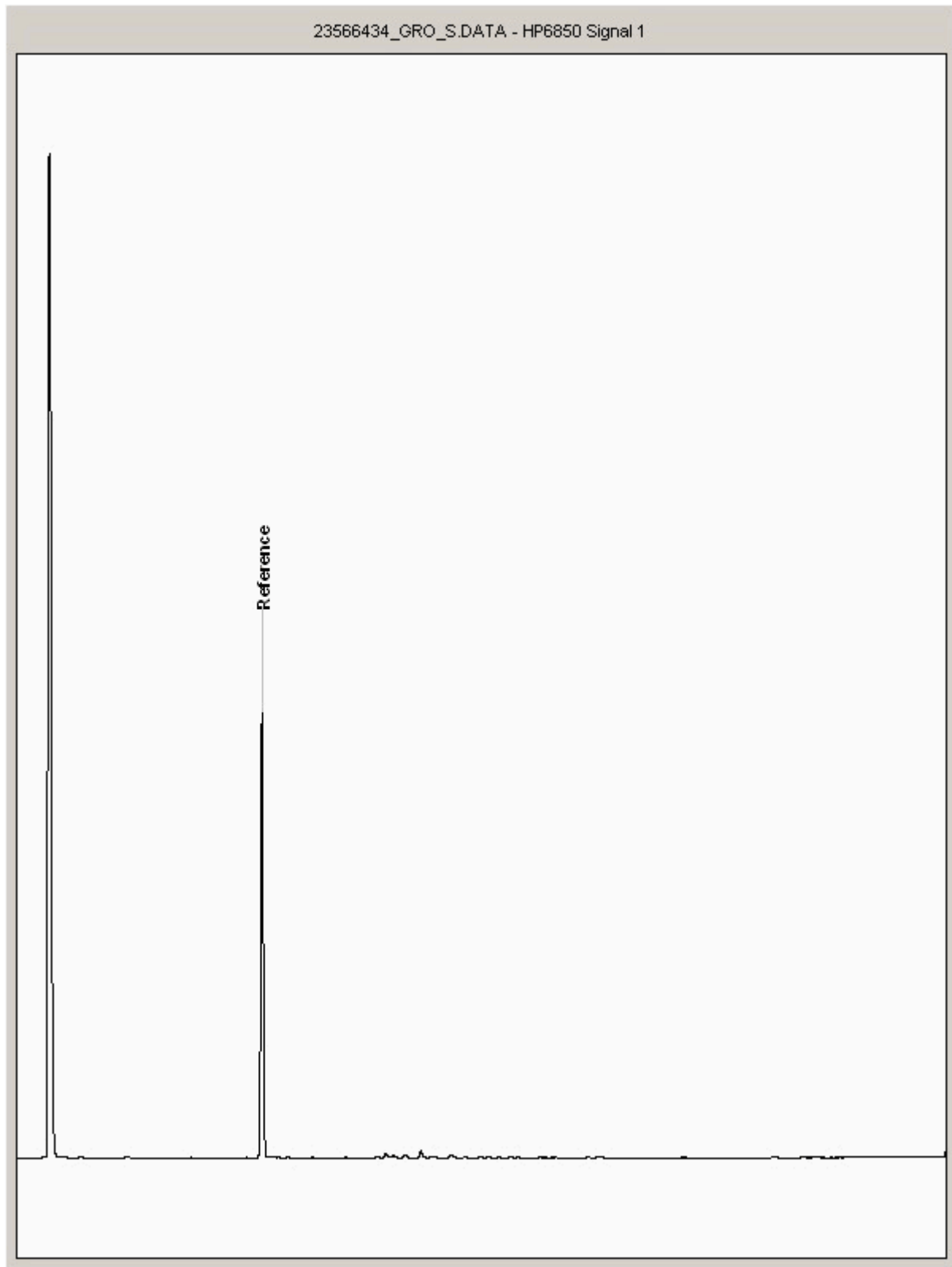
SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23566434
Sample ID : WS101

Depth : 0.17 - 0.30





CERTIFICATE OF ANALYSIS

Validated

SDG: 210114-53
Location: Heol Offa

Client Reference: Heol Offa
Order Number: 70079705

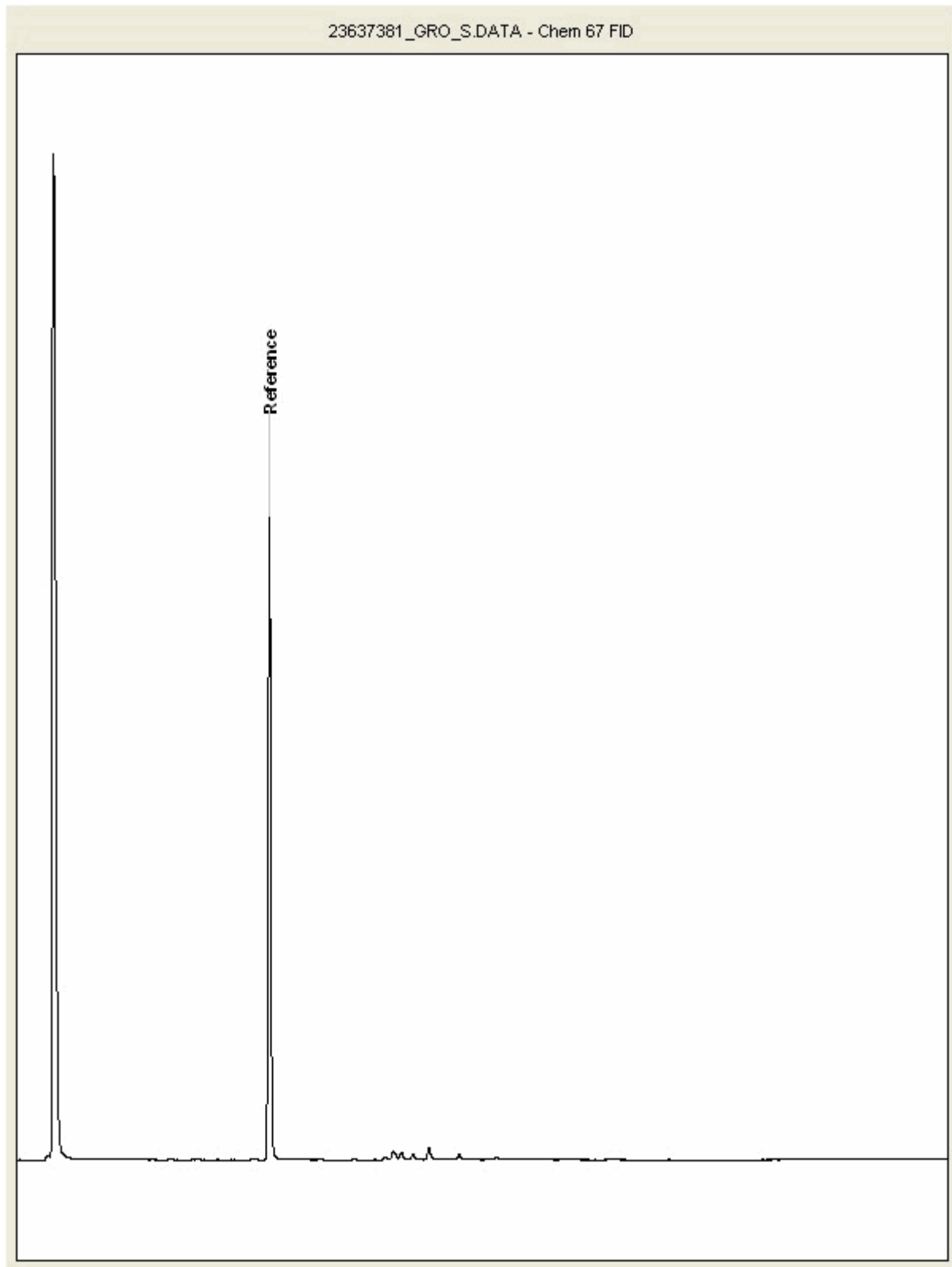
Report Number: 585634
Superseded Report: 585021

Chromatogram

Analysis: GRO by GC-FID (S)

Sample No : 23637381
Sample ID : WS101

Depth : 0.15 - 0.17





ALS Environmental
Units 7-8 Hawarden Business Park
Manor Lane
Hawarden
Deeside
CH5 3US

For the attention of Annabella Szelyes

TEST REPORT

PROJECT/SITE	Heol Offa	Version No.	1
REPORT NUMBER	21/3529	Page No.	1 to 6
Your ref/PO:	210114-53 / 32999	Date of Issue	04/02/2021
		Status	Final
SUMMARY OF RESULTS ATTACHED			
TEST METHOD & DESCRIPTION			QUANTITY
BS 1377: Part 2: Clause 4.2-4.4 & 5.2-5.4: 1990 Liquid & Plastic Limits			2
BS 1377: Part 2: Clause 9.2 & 9.3: 1990 Determination of particle size distribution – wet & dry sieving method			3
Remarks This report may not be partially reproduced without written permission from this laboratory. Any descriptions, opinions and interpretations are outside the scope of UKAS accreditation. The results reported herein relate only to the items tested or sampled. * Tests have been sub-contracted out. # Tests are not UKAS accredited.		Approved Signatories: L Griffin LG (QA Technical & Laboratory Manager) K Mazerant KM (Laboratory Manager) 	

London Laboratory
47-49 Brunel Road
London
W3 7XR
lab@conceptconsultants.co.uk
020 8740 1553

Coventry Laboratory
Unit D, Herald Way
Binley Industrial Estate
Coventry
CV3 2RQ
coventrylab@conceptconsultants.co.uk
024 7708 7673

CONCEPT SITE INVESTIGATIONS			
Site Name:	Heol Offa	Job No.:	21/3529
Client:	ALS	Date Reported:	04/02/2021

Summary Test Report

Determination of Moisture Content and Liquid and Plastic Limits by 4 Point Cone Method

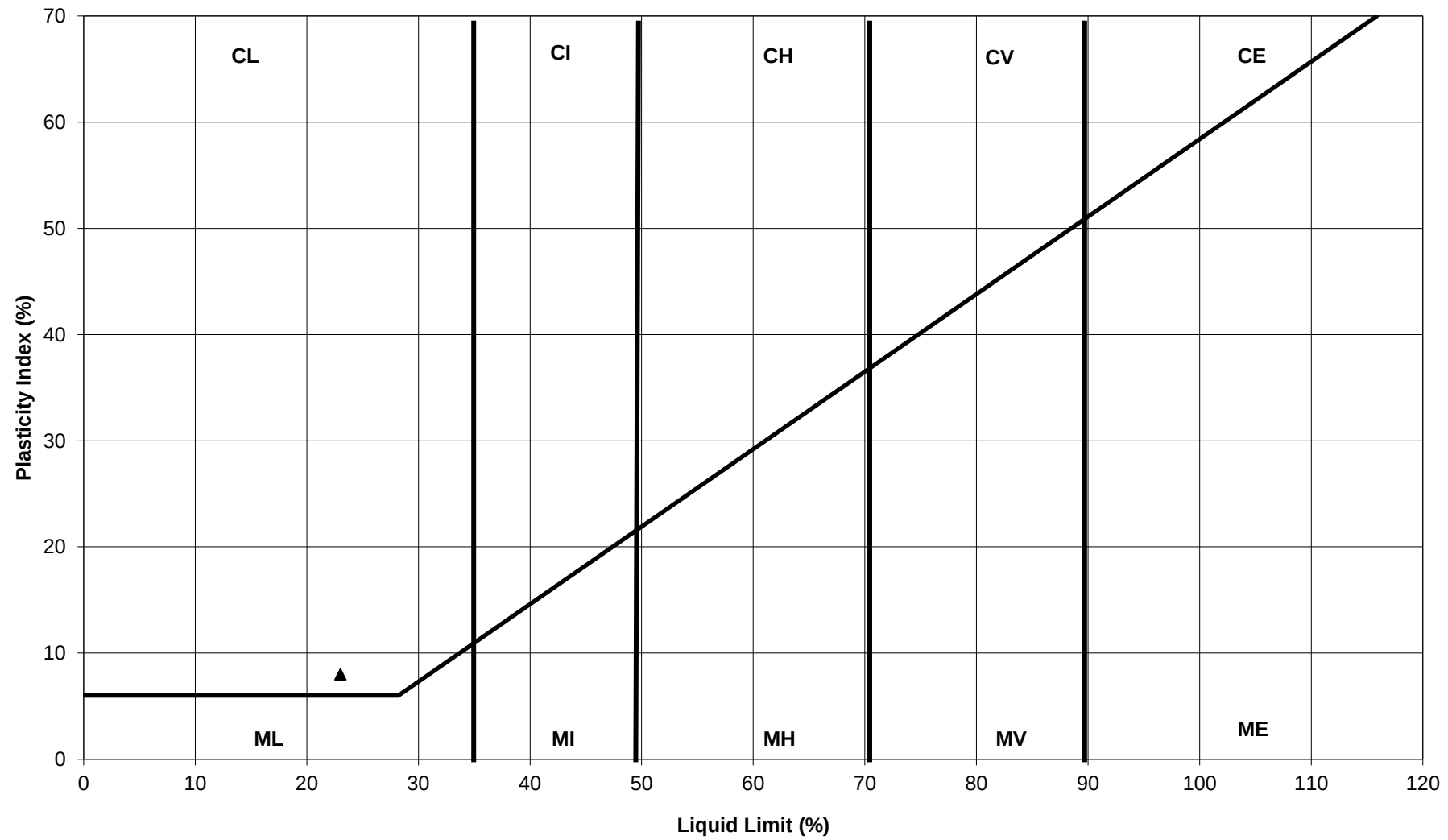
[illegible]

Date - samples received:	20/01/2021		
Date - sample testing commenced :	03/02/2021	Checked / Approved by:	LG
Date - sample testing completed :	04/02/2021	Date Approved:	04/02/2021
Approved Signatories:	L Griffin LG (QA Technical & Lab Mngnr) – K Mazerant KM (Lab Mngnr)		



Unit D, Herald Way, Coventry CV3 2RQ
Tel: 02477087673
Email: coventrylab@conceptconsultants.co.uk

PLASTICITY CHART



CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

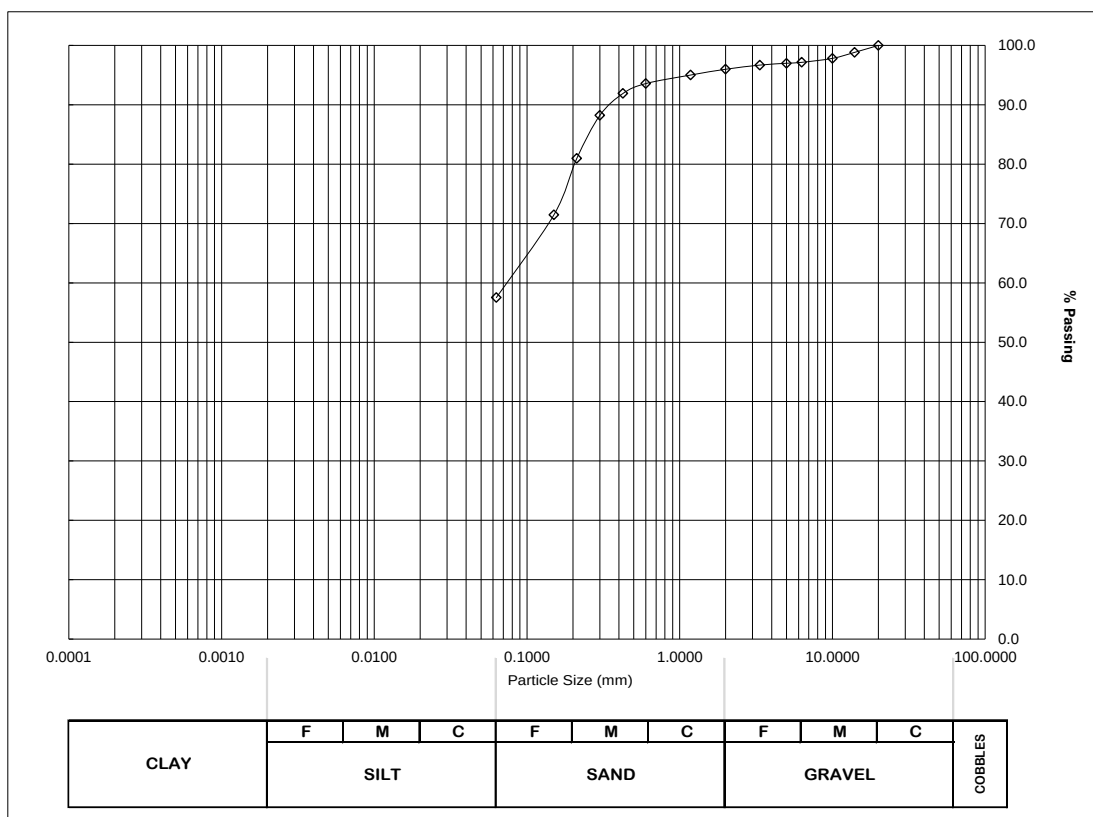
Site Name:	Heol Offa	Job Number:	21/3529
Client:	ALS	Date Reported:	04/02/2021
Borehole No:	WS101	Sample Type/No.	D 8
		Top Depth:	1.40 m
		Bottom Depth:	1.60 m

Soil Description:

Light brown sandy slightly gravelly silty CLAY. Gravel comprises fine to medium flint, and siltstone, sandstone, and coal fragments

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	100
28.000	100
20.000	100
14.000	99
10.000	98
6.300	97
5.000	97
3.350	97
2.000	96
1.180	95
0.600	94
0.425	92
0.300	88
0.212	81
0.150	71
0.063	58

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Wet Sieving
--------------	-------------

BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	4.0
Sand	38.5
Silt and Clay	57.5



4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	20/01/2021	CONCEPT 47-49 Brunel Road, London W3 7XR Tel: 02087401553 Email: lab@conceptconsultants.co.uk
Date - sample testing commenced :	27/01/2021	
Date - sample testing completed :	29/01/2021	
Checked / Approved by: LG Date Approved: 04/02/2021		
Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

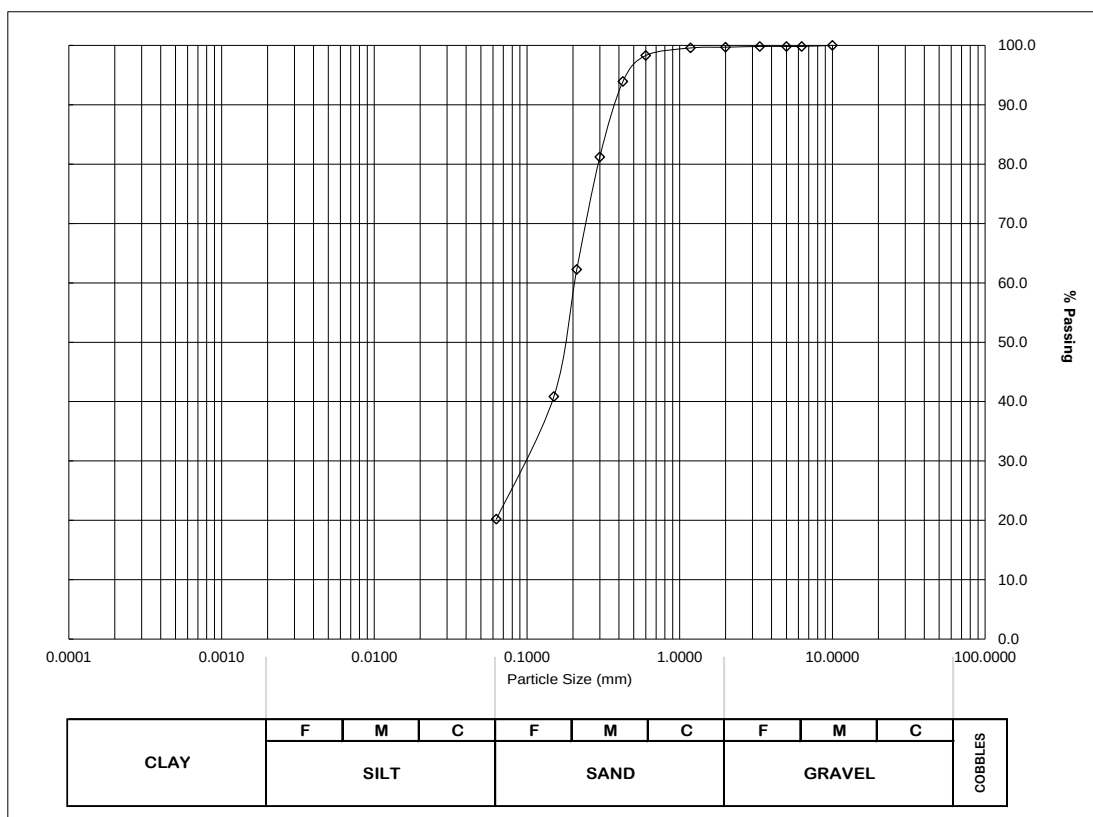
Site Name:	Heol Offa	Job Number:	21/3529
Client:	ALS	Date Reported:	04/02/2021
Borehole No:	WS101	Sample Type/No.	D 9
		Top Depth:	1.80 m
		Bottom Depth:	2.00 m

Soil Description:

Light brown clayey silty SAND

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	100
28.000	100
20.000	100
14.000	100
10.000	100
6.300	100
5.000	100
3.350	100
2.000	100
1.180	100
0.600	98
0.425	94
0.300	81
0.212	62
0.150	41
0.063	20

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Wet Sieving
--------------	-------------

BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	0.3
Sand	79.5
Silt and Clay	20.2



4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	20/01/2021	CONCEPT 47-49 Brunel Road, London W3 7XR Tel: 02087401553 Email: lab@conceptconsultants.co.uk
Date - sample testing commenced :	27/01/2021	
Date - sample testing completed :	29/01/2021	
Checked / Approved by: LG Date Approved: 04/02/2021		
Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		

CONCEPT SITE INVESTIGATIONS

PARTICLE SIZE DISTRIBUTION

TEST REPORT

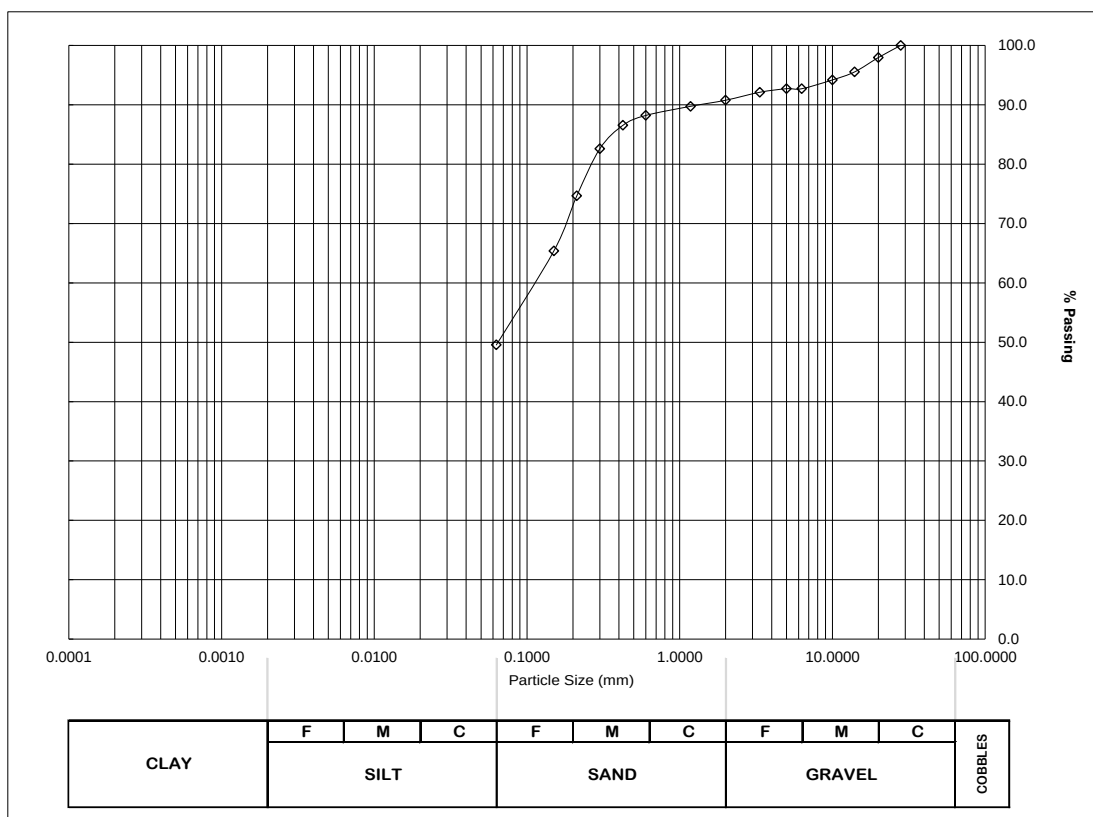
Site Name:	Heol Offa	Job Number:	21/3529
Client:	ALS	Date Reported:	04/02/2021
Borehole No:	WS102	Sample Type/No.	D 10
		Top Depth:	1.25 m
		Bottom Depth:	1.40 m

Soil Description:

Light brown sandy slightly gravelly silty CLAY with rare rootlets. Gravel comprises fine to coarse flint and coal fragments

BS Test Sieves	
Size (mm)	% Passing
75.000	100
63.000	100
50.000	100
37.500	100
28.000	100
20.000	98
14.000	96
10.000	94
6.300	93
5.000	93
3.350	92
2.000	91
1.180	90
0.600	88
0.425	87
0.300	83
0.212	75
0.150	65
0.063	50

Sedimentation (*if applicable)	
Size (mm)	% Passing
0.020	
0.006	
0.002	



Method/type:	Wet Sieving
--------------	-------------

BS 1377: Part 2: Clause 9.2: 1990 Determination of particle size distribution - wet sieving method.

Particle Proportions %	
Cobbles	
Gravel	9.2
Sand	41.2
Silt and Clay	49.6



4503

Remarks:

The results reported relate only to the items tested or sampled.

Date - samples received:	20/01/2021	CONCEPT 47-49 Brunel Road, London W3 7XR Tel: 02087401553 Email: lab@conceptconsultants.co.uk
Date - sample testing commenced :	27/01/2021	
Date - sample testing completed :	29/01/2021	
Checked / Approved by: LG Date Approved: 04/02/2021		
Approved Signatories: L Griffin LG (QA Technical & Lab Mngr) – K Mazerant KM (Lab Mngr)		



CERTIFICATE OF ANALYSIS

SDG:	210114-53	Client Reference:	Heol Offa	Report Number:	585634
Location:	Heol Offa	Order Number:	70079705	Superseded Report:	585021

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

General

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.
Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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Hawarden

Deeside

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WSP UK Limited

8 First Street

Manchester

Lancashire

M15 4RP

Attention: Emily Lyons

CERTIFICATE OF ANALYSIS

Date of report Generation: 24 November 2021
Customer: WSP UK Limited
Sample Delivery Group (SDG): 211111-88
Your Reference: 70079705-Heol Offa_P1 & P2
Location: Heol Offa Wrexham
Report No: 622545
Order Number: 70079705-S11

This report has been revised and directly supersedes 621556 in its entirety.

We received 30 samples on Thursday November 11, 2021 and 30 of these samples were scheduled for analysis which was completed on Wednesday November 24, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88

Report Number: 622545

Superseded Report: 621556

Client Ref.: 70079705-Heol Offa P1 & P2

Location: Heol Offa Wrexham

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25314774	HP01	ES	0.15 - 0.25	09/11/2021
25314805	HP01	ES	0.40 - 0.50	09/11/2021
25314835	HP02	ES	0.20 - 0.30	09/11/2021
25314840	HP02	ES	0.40 - 0.50	09/11/2021
25314845	HP03	ES	0.05 - 0.10	09/11/2021
25314850	HP03	ES	0.20 - 0.30	09/11/2021
25314854	HP04	ES	0.10 - 0.20	09/11/2021
25314859	HP04	ES	0.30 - 0.40	09/11/2021
25314865	HP05	ES	0.10 - 0.20	09/11/2021
25314776	HP05	ES	0.30 - 0.50	09/11/2021
25314780	HP06	ES	0.10 - 0.20	09/11/2021
25314783	HP06	ES	0.30 - 0.40	09/11/2021
25314786	HP07	ES	0.20 - 0.30	09/11/2021
25314788	HP08	ES	0.10 - 0.20	09/11/2021
25314791	HP08	ES	0.30 - 0.40	09/11/2021
25314793	HP09	ES	0.10 - 0.20	09/11/2021
25314796	HP10	ES	0.10 - 0.25	09/11/2021
25314798	HP11	ES	0.10 - 0.25	09/11/2021
25314801	HP12	ES	0.10 - 0.20	09/11/2021
25314811	HP13	ES	0.10 - 0.20	09/11/2021
25314814	HP14	ES	0.10 - 0.20	09/11/2021
25314816	HP15	ES	0.20 - 0.30	09/11/2021
25314819	HP16	ES	0.10 - 0.25	09/11/2021
25314821	HP17	ES	0.10 - 0.20	09/11/2021
25314824	HP18	ES	0.10 - 0.20	09/11/2021
25314826	HP18	ES	0.20 - 0.30	09/11/2021
25314828	HP19	ES	0.10 - 0.20	09/11/2021
25314830	HP19	ES	0.30 - 0.35	09/11/2021
25314833	HP20	ES	0.10 - 0.20	09/11/2021
25314837	HP20	ES	0.40 - 0.50	09/11/2021

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88

Report Number: 622545

Superseded Report: 621556

Client Ref.: 70079705-Heol Offa P1 & P2

Location: Heol Offa Wrexham

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

Asbestos ID in Solid Samples

All

NDPs: 0
 Tests: 30

Asbestos Quantification - Full

All

NDPs: 0
 Tests: 1

25314801	HP12	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314798	HP11	ES	0.10 - 0.25	1kg TUB with Handle (ALE260)	S
25314796	HP10	ES	0.10 - 0.25	1kg TUB with Handle (ALE260)	S
25314793	HP09	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314791	HP08	ES	0.30 - 0.40	1kg TUB with Handle (ALE260)	S
25314788	HP08	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314786	HP07	ES	0.20 - 0.30	1kg TUB with Handle (ALE260)	S
25314783	HP06	ES	0.30 - 0.40	1kg TUB with Handle (ALE260)	S
25314780	HP06	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314776	HP05	ES	0.30 - 0.50	1kg TUB with Handle (ALE260)	S
25314865	HP05	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314859	HP04	ES	0.30 - 0.40	1kg TUB with Handle (ALE260)	S
25314854	HP04	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S
25314850	HP03	ES	0.20 - 0.30	1kg TUB with Handle (ALE260)	S
25314845	HP03	ES	0.05 - 0.10	1kg TUB with Handle (ALE260)	S
25314840	HP02	ES	0.40 - 0.50	1kg TUB with Handle (ALE260)	S
25314835	HP02	ES	0.20 - 0.30	1kg TUB with Handle (ALE260)	S
25314805	HP01	ES	0.40 - 0.50	1kg TUB with Handle (ALE260)	S
25314774	HP01	ES	0.15 - 0.25	1kg TUB with Handle (ALE260)	S

25314837	HP20	ES	0.40 - 0.50	1kg TUB with Handle (ALE260)	S	X		
25314833	HP20	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		
25314830	HP19	ES	0.30 - 0.35	1kg TUB with Handle (ALE260)	S	X		
25314828	HP19	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		
25314826	HP18	ES	0.20 - 0.30	1kg TUB with Handle (ALE260)	S	X		
25314824	HP18	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		
25314821	HP17	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		
25314819	HP16	ES	0.10 - 0.25	1kg TUB with Handle (ALE260)	S	X		
25314816	HP15	ES	0.20 - 0.30	1kg TUB with Handle (ALE260)	S	X		
25314814	HP14	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		
25314811	HP13	ES	0.10 - 0.20	1kg TUB with Handle (ALE260)	S	X		



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88 Report Number: 622545 Superseded Report: 621556
Client Ref.: 70079705-Heol Offa P1 & P2 Location: Heol Offa Wrexham

Asbestos Identification - Solid Samples

Results Legend

ISO17025 accredited.
M mCERIS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*&@ Sample deviation (see appendix)

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP01ES 0.15 - 0.25 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314774 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP01ES 0.40 - 0.50 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314805 TM048	17/11/2021	Emily Anderton	ACM fragment in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP02ES 0.20 - 0.30 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314835 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP02ES 0.40 - 0.50 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314840 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP03ES 0.05 - 0.10 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314845 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP03ES 0.20 - 0.30 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314850 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP04ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314854 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP04ES 0.30 - 0.40 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314859 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88

Report Number: 622545

Superseded Report: 621556

Client Ref.: 70079705-Heol Offa P1 & P2

Location: Heol Offa Wrexham

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP05ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314865 TM048	16/11/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP05ES 0.30 - 0.50 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314776 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP06ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314780 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP06ES 0.30 - 0.40 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314783 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP07ES 0.20 - 0.30 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314786 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP08ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314788 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP08ES 0.30 - 0.40 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314791 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP09ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314793 TM048	17/11/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP10ES 0.10 - 0.25 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314796 TM048	17/11/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88

Report Number: 622545

Superseded Report: 621556

Client Ref.: 70079705-Heol Offa P1 & P2

Location: Heol Offa Wrexham

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP11ES 0.10 - 0.25 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314798 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP12ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314801 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP13ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314811 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP14ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314814 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP15ES 0.20 - 0.30 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314816 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP16ES 0.10 - 0.25 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314819 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP17ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314821 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP18ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314824 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP18ES 0.20 - 0.30 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314826 TM048	17/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

SDG: 211111-88 Report Number: 622545 Superseded Report: 621556
Client Ref.: 70079705-Heol Offa P1 & P2 Location: Heol Offa Wrexham

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP19ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314828 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP19ES 0.30 - 0.35 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314830 TM048	17/11/2021	Emily Anderton	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP20ES 0.10 - 0.20 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314833 TM048	16/11/2021	Agnieszka Chelmowska	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	HP20ES 0.40 - 0.50 SOLID 09/11/2021 00:00:00 11/11/2021 05:00:00 211111-88 25314837 TM048	16/11/2021	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88 Report Number: 622545 Superseded Report: 621556
Client Ref.: 70079705-Heol Offa P1 & P2 Location: Heol Offa Wrexham

Asbestos Quantification - Full

Results Legend

ISO17025 accredited.
M mCERIS accredited.
* Subcontracted test.
(F) Trigger breach confirmed
1-5&*\$\$@ Sample deviation (see appendix)

		Additional Asbestos Components	Analysts Comments	Asbestos Quantification - Gravimetric - %	Asbestos Quantification - PCOM	Asbestos Quantification - Total - %
Cust. Sample Ref.	HP01ES	None (#)	N/A	0.0048 (#)	<0.001 (#)	0.0048 (#)
Depth (m)	0.40 - 0.50					
Sample Type	SOLID					
Date Sampled	09/11/2021 00:00:00					
Date Received	11/11/2021 05:00:00					
SDG	211111-88					
Original Sample	25314805					
Method Number	TM304					



CERTIFICATE OF ANALYSIS

Validated

SDG: 211111-88 **Report Number:** 622545 **Superseded Report:** 621556
Client Ref.: 70079705-Heol Offa P1 & P2 **Location:** Heol Offa Wrexham

Table of Results - Appendix

Method No	Reference	Description
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM304	HSE Contract research Report no 83/1996	Asbestos Quantification in Soil: Fibres identified by morphology only

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

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Test Completion Dates

Lab Sample No(s)	25314774	25314805	25314835	25314840	25314845	25314850	25314854	25314859	25314776	25314865
Customer Sample Ref.	HP01	HP01	HP02	HP02	HP03	HP03	HP04	HP04	HP05	HP05
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.15 - 0.25	0.40 - 0.50	0.20 - 0.30	0.40 - 0.50	0.05 - 0.10	0.20 - 0.30	0.10 - 0.20	0.30 - 0.40	0.30 - 0.50	0.10 - 0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	17-Nov-2021	17-Nov-2021	16-Nov-2021	16-Nov-2021	17-Nov-2021	17-Nov-2021	16-Nov-2021	17-Nov-2021	17-Nov-2021	16-Nov-2021
Asbestos Quantification - Full		24-Nov-2021								

Lab Sample No(s)	25314780	25314783	25314786	25314788	25314791	25314793	25314796	25314798	25314801	25314811
Customer Sample Ref.	HP06	HP06	HP07	HP08	HP08	HP09	HP10	HP11	HP12	HP13
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.10 - 0.20	0.30 - 0.40	0.20 - 0.30	0.10 - 0.20	0.30 - 0.40	0.10 - 0.20	0.10 - 0.25	0.10 - 0.25	0.10 - 0.20	0.10 - 0.20
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	16-Nov-2021	17-Nov-2021	16-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021

Lab Sample No(s)	25314814	25314816	25314819	25314821	25314824	25314826	25314828	25314830	25314833	25314837
Customer Sample Ref.	HP14	HP15	HP16	HP17	HP18	HP18	HP19	HP19	HP20	HP20
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth	0.10 - 0.20	0.20 - 0.30	0.10 - 0.25	0.10 - 0.20	0.10 - 0.20	0.20 - 0.30	0.10 - 0.20	0.30 - 0.35	0.10 - 0.20	0.40 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	17-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	16-Nov-2021	17-Nov-2021	17-Nov-2021	17-Nov-2021	16-Nov-2021	16-Nov-2021



CERTIFICATE OF ANALYSIS

SDG:	211111-88	Client Reference:	70079705-Heol Offa_P1	Report Number:	622545
Location:	Heol Offa Wrexham	Order Number:	70079705-S11	Superseded Report:	621556

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix F

Soil Suitability Criteria



Suitability for Re-Use Criteria	GAC Residential with Plant Uptake (1% SOM)
Analysis	
Asbestos	
Asbestos Quantification - Gravimetric - %	None Detect
Metals - (Solids)	
Arsenic	32
Cadmium	12
Chromium	1590
Copper	2490
Lead	134
Mercury	39
Nickel	126
Selenium	258
Zinc	3860
TPH Criteria Working Group (TPH CWG)	
GRO Surrogate % recovery**	-
Aliphatics >C5-C6	42
Aliphatics >C6-C8	103
Aliphatics >C8-C10	27
Aliphatics >C10-C12	132
Aliphatics >C12-C16	1030
Aliphatics >C16-C21	52800
Aliphatics >C16-C35	52800
Aliphatics >C21-C35	52800
Aliphatics >C35-C44	-
Total Aliphatics >C10-C44	-
Total Aliphatics & Aromatics >C10-C44	-
Aromatics >EC5-EC7	72
Aromatics >EC7-EC8	130
Aromatics >EC8-EC10	34
Aromatics > EC10-EC12	74
Aromatics > EC12-EC16	141
Aromatics > EC16-EC21	248
Aromatics > EC16-EC35	248
Aromatics > EC21-EC35	872
Aromatics >EC35-EC44	-
Aromatics > EC40-EC44	-
Total Aromatics > EC10-EC44	-
Total Aliphatics & Aromatics >C5-C44	-
Polyaromatic Hydrocarbons (PAHs)	
Naphthalene-d8 % recovery**	-
Acenaphthene-d10 % recovery**	-
Phenanthrene-d10 % recovery**	-
Chrysene-d12 % recovery**	-
Perylene-d12 % recovery**	-
Naphthalene	2.3
Acenaphthylene	-
Acenaphthene	-
Fluorene	-
Phenanthrene	-
Anthracene	-
Fluoranthene	-
Pyrene	-
Benz(a)anthracene	-
Chrysene	-
Benzo(b)fluoranthene	-
Benzo(k)fluoranthene	-
Benzo(a)pyrene	1.6
Indeno(1,2,3-cd)pyrene	-
Dibenzo(a,h)anthracene	-
Benzo(g,h,i)perylene	-
PAH, Total Detected USEPA 16	-
Volatile Organic Compounds (VOCs)	
Methyl Tertiary Butyl Ether	62
Benzene	0.089
Toluene	131
Ethylbenzene	47
p/m-Xylene	57
o-Xylene	57
Tert-amyl methyl ether	-

*Soil Re-Use Criteria in mg/kg