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Preliminary Ground Investigation Interpretive Report

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Final Factual Report

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Preliminary Ground Investigation Interpretive Report (Arup)

The following report was commissioned by The University of Manchester and undertaken by Ove Arup and Partners Ltd (Arup), to assist in assessing the feasibility of redeveloping part of their university campus, formerly North Campus, now called ID Manchester.

The intrusive fieldwork was undertaken by AEG and is presented in the *Final Factual Report* at the rear of the document.

Prior to undertaking this Preliminary Ground Investigations Study, Arup carried out a desk-based review of the ground conditions and site history (this report is also available via the data room, titled *Ground Conditions Desk Study*) which identified a number of possible below ground constraints which have the potential to impact future redevelopment of the site. In particular the following were identified as warranting further investigation to help quantify the level of risk:

- Potential for unexploded ordnance (UXO);
- Presence of buried obstructions;
- Former channel of the River Medlock with potential for voids and soft ground;
- Shallow rockhead;
- Tunnels (specifically the BT tunnel);
- Potential contamination associated with past industry (specifically chemical and oil works with a higher contamination potential); and
- Retaining structures

This Preliminary Ground Investigations Interpretive Report was designed to target specific features (as above) to provide data to better quantify the level of risk to the expected activities associated with redevelopment on the site.

Final Factual Report (AEG)

The Final Factual Report is provided at the rear of this document and details the intrusive fieldwork undertaken by Allied Exploration and Geotechnics (AEG), designed and supervised by Arup. The investigation targeted specific below ground features across the Site and comprised:

- Seventeen boreholes;
- Three trial pits;
- Four horizontal cores;
- Thirteen monitoring installations;
- Geoenvironmental and geotechnical testing; and
- Gas and groundwater monitoring.

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The University of Manchester

ID Manchester

Preliminary Ground Investigation Interpretive Report

UNMC-ARUP-ZZ-XX-RP-CG-0004

Issue 2 | 16 April 2020

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 265190-00

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Job title		ID Manchester			**Job number** 265190-00
Document title		Preliminary Ground Investigation Interpretive Report			**File reference** 04-05-11
Document ref		UNMC-ARUP-ZZ-XX-RP-CG-0004			
Revision	**Date**	**Filename**	Preliminary GI Report Draft Issue.docx		
Issue 1	29 Jan 2020	**Description**	Interim Issue: Monitoring works are ongoing and the relevant sections are to be updated in a subsequent revision		
			Prepared by	Checked by	Approved by
		Name	Jordan Weddepohl	Mark Griffiths / Lee Jordan / Jenny Lightfoot	Jane Collins
		Signature	[redacted]	[redacted]	
Issue 2	16 April 2020	**Filename**	Preliminary GI Report Issue 2.docx		
		Description	Final issue of Preliminary GI Report including completed groundwater and gas monitoring data		
			Prepared by	Checked by	Approved by
		Name	Jordan Weddepohl	Mark Griffiths / Lee Jordan / Jenny Lightfoot	Michael Wilton
		Signature	[redacted]		
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document verification with document ✓

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Preliminary Ground Investigation Rationale

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Executive Summary

The ID Manchester site is part of the University of Manchester's estate. The site occupies around 11.8ha and is located in the centre of Manchester, southwest of Manchester Piccadilly rail station. The site had an industrial past prior to being cleared and redeveloped into the University campus which began in the 1960s.

Arup undertook a desk-based review of the ground conditions and site history which identified a number of possible below ground constraints which have the potential to impact future redevelopment of the site. In particular the following were identified as some of the potentially higher risk items compared to others and warranted further investigation to help quantify the level of risk:

- Potential for unexploded ordnance (UXO);
- Presence of buried obstructions;
- Former channel of the River Medlock with potential for voids and soft ground;
- Shallow rockhead;
- Tunnels (specifically the BT tunnel);
- Potential contamination associated with past industry (specifically chemical and oil works with a higher contamination potential); and
- Retaining structures.

Supplemental surveys and investigations were recommended to better define the risk posed by some of these below ground constraints. This included UXO risk assessment, a preliminary intrusive ground investigation (Preliminary GI), and additional desk study incorporating past ground investigation data provided by the University.

The table below provides a summary of the below ground constraints investigated as part of this study and the revised assessment of the hazard based on the findings of the additional assessments.

The Preliminary GI was designed to target specific features (see above) to provide data to better quantify the level of risk to the expected activities associated with redevelopment on the site. The investigation was constrained by the presence of existing operational buildings. In addition, the exact form of the development and building positions isn't defined at this stage. Given these points, further ground investigation will be needed in the future to provide an appropriate level of detail for earthworks design, foundation design, environmental risk assessment and discharge of associated ground related planning conditions. Given the site is heavily constrained by existing buildings and infrastructure it is probable that further ground investigation will need to be undertaken in phases as and when parcels of land become available for development.

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Hazard/ constraint	Description of hazard/ constraint	Development or construction activity	Assessment of hazard
UXO	A more detailed UXO risk assessment has concluded that some areas of the site are low risk with the central and southern areas only considered to be a moderate risk.	Piling or ground investigation	Zetica has recommended UXB detection in boreholes/ piles in moderate risk areas
		Earthworks/ excavations	Zetica has recommended UXO awareness briefings for shallow excavations in moderate risk areas
Buried obstructions	Former structures associated with past development and boulder sized obstructions of concrete and former brick structures may cause problems with activities such as piling, earthworks and temporary works. The ground investigation encountered concrete obstructions, intact brick walls as well as large brick and concrete within made ground.	Piling or ground investigation	Buried obstructions may restrict certain piling methods, such as driven or CFA piles, without prior removal of these obstructions.
		Earthworks/ excavations	Excavations may become unstable if ripping out large slabs and brick walls and may result in delays in earthworks whilst features are broken out, particularly if these obstructions extend below parts of the site that will remain operational. These brick and concrete structures are likely to form a suitable engineering material following their removal and processing.
Former channel of the River Medlock	The depth, composition of fill and presence of associated structures was previously unknown. The Preliminary GI found that the base of the River Medlock extends to the infill material and is compositionally similar to surrounding made ground, and no voids were encountered. The base of the river was found to be between 6.3 to 8.9mbgl (25.3 to 27.8mOD). No bridge structures over the former river were encountered.	Earthworks/ excavations	The material within the former channel of the River Medlock is likely to be suitable for use as an engineering fill but will require selection/processing and controlled backfilling. Buried structures associated with the former River Medlock may cause problems with earthworks - see buried obstructions above
		External works	Ground improvement is unlikely to be required for external areas but will need further validation through future phases of ground investigation.
		Foundations	For foundations to low rise structures it may be practical to undertake earthworks to remove obstructions and produce platforms with a suitable bearing capacity. However, if this is not possible then piling would be required and any risks associated with obstructions would need to be mitigated.
Shallow rockhead	Rockhead is generally shallow and was typically encountered between 5 and 6mbgl (28 to 30mOD).	Piling	At these depths shallow (c. 10m) piled foundations are likely the most suitable foundation solution. Ground improvement (eg using vibro stone columns) could be considered in areas where the obstruction risks and proposed loading are relatively low.

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Hazard/ constraint	Description of hazard/ constraint	Development or construction activity	Assessment of hazard
		Earthworks/ excavations	The uppermost sandstone (to circa 6m below rockhead) is highly weathered and is unlikely to require specialist excavation or blasting equipment to excavate within the uppermost 6m. The sandstone strength increases with depth and further assessment will be needed for deeper excavations.
BT Tunnel	The BT Tunnel is located beneath the site with associated restrictions regarding adjacent construction or over the tunnel. Boreholes positioned near the BT tunnel determined the rockhead ranged between 25.9 and 33.4mOD. The top of tunnel is around 6.5mOD. A single borehole investigating deeper rock found that the sandstone becomes stronger and less weathered with depth.	Masterplan	Future proposals to build over and adjacent to the tunnel will need to take cognisance of the restrictions placed by the owner of this asset (See section 5.6). If build over is required as part of the masterplan, it may be necessary to limit the magnitude of loading to accommodate these requirements or utilise foundations which transfer load below it.
		Piling	Further to the above points, vibration, additional loading, and clearance restrictions which accompany the BT Tunnel may influence which piling techniques are appropriate.
Contamination	The site has an industrial heritage and multiple sources of contamination were identified from historical maps. These include: The Ardwick Bridge Chemical Works and other chemical works; the Medlock Oil Works; other previous industrial activities (wood, iron, soap works, mills, and garages); and the former River Medlock and other infilled associated features.	Earthworks	Soils tested detected only a single, marginal, exceedance of lead (out of 49 lead tests) in borehole DS002. This sample was located within the footprint of the former chemical works). Asbestos was identified in 8 of 51 samples. Based on the findings of this Preliminary GI it is likely that a significant proportion of the site soils will be suitable for re-use with the development below a cover system (ie building slab, or hard and soft landscaping). Further investigation will be required to confirm this conclusion. Planning permission is likely to require a remediation strategy outlining the clean cover proposals and validation strategy as well as careful management of earthworks to minimise cross contamination and a verification report.
		Waste	If there is no opportunity to re-use site soils, or for logistical reasons it is not possible (e.g. limited land for storage), then the soil material will become a waste and will require appropriate transfer to a waste processing facility or disposal at landfill. Based on the findings of this Preliminary GI it is likely that a significant proportion of waste soils would be classified as non-hazardous waste. Further testing is required to determine if the material would be acceptable for disposal at an inert landfill.

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Hazard/ constraint	Description of hazard/ constraint	Development or construction activity	Assessment of hazard
		Groundwater remediation	Groundwater samples were collected from six locations. No extensive or gross contamination of groundwater has been identified. However locally elevated lead and cyanide and several other contaminants were identified. Whilst it is considered that extensive groundwater remediation will not be required to mitigate the risks to controlled waters, further sampling and assessment of the contaminants noted above is recommended to confirm concentrations and inform further risk assessment. Notwithstanding this assessment, it is likely that any piling works would require the completion of a Foundation Works Risk Assessment to satisfy planning conditions.
		Buildings	Across the site, ground gas levels were found to be consistent with CS1. No special precautions or protective measures are required for sites characterised as CS1.
Retaining structures		Earthworks/ excavations	Historical retaining structures may restrict certain piling methods, such as driven or CFA piles, and would require either avoidance of the pile groupings or prior removal. If these materials are removed then they could be crushed/processed to form a high quality engineering fill for reuse. However, the removal of any buried obstructions should be undertaken in a way that mitigates the undermining and destabilisation of adjacent properties and utilities.

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1 Introduction

Ove Arup and Partners Ltd (Arup) has been commissioned by CBRE on behalf of the University of Manchester to provide further assessment of the ground conditions at ID Manchester[1] (the Site). The assessments presented in this report focus on ground conditions identified through desk study and constraints identification which are generally atypical of Manchester brownfield sites. Further detail is presented within the Arup (2019) Geotechnical Desk Study [1] and should be read in conjunction with this report. The following features were identified in the desk study as specifically warranting further early investigation and assessment:

- Buried obstructions;
- Former channel of the River Medlock with potential for voids and soft ground;
- Tunnels (specifically the BT tunnel);
- Shallow rockhead;
- Potential contamination associated with past industry (specifically chemical and oil works with a higher contamination potential);
- Potential for UXO; and
- Old retaining structures.

This report builds upon the desk study work through a combination of additional archive data, desk-based assessments and intrusive investigations at the site. The ground conditions have been re-assessed and the level of risk re-evaluated based on these additional sources of data and information.

It should be noted that the extent of intrusive investigation was relatively limited and was focussed on specific high-risk items identified in the desk study. Supplementary intrusive investigation will be needed on a plot by plot basis once the form of each development and the specific requirements are known.

[1] previously referred to as the North Campus

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2 Additional surveys and data

This section provides a summary of the surveys and data that has been acquired since issue of the Arup Geotechnical Desk Study [1]. The additional data includes a combination of archive data provided by the University of Manchester as well as surveys commissioned in line with recommendations made in the desk study.

2.1 Unexploded Ordnance

Zetica Ltd (Zetica) was commissioned to prepare a UXO desk study and risk assessment for the Site. Zetica concluded that the central and southern parts of the site are classified as moderate risk for UXO [2]. Bomb strikes have been recorded in these areas, and there is a moderate risk for UXO for deep excavations (>1mbgl) and boreholes/piling. The remainder of the site was classified as low risk. The UXO risk zoning is shown in **Figure 2.1**.

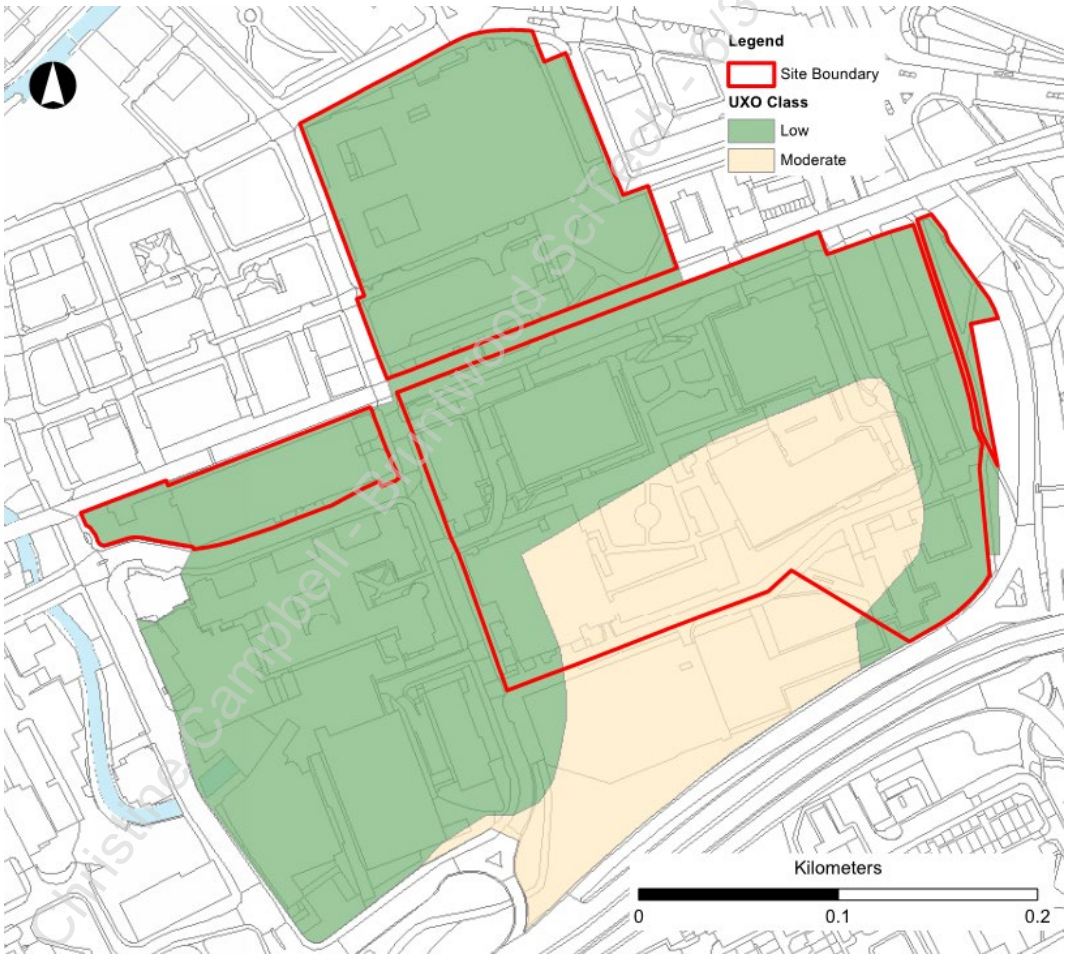


Figure 2.1: Zetica UXO risk map

In moderate risk zones, Zetica recommended UXO awareness briefings for shallow ground works (such as excavations or trial pits) and deep UXB detection during construction of boreholes and piles. In low risk areas, a UXO awareness briefing may be provided however isn't required. Further details are presented in the Zetica report which is included in **Appendix A**.

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2.2 Ecological constraints assessment

An ecological constraints assessment was undertaken by Arup in September 2019 to support the Preliminary GI (see Section 3) for the site. This assessment is presented in **Appendix B**.

The assessment identified some ecologically valued features such as trees and scrub. These features have significance during the breeding bird season (March – August) and an ecologist should be consulted if works are to be carried out during this period. If trees are felled, they should be replaced at a ratio of 2:1. Prior to development a Preliminary Ecological Appraisal (PEA) should be undertaken.

2.3 Ground investigation data

The University of Manchester commissioned a targeted intrusive ground investigation designed specifically to provide data on some of the abnormal ground conditions identified in the Arup Geotechnical Desk Study. This ground investigation has been termed the Preliminary Ground Investigation (Preliminary GI). The Preliminary GI has been supplemented by ground investigation data for nearby University of Manchester sites:

- Geotechnics (2015); and
- Constructive Evaluation (2015).

Details of these investigations are briefly described below, and details of the Preliminary GI are expanded upon in **Section 3**.

A plan showing the investigation hole locations is presented below in **Figure 2.2**, and in **Drawing UNMC-ARUP-ZZ-XX-DR-CG-1001**.

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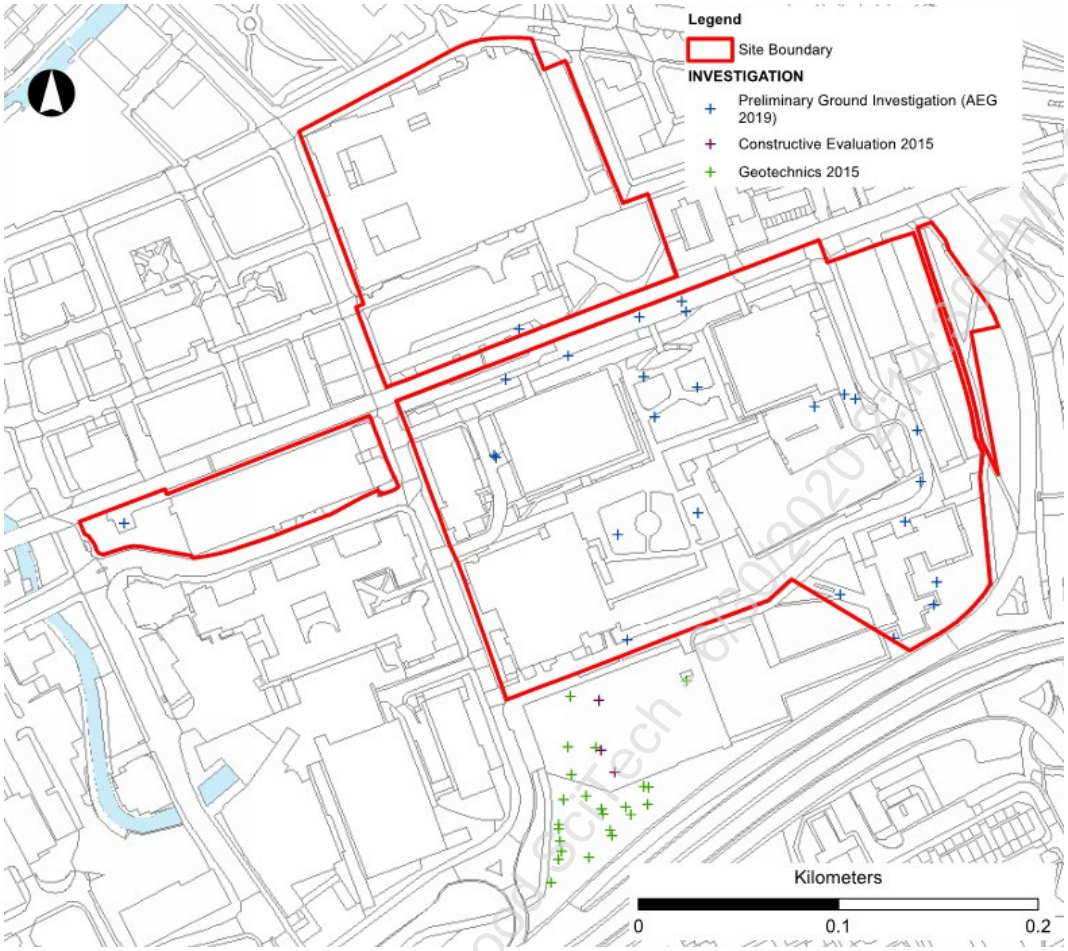


Figure 2.2: Ground investigation locations (**Drawing UNMC-ARUP-ZZ-XX-DR-CG-1001**)

2.3.1 Geotechnics, 2015

Geotechnics undertook a ground investigation between 28th April and 12th May 2015 to the south of the site. The investigation comprised:

- Six cable percussive boreholes to a maximum depth of 20.06 mbgl;
- Three window sample holes to a maximum depth of 6.45 mbgl;
- Fourteen trial pits to a maximum depth of 4.1 mbgl, some of which targeted locating the River Medlock culvert;
- Installation of seven monitoring installations;
- Geotechnical testing:
  - 15 No. Water content determination;
  - 16 No. Liquid and plastic limit determination;
  - 17 No. Wet sieving;
  - 6 No. Sedimentation;
  - 12 No. Sulphate analysis and pH determination;
  - 7 No. Dry density/ moisture content and compaction test (4.5kg hammer);
  - 3 No. California bearing ration measurement;
  - 2 No. one-dimensional consolidation test;

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- 2 No. shear strength measurement – 100mm undrained triaxial compaction test;
- Geoenvironmental testing:
  - Asbestos, metals, PAH, BTEX, VOC, SVOC, TPH;
- Gas and groundwater monitoring.

2.3.2 Constructive Evaluation, 2015

Constructive Evaluation undertook intrusive fieldwork between 17th and 18th March 2015 as part of the ground investigation for the Faraday Building, located to the south-west of the site, adjacent the Sackville Street. The ground investigation was undertaken within the building (prior to demolition) and comprised:

- Three vertical concrete cores to a maximum depth of 1.65mbgl (to establish concrete floor thickness);
- Four horizontal cores to a maximum length of 0.66m (to establish external basement wall thickness);
- Three shallow (<1.7mbgl) window sample holes (to assess ground conditions beneath the basement);
- Geotechnical testing:
  - 1 No. Particle size distribution;
  - 2 No. Moisture content testing; and
  - 2 No. Sulphate and pH determination;
- Geoenvironmental testing:
  - Asbestos, metals, PAH, BTEX, TPH.

2.3.3 ID Manchester Preliminary Ground Investigation, 2019

Allied Exploration and Geotechnics (AEG) undertook a ground investigation designed and supervised by Arup. The investigation targeted specific below ground features across the Site and comprised:

- Seventeen boreholes;
- Three trial pits;
- Four horizontal cores;
- Thirteen monitoring installations;
- Geoenvironmental and geotechnical testing; and
- Gas and groundwater monitoring.

Further details of the investigation can be found in **Section 3**.

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3 Preliminary ground investigation

3.1 Objectives and rationale

Arup recommended a ground investigation with a focus on collecting data for below ground features identified at desk study which were considered to have the biggest potential to impact ground related costs. The Preliminary GI was designed to collect data on:

- the depth to bedrock, in particular near to the BT tunnel which has specific requirements relating to construction over or adjacent to it;
- the infill within the former River Medlock;
- potential for contamination within the plots of the former chemical works;
- the material behind the Altrincham Street retaining wall; and
- infiltration potential in parts of the site not underlain by low permeability glacial till.

Further details can be found in the Preliminary GI rational document provided in **Appendix I**.

3.2 Scope of works

At this early stage in the project the scope of this Preliminary GI is considered appropriate to inform scheme design and provide greater understanding of some of the abnormal ground conditions. The ground conditions in between the investigation points could vary significantly. Additional phases of ground investigation will be required in the future to provide specific data for the design and costing of earthworks, foundations and remediation on a plot/ building specific basis.

3.3 Fieldwork

Intrusive fieldwork was undertaken by Allied Exploration and Geotechnics (AEG) between 26th October 2019 and 1st December 2019 and was predominantly carried out on weekends to minimise disruption to the university. The fieldwork was supervised by an Arup engineer.

3.4 Monitoring

Thirteen monitoring wells were installed in boreholes as part of the ground investigation.

3.4.1 Groundwater sampling

Groundwater samples were collected from six of the monitoring installations between 15th and 17th January 2020. A list of these boreholes is presented in

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Table 3.1. Chemical analysis of these samples is presented in the AEG 2020 factual report [7] and assessment of the data in **Section 6**.

Table 3.1: Summary of groundwater sample locations and strata

Borehole ID	Response zone (mbgl)	Strata
BH001	10 – 15.5	Sandstone
BH004	11 – 14	Sandstone
BH005	18.5 – 21.5	Sandstone
BH007	10.6 – 13.6	Sandstone
BH011	10 – 13	Sandstone
BH013	11 – 16.5	Sandstone

3.4.2 Gas and groundwater levels

Gas and groundwater monitoring included two rounds of groundwater monitoring during/ at the end of the intrusive fieldwork and four post fieldwork monitoring rounds. The dates of these monitoring rounds are presented in **Table 3.2**.

Table 3.2: Summary of monitoring rounds

Monitoring Round Number	Date
1	22/11/2019 (groundwater only)
2	03/12/2019 (groundwater only)
3	15/01/2020 - 17/01/2020
4	06/02/2020
5	20/02/2020
6	06/03/2020

The groundwater level data is presented in **Table 3.3**.

Table 3.3: Summary of groundwater level data

Borehole ID	Base of installation (mbgl)	Groundwater level (mbgl)					
		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
ARP-BH001	15.60	9.47	9.52	9.5	9.73	9.75	9.80
ARP-BH002 (s)	3.10	Wet at tip	Wet at tip	Dry	Dry	Dry	Wet at tip
ARP-BH002 (d)	3.95	Dry	Dry	Dry	Dry	Dry	Wet at tip
ARP-BH004	7.70	5.98	6.01	6.06	6.15	6.20	6.20
ARP-BH004A	4.20	Wet at tip	Wet at tip	Dry	Dry	Wet at tip	Wet at tip

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Borehole ID	Base of installation (mbgl)	Groundwater level (mbgl)					
		Round 1	Round 2	Round 3	Round 4	Round 5	Round 6
ARP-BH005	21.5	N/A	N/A	6.02	5.27	5.30	5.25
ARP-BH007	14.30	6.02	3	6.07	6.27	6.20	6.10
ARP-BH008	6.50	5.32	5.29	Wet at tip	5.51	5.50	5.50
ARP-BH009	1.80	Dry	Dry	Dry	Dry	Dry	Wet at tip
ARP-BH011	13	N/A	5.56	7.4	5.65	5.70	5.60
ARP-BH012A	6.25	5.99	5.98	Wet at tip	5.98	Wet at tip	Wet at tip
ARP-BH013	16.50	5.30	5.33	5.3	5.40	5.40	5.30
ARP-DS001	4	N/A	2.60	Wet at tip	3.17	3.05	3.00
ARP-DS002	10	N/A	5.32	9.7	5.51	5.45	5.40
Notes: N/A – borehole not complete at time of monitoring							

The depth to groundwater ranged from 2.6 to 9.7mbgl, however was typically encountered between 5 and 6mbgl (28 to 30mOD).

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4 Ground conditions

4.1 Ground model

Made ground was encountered in all exploratory holes across the site. Within the centre of the site, the base was typically around 4 to 4.6mbgl. However, deeper areas of made ground were found in the area of the former River Medlock and are inferred to represent infill of the former channel. This material was similar in composition to the other made ground but to a depth of between 6.3 to 8.9mbgl. The made ground was of similar composition to the natural superficial alluvium and glacial till and is likely to include some reworked natural superficial material.

Alluvium was encountered in some exploratory locations in the centre, east, and west of the site. It ranged in composition to a very dense clayey very gravelly sand to a loose medium dense clayey gravelly sand. The top of alluvium strata was found between 1 to 6mbgl and ranged in thickness between 0.2 to 2.7m. The locations where alluvium was encountered coincides with the former River Medlock valley. In several locations within the central areas of the site the alluvium was absent and made ground directly overlies the sandstone bedrock. It is noted that there is some uncertainty relating to the interface between weathered sandstone (see below) and alluvium where the latter is a red/orange sand which has similar properties to weathered sandstone.

Glacial till was encountered in the north of the site (north of the Network Rail viaduct) with a thickness of 4.2 to 7.2m, and in the south of the site with a thickness of 0.2 to 3.2m. Glacial till was absent in the central areas of the site.

The Sherwood Sandstone Group was encountered in all boreholes which fully penetrated superficial deposits with geological rockhead found between 3.1 to 4.6mbgl. Five boreholes (BH001, 04, 07, 11, 13) were rotary drilled 6m into the sandstone bedrock, and BH005 was drilled 18.5m into the bedrock. The upper 0.5 to 3m of the sandstone was recovered as a very dense clayey slightly gravely sand; had no core recovery; and was described as extremely to highly weathered. There is some uncertainty surrounding this rock. It could be interpreted either as an extremely weathered sandstone, or as alluvial deposits of the River Medlock.

Beyond the upper sand layer, the rock was described as a highly weathered weak fine to coarse grained sandstone and had occasional subhorizontal discontinuities and apertures. One borehole, BH005, was drilled to 21.5mbgl to provide data on the deeper sandstone. BH005 identified a weak to medium strong partially weathered sandstone from 14mbgl (19.4mOD), 10.9m below geological rockhead, indicating the weathering profile reduces with depth.

A summary of the ground conditions encountered is provided in **Table 4.1** below.

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Table 4.1: Summary of ground conditions

Stratum	Thickness (range) (m)	Typical thickness	Top of strata (mbgl)	Description and distribution
Made ground (general)	1.5 to 8.9	4 to 4.6	Ground level	Generally described as a clayey, gravelly, sand with clinker, and fragments of pottery, glass and wood. Present across the site, typically to a depth of 4 to 4.6mbgl. However, thicker layers are present associated with the former River Medlock and Altrincham Street retaining wall
Made ground (former Medlock infill)	1.8 to 4.5	2.5 to 4	2.2 to 4.6 (typically 4.6)	Similar composition to the other made ground. Soft to firm brown yellow grey sandy gravelly clay with bands of clayey sandy gravel. Sand and gravel is fine to coarse and includes ash, wood, brick and clinker
Alluvium	0.2 to 2.7	0.5 to 1	1 to 6	Alluvium was found in five locations (BH004, 005, 007, 013, and 014) and generally comprised of dense brown clayey very gravelly sand with subangular to rounded cobbles of sandstone Possible sand deposited by the river
Glacial till	4.2 to 7.2 (in the north) 0.2 to 3.2 (in the south)	5 to 6 (in the north) 0.4 to 1.5 (in the south)	0.5 to 3.8 (in the north) 1.3 to 4 (in the south)	Glacial till was identified in the north of the site to a significant thickness (up to 7.2m thick), and to the south of the site (to 1.5m thick). It was generally described as a stiff to very stiff high strength grey to brown slightly gravelly clay with stone inclusions and occasional sand lenses
Sherwood Sandstone Group	Not proven	Not proven	3.1 to 10.4	Rockhead is generally 3.1 to 4.6mbgl (27.5 to 30mOD) across most of the site. The upper section of the unit (top 6m) is an extremely weak to weak, moderately to highly weathered fine sandstone. The unit likely becomes stronger and more competent with depth and at one location (BH005) the sandstone was found to be a weak to moderately strong, partially weathered, coarse sandstone at 10.9m below rockhead

A summary geological cross section of the anticipated geology is shown in **Figure 4.1**.

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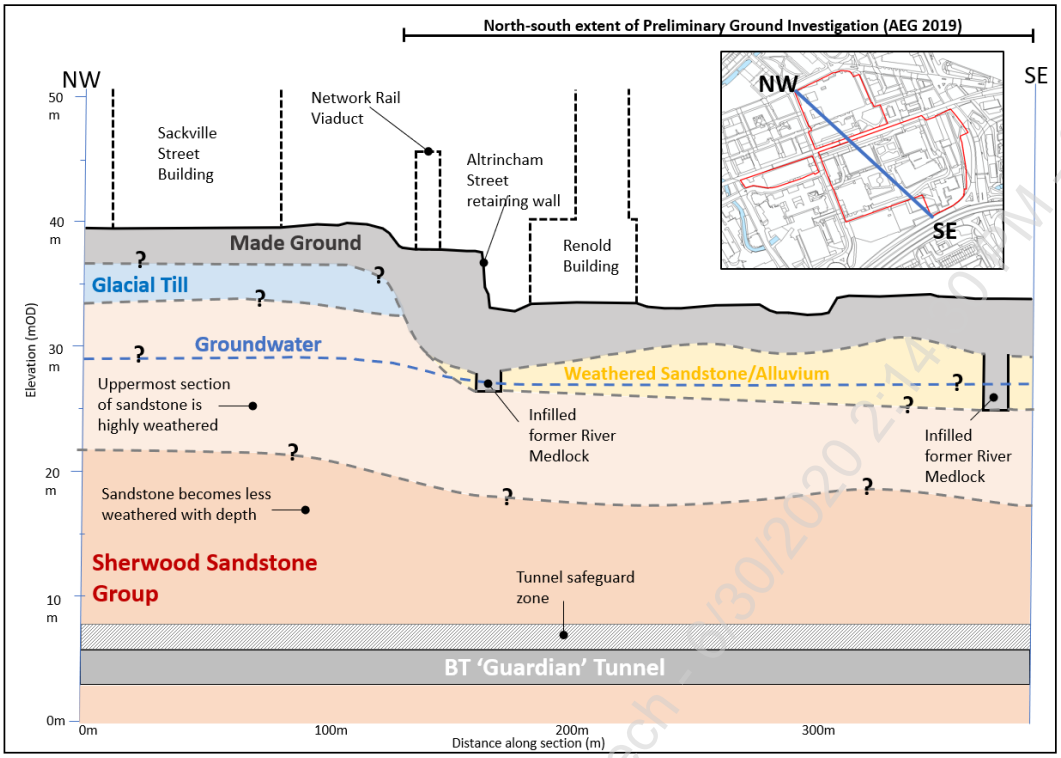


Figure 4.1: Inferred geological cross section NW to SE across the ID Manchester site.

4.2 Made ground

Made ground was encountered in all exploratory holes at the site to a typical depth of 4 to 4.6mbgl (28.6 to 29.6mOD). Locally, at locations BH004, BH007, BH008, DS001, and DS002, made ground was found at deeper depths, between 6.3 to 8.9mbgl (25.3 to 27.8mOD). These boreholes are located on the former River Medlock and the thicker made ground is thought to represent the infilled material of the Medlock. The infill material was found to have a similar composition to the surrounding made ground. BH012A, located north of the Altrincham Street retaining wall, encountered made ground to 10.4mbgl (25.3mOD).

The made ground composition varies but was generally described as a clayey, gravelly, fine to coarse sand. Gravel within the made ground was described as fine to course, subangular to angular and includes sandstone, brick, and limestone. Anthropogenic material within the made ground included fragments of pottery, glass, wood and clinker.

Concrete obstructions were encountered at 1.6mbgl, 1.3mbgl, and 0.7mbgl at BH006, BH006A, and BH006B respectively and are inferred to be linked to a single larger structure. Intact brick structures were encountered in TP002 and DS001 and represent former structures. These obstructions are discussed further in **Section 5.3**.

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4.3 Natural superficial deposits

4.3.1 Alluvium

Material interpreted to represent alluvium was encountered in five locations across the Site between 0.2 and 2.7m thick. At these locations the material was described as a dense brown clayey very gravelly sand with subangular to rounded cobbles of sandstone. It was also occasionally described as a loose medium dense clayey gravelly sand. The material has similarities to weathered sandstone and therefore it is possible that alluvium may have been recorded as weathered sandstone in places.

British Geological Survey (BGS) records indicate alluvium up to 1.2m thick was encountered in historical boreholes within the footprint of the Renold Building.

4.3.2 Glacial till

BGS historical borehole records identified glacial till in the north of the site (north of the Network Rail viaduct). The top of strata was found between 0.5 to 3.8mbgl and ranged in thickness from 4.2 to 7.2m. It was generally described as a very stiff brown silty and sandy clay with grey fissures and stone inclusions with occasional lenses of silt and sand. BH001 and BH012A, which are located near to the Network Rail viaduct did not encounter glacial till.

Glacial till was absent in the centre of the Site in the area indicated to represent the valley of the former River Medlock.

Historic BGS and the 2015 Geotechnics investigation encountered glacial till offsite to the South between 1.3 to 4mbgl and ranged in thickness from 0.4 to 1.5m. It was generally described as a stiff high strength slightly sandy gravelly clay.

4.4 Bedrock

4.4.1 Description

The upper portion of sandstone was found to be highly weathered. In the one borehole (BH005) which was advanced beyond 6m into rockhead, this weathered zone transitioned to a less weathered material from 10.9m below rockhead.

Most boreholes only extended into the upper 6m of the sandstone, within the upper highly weathered section. This rock was described as a very dense red extremely weak to weak and moderately to highly weathered fine-grained sandstone.

BH005 extended 18.4m into the sandstone (21.5mbgl). At 10.9m below geological rockhead the sandstone became a partially weathered weak to medium strong red brown coarse grained sandstone.

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4.4.2 Rockhead

The depth to geological rockhead ranged from 25.1mOD to 33.41mOD (2.4mbgl to 10.4mbgl) and varied as a function of ground elevation. The depths to rockhead identified as part of the 2019 AEG and 2015 Geotechnics investigations closely matched depths presented within the ca. 1960's rockhead contour drawing by CS Allott & Son [6]. Indicative rockhead surface contours have been generated by adapting the Allott & Son rockhead contour plan with more recent ground investigation data. These contour plans are presented in drawings **UNMC-ARUP-ZZ-XX-DR-CG-1002** and **UNMC-ARUP-ZZ-XX-DR-CG-1003**.

The rockhead contours represent the inferred natural variations in geological rockhead. However locally these may be deeper where excavations to form foundations, basements or other structures or where the former River Medlock has incised the bedrock.

4.5 Hydrogeology

4.5.1 General

The superficial glacial till, which can be found to the north and south of the site, is classified as a Secondary Aquifer (Undifferentiated). The superficial alluvium, which can be found in the centre of the site, is classified as a Secondary A aquifer. Secondary Aquifers are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The bedrock geology is classified as a Principal Aquifer. Principal Aquifers are defined as geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.

The culverted River Medlock runs from east to west and is located between 10 and 65m south of the site.

4.5.2 Infiltration

A single soakaway test was attempted between 1.4 to 2.6mbgl (within made ground) in TP001 but it wasn't possible to fill the pit due to the high infiltration rate (i.e. water drained away quicker than it was introduced). The flow rate of 33 litres per minute was noted.

Hydraulic conductivity was calculated by applying particle size distribution data to published empirical formulae. This was completed using the HydroGeoSieve XL tool [16]. Multiple empirical relationships are suitable for undertaking this assessment, and hence the geometric and arithmetic mean for each results of each relationship were calculated. A summary of the findings is presented in **Table 4.2** below.

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Table 4.2: Summary of estimated hydraulic conductivity of made ground laboratory particle size distribution data

Sample	Geometric mean (m/s)	Arithmetic mean (m/s)
TP001, 0.8mbgl	5.08 x10^{-4}	2.68 x10^{-3}
TP001, 1.5mbgl	3.54 x10^{-3}	1.36 x10^{-2}
TP002, 1mbgl	4.95 x10^{-3}	1.83 x10^{-2}
TP002, 2.5mbgl	8.39 x10^{-3}	3.02 x10^{-2}
TP003, 1mbgl	1.71 x10^{-3}	1.28 x10^{-2}
TP003, 3mbgl	1.25 x10^{-4}	5.45 x10^{-4}

As can be seen from **Table 4.2**, the hydraulic conductivity of made ground ranged by two orders of magnitude from 5.45 x10^{-4} to 1.28x10^{-2} m/s. These values are consistent with published values for unconsolidated silty gravelly sand [17], which also matches soil descriptions of the made ground.

4.5.3 Groundwater levels

The depth to groundwater ranged from 2.6 to 9.7mbgl, however was typically encountered between 5 and 6mbgl (28 to 30mOD). Further details of groundwater levels are presented in **Section 3.4**.

4.6 Evidence of contamination

During the Preliminary GI, a photo ionisation detector (PID) was used to identify volatile compounds. Eighty-six measurements were taken from 19 positions (all boreholes and trial pits). The depth of the measurements ranged from 0.2 to 10mbgl, located primarily within the made ground. PID readings ranged from 0 to 0.4ppmV. These results are very low and infer that no volatile compounds are present.

No visual or olfactory evidence of contamination was encountered on site.

4.7 Typical material properties

In situ and laboratory testing of soils and rock has been undertaken as part of the AEG 2019 Preliminary GI and the Geotechnics and Constructive Evaluation 2015 investigations. It is noted that the Preliminary GI targeted areas of the site with potential for abnormal ground conditions and therefore the results presented in the following sections may not be typical of the wider site.

4.7.1 Soil

Geotechnical testing of soils was undertaken as part of the 2019 and 2015 investigations. A summary of in situ and lab test data is provided in **Table 4.3** below. Further details can be found in the factual report [7].

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Table 4.3: Summary of the geotechnical properties of made ground, alluvium, and glacial till

Stratum	SPT	PSD	MC[#]	Atterberg limits
Made ground	81 No. Range: 3 – 50* Highly variable across the site (See **Figure 005** in **Appendix H**)	32 No. Well distributed particle sizes, consistent with soil descriptions (See **Figure 001** in **Appendix H**)	35 No. Range: 8.3 – 29.2% Typical: 17.3% (See **Figure 007** in **Appendix H**)	12 No. Liquid limit: 15 to 47% Plastic limit: 15 to 24% Plasticity index: 0 to 23% Pass 425µm sieve: 27 to 75% (See **Figure 007** in **Appendix H**)
Alluvium	7 No. Range: 10 – 50* (See **Figure 005** in **Appendix H**)	5 No. Well distributed with larger clasts, consistent with descriptions (See **Figure 002** in **Appendix H**)	5 No. Range: 7.5 to 18.6% Typical: 17.6% (See **Figure 007** in **Appendix H**)	No data
Glacial Till	5 No. 6 – 33 Data from the 2015 Geotechnics investigation (south of site) (See **Figure 005** in **Appendix H**)	2 No. High proportion of clays and silts with some sand and gravels. Consistent with descriptions (See **Figure 003** in **Appendix H**)	No data	No data

[#] Moisture content typical value is the median value

* SPT values denoted with 50* represent refusal. Within 50 blows the SPT tool progressed less than 75mm.

4.7.2 Rock

Cores of the sandstone bedrock were collected from six locations (BH001, BH004, BH005, BH007, BH011, and BH013), however, core recovery was generally low due to the high degree of weathering. Total core recovery and rock quality designation generally increased with depth into the sandstone, this is likely to be a function of the reduced wreathing profile (See **Figure 008** and **Figure 009** in **Appendix H**). Furthermore, of the borehole samples that were recovered, all of them were unsuitable for laboratory testing other than point load and moisture content testing. Only one sample, from horizontal core HC004, was suitable and tested for uniaxial compressive strength (UCS). SPT testing was undertaken in situ. The results of geotechnical tests are presented in **Table 4.4** below.

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Table 4.4: Summary of the geotechnical properties of the sandstone bedrock

Stratum	**SPT**	**UCS[#]**	**PL[#]**	**MC[#]**
Sandstone	78 No. Typical: 50* (in 77 of 78 tests) Single N value of 25 at BH011 (See **Figure 006** in **Appendix H**)	No Data. All core samples tested were either found to be unsuitable or fractured prematurely during the test.	131 No. Range: 0 – 2.5MPa Typical: 0.1MPa	17 No. Range: 9.9 to 19.4% Typical: 15%
* SPT values denoted with 50* represent refusal. Within 50 blows the SPT tool progressed less than 75mm. [#] Obtaining cores for geotechnical testing proved challenging due to the highly weathered and non-cohesive nature of the rock. The samples were only suitable for point load and moisture content tests, and unsuitable for UCS tests.				

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5 Geotechnical considerations

5.1 Introduction

This section updates the high-level assessment of the geotechnical constraints and ground-related hazards at the site to reflect the findings of the additional surveys and investigations. The Preliminary GI aimed to provide further details regarding the River Medlock, Ardwick Bridge Chemical works, and BT Tunnel. Additional data has been obtained, however this was supplementary to the scope of this investigation. This section should be read in conjunction with the Geotechnical Desk Study [1], the geotechnical constraints drawing **UMNC-ARUP-ZZ-XX-DR-CG-0002** and constraints tracker **UMNC-ARUP-ZZ-XX-SH-CG-0018 Rev3**.

5.2 UXO

A preliminary UXO assessment identified a moderate UXO risk across the entire site. As part of the Preliminary GI, Zetica were commissioned to prepare a UXO desk study and risk assessment of the site. The Zetica UXO risk report concluded that some areas of the site are low risk with the central and southern areas only considered to be a moderate risk.

Zetica has recommended UXB detection in boreholes/piles, and UXO awareness briefings for shallow excavations in moderate risk areas. (The Zetica Report is included in **Appendix A.**)

5.3 Buried obstructions

There is a high potential for encountering buried obstructions at the site due to the site development history. Obstructions may include former basements, foundations, walls, utilities and made ground containing demolition rubble and large boulder sized obstructions of concrete and former brick structures [1].

These types of obstructions may affect activities such as piling, excavations and earthworks as well as the design and construction of new retaining structures. Refer to the desk study for further detail [1].

Obstructions were encountered in several of the exploratory holes at the site. The obstructions included very strong concrete in BH006, BH006A and BH006B (likely all linked to a larger structure) as well as intact weak brick walls (e.g. TP001). At DS001 the ground was found to contain lots of bricks. It is considered that these types of observations are generally typical of the wider site.

5.4 Voids

The desk study identified several potential sources of voids within the ground ranging from smaller scale voids resulting from uncontrolled backfill of historical features (such as basements, River Medlock and other water bodies) and larger voids due to incomplete backfill such as below old bridge structures. These voids

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may pose a hazard to shallow foundations, and potentially external works, without some form of treatment (such as excavation/replacement or other treatment such as grouting or ground improvement).

The Preliminary GI included five boreholes which targeted the former course of the River Medlock prior to it being infilled. This included a former bridge structure. No evidence of voids was encountered in these or any of the other exploratory location at the site. Whilst it is not possible to discount the possibility of voids the Preliminary GI suggests that voids are unlikely to be a widespread hazard. However, plot specific ground investigation is recommended to further quantify the risk and allow the design of appropriate mitigation if needed.

5.5 Shallow rockhead

Fourteen boreholes from the 2019 investigation and six from the 2015 Geotechnics investigation extended into the sandstone bedrock. The rockhead was identified to be shallow, typically between 3.1 and 4.6mbgl (27.5 to 30mOD) within the centre of the site. However deeper areas are present, such as the Charles Street Car Park where rockhead extended to 9.4mbgl. The implication of this variable rockhead is that a variety of foundation solutions may be required across the site. This is discussed in further detail in **Section 5.9.3** below.

5.6 Tunnels

Two tunnel networks were originally identified within the ID Manchester Site [1]. A telecommunications tunnel running approximately NNW to SSE through the centre of the site (BT Tunnel) and a former network of tunnels associated with an old dye works (UMIST tunnels). However, the site boundary has since been modified such that the UMIST tunnels are no longer within the site.

To reduce the potential for damage to the BT Tunnel a set of safeguard guidelines have been prepared by Halcrow Group Ltd on behalf of BT [6]. These include:

- A minimum clearance of 2m;
- New works and structures cannot cause variation in loading on the tunnel to vary by more than 10%;
- Piling and construction works cannot exceed vibrations of 20mm/sec;
- Tunnel condition surveys are to be carried out before and after the works are carried out;
- Piles proposed within 3m of the tunnel require detailed surveying of pile locations; and those within 2m additionally require continuous monitoring of the tunnel during piling.

The depth of the tunnel has been reviewed since the Geotechnical Desk Study was issued and the top of the tunnel is now understood to be around 6.5mOD, which is deeper than 15mOD initially thought. In addition, the ground investigations have provided greater certainty on the rockhead elevation adjacent to the tunnel as well as data on the rock condition and strength. An updated inferred geological rockhead contour drawing is presented in **Figure 4.1**.

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The depth to rockhead along the alignment of the tunnel ranged from 25.9mOD to 33.4mOD (3.1 to 8.15mbgl), as shown in **Drawing UNMC-ARUP-ZZ-XX-DR-CG-1002** and **UNMC-ARUP-ZZ-XX-DR-CG-1003**.

Much of the site located rockhead between 3 to 7.5mbgl. At this depth it is thought that shallow piles (to ca. 10mbgl) are likely the most suitable piling solution. The BT tunnel is now understood to be around 6.5mOD, which is deeper than previously thought. The additional depth will impact loading calculations for structural design. The sandstone was found to be weak and highly weathered in the upper section and partially weathered at 10.9m depth from the top of rockhead. The weak nature of the rock may impact pile design. Deeper or larger diameter piles may be required due to the weak nature of the rock.

5.7 Retaining walls

Due to the stepped topography of the site there are several retaining walls. Two retaining walls were investigated as part of Preliminary GI. These were the Altrincham Street retaining wall and the retaining wall for the ramp to the basement of the Pariser Building. The material behind the Altrincham Street retaining wall was also investigated.

Three, 2m long, horizontal cores (HC001 to HC003) were drilled in the Altrincham Street retaining wall. All three cores identified a strong orange red brick with moderately strong light grey mortar, well bonded facing brick between 0.19 to 0.33m thick. This became a moderately weak to moderately strong dark to light orange red brick with weak dark grey mortar, poorly bonded to 2m. The full thickness of the wall was not proven. In HC003, a strong grey concrete was also identified between 0.33m and 0.55m. The retaining wall includes a number of arches, used as leased storage areas, which extend beneath Altrincham Street.

BH012A, located above HC003 and approximately 4.7m north of the Altrincham Street retaining wall, encountered made ground from the surface to a depth of 10.4 mbgl. The made ground varied in composition between a loose slightly clayey gravelly sand to a very clayey gravelly sand and included brick fragments.

Therefore, the Altrincham Street retaining wall is quite extensive, measured to be greater than 2m, but less than 4.7m thick.

A further horizontal core, HC004, was drilled in the south of the site in the supporting wall of the Pariser Building basement access ramp. The core extended to 0.46m. The first 0.42m was comprised of an extremely strong light grey concrete with 5mm diameter reinforcing bars at 0.05m-0.1m and 8-10mm diameter reinforcing bars at 0.36m-0.42mm. The reminder of the core from 0.42 to 0.46m was found to be hardcore/ gravel behind the retaining wall.

Further details and core logs can be found in the factual report [7].

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5.8 Infiltration

The permeability of the superficial deposits and bedrock will determine drainage design. A single soakaway test was attempted at TP001 in the centre of the site, however due to the high infiltration rate the test couldn't be completed.

Permeability of the made ground was estimated using Particle Size distribution data. Samples collected from TP001, TP002, and TP003 between 0.8 to 3mbgl was found to range in hydraulic conductivity from 5.45 $x10^{-4}$ to 1.28$x10^{-2}$ m/s. The high estimated hydraulic conductivity of the made ground may impact drainage design and could cause rapid inflows in to any excavations adjacent to perched waters. Further details can be found in **Appendix H**.

5.9 Further geotechnical considerations

Whilst the Preliminary GI was designed specifically to provide data on the issues described above, the data collected has provided some additional data on other possible hazards and features identified at the site. These are summarised below.

5.9.1 Soft ground

Potential for soft ground within made ground and alluvium was identified in the Geotechnical Desk Study [1]. The made ground was found to vary in strength/density, with a range of SPT 'N' values from 3 to 50 (refusal). The average made ground was medium dense. Glacial till was found to be very stiff and firm, and therefore does not represent soft ground. Some alluvium was encountered. It was occasionally found to be loose, however it generally comprised a dense clayey gravelly sand. SPT 'N' values ranged from 10 to 50 (refusal)

While few areas of the site were found to be contain soft ground, it may still be present. Due to the low density of GI coverage and the targeted nature of the Preliminary GI, alluvium, which is thought to pose the greatest risk of soft ground, may be under represented in the available GI across the site.

5.9.2 Groundwater

Groundwater levels were found to range from 2.6 to 9.7mbgl but was typically found between 5 and 6mbgl (28 to 30mOD). The depth of groundwater will have implications for earthworks such as the requirement for pumping in deeper excavations or casing piles. Shallow groundwater will also increase the contaminative risk to aquifers. No perched water was encountered, however may still be present due to the limited scale of this investigation.

The depth to groundwater (generally 28 to 30mOD) is comparable to rockhead (28.7 to 30.3mOD across much of the site). Earthworks are likely to extend into the bedrock and therefore some dewatering is likely to be required. Where deeper excavations are required, where rockhead is deeper (such as the west of the site), dewatering is very likely to be required.

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5.9.3 Foundations

It is assumed that where rockhead is <3mbgl shallow footings will be suitable. Where the depth to rockhead is greater, piled foundation solutions are likely to be required with pile lengths assumed to be 3-5m below the top of geological rockhead. This is around 10 to 15mbgl.

Where new basements are proposed and the rock depths are relatively shallow, a combination of piled basement retaining walls (to carry vertical loads from the perimeter of the structure), and pads onto rock for the internal columns/cores could be considered.

An indicative rockhead and foundation plan has been produced from historical rockhead contour data and 2019 Preliminary GI data (**Drawing UNMC-ARUP-ZZ-XX-DR-CG-1005**). This plan shows that the centre of the site generally has rockhead at 3 to 7.5mbgl. Some areas with shallow rockhead (<3mbgl) are present in the centre/south of the site; and some areas of deeper rockhead (>7.5mbgl) are present in the east and west of the site.

5.9.4 Earthworks

The proposed development levels for the site are yet to be determined. However, adjacent developments and highways will limit significant changes in level at the site boundaries. It is currently assumed that the target for earthworks cut to fill balance will be zero, however this needs to be verified as the masterplan develops. Materials used in earthworks will need to be verified as suitable from both a geotechnical and geoenvironmental perspective; this includes both site won and imported soils.

The ground investigation identified that the upper (6m) of the sandstone unit is weak to very weak and extremely to highly weathered. The excavatability of a rock can be estimated based on point load and fracture index data. Within the sandstone cores tested, points load test results ranged from 0 to 0.3MPa, while average discontinuity spacing per core ranged from 0.07 to 0.36m This suggests that easy digging or hard digging excavation will be encountered across most of the site, and there is a small likelihood that 'easy ripping' type excavation might be required. From experience within the region there is a possibility that localised more strongly cemented sandstone is present requiring higher excavation effort than currently identified in the GI. A plot of excavatability is presented in **Appendix H**.

5.9.5 Medlock culvert

The River Medlock is now culverted, and the culvert is located to the south of the site. The exact position is not known however plans showing approximate location were obtained and included in the desk study [1]. The 2015 Geotechnics investigation included fourteen trail pits to locate the culvert. Seven intersected the culvert at a depth of between 1.9 to 3.55mbgl (32 to 33.6mOD).

A drawing showing the reported position of the culvert and the depth to the top of culvert is presented in **Drawing UNMC-ARUP-ZZ-XX-DR-CG-1004**.

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6 Contamination and surplus soil

6.1 Approach

This section presents an initial assessment of contamination and waste classification which is considered appropriate at this early stage of this project and the targeted nature of the Preliminary GI. The assessment is indicative and for use in providing qualitative judgements regarding remediation scope and waste disposal options. Additional assessment will be required once further design has been done in relation to building locations, building use, landscaping proposals and earthworks and foundation design.

6.2 Conceptual model

Arup has prepared a conceptual model following the guidance outlined in the Environment Agency's Contaminated Land: Risk Management framework [4]. The conceptual model is based on the masterplan presented in the Geotechnical Desk Study[1].

6.2.1 Possible sources of contamination

Possible sources of contamination have been identified at the site and are primarily associated with the former industrial land use. Historically the regulations regarding environmental protection measures (such as waste management and containment measures for spills and leaks) were much less stringent and therefore the older activities on site (especially those undertaken prior to the campus development) have a greater likelihood to have impacted soil and water quality.

The locations of these historical land use which are considered to have potential to act as a contaminant sources are shown in **UMNC-ARUP-ZZ-XX-DR-CG-0001**.

Made ground, where present, can contain a wide variety of potential contaminants depending on the source of the material (which is often unknown). Common contaminants in made ground can include heavy metals, asbestos and PAHs (particularly associated with ash and clinker fragments). Degradation of organic materials within made ground may also generate ground gases.

The former land uses with the highest potential to have caused extensive contamination are the Ardwick Bridge Chemical Works, in the southeast of the site, and the Medlock Oil Works, in the west of the site.

Historical land use immediately adjacent the site was primarily terraced housing. Minor industrial works were located north and west of the site, however due their size the influence of off-site contamination is likely to be minimal.

The Department of Environment (DoE) Industry Profiles [8] were used to identify potential contaminants associated with historical land uses. The potential sources of contamination are summarised below.

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Table 6.1: Potential sources of contamination

Potential Source	Potentially Contaminative Materials	Comments
Ardwick Bridge Chemical Works[1] and other chemical works	Metals, metalloids and their compounds Inorganic compounds Organic compounds Acids/bases Fuel oils Asbestos Dyes	Contamination likely associated with spills and leaks.
Medlock Oil Works[2]	Metals, metalloids and their compounds Inorganic compounds Hydrocarbons Other organic compounds Asbestos	Contamination likely associated with spills, leaks and fuelling/filling of tanks
Other previous industrial activities[3,4,5,6,7]	Heavy metals Hydrocarbons Lubricating oils Polycyclic Aromatic Hydrocarbons (PAH) Chlorinated solvents and non-chlorinated solvents Acids/bases Asbestos	Works include: wood works, garages, iron works, mills and soap works.
Former River Medlock and other infilled associated features	Asbestos Heavy metals Sulphate Acid/bases Inorganics Hydrocarbons	Possible infill with soils which pose a risk to human health and the environment, may also be a source of ground gas
DoE Industrial Profile document titles: [1] Textile works and dye works [2] Oil refineries and bulk storage of crude oil and petroleum products [3] Timber treatment works [4] Timber manufacturing works [5] Road vehicle fuelling, service and repair – garages and filling stations [6] Chemical works – soap detergent manufacturing works [7] Metal manufacturing, refining and finishing works – iron and steel works		

6.2.2 Receptors

The following receptors have been identified at the Site:

Construction phase:

- Ground workers;
- Users of nearby site;
- River Medlock (culvert); and

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- Sherwood Sandstone Principal Aquifer;

Post construction phase:

- Future site users;
- Future ground workers;
- River Medlock (culvert);
- Sherwood Sandstone Principal Aquifer;
- Buried structures in contact with chemically aggressive ground; and
- Buried water supply pipe.

6.2.3 Pathways

The following pathways may link sources of contamination to receptors at the Site during construction:

- Inhalation of soil dust;
- Inhalation of vapours;
- Ingestion of soil and soil dust;
- Dermal contact with soils and groundwater.

The following pathways may link sources of contamination to receptors at the Site during post-construction:

- Inhalation of soil dust;
- Inhalation of vapours;
- Ingestion of soil and soil dust;
- Dermal contact with soils and groundwater;
- Direct contact and lateral flow of groundwater;
- Ingress and accumulation of gases in confined spaces

6.2.4 Conceptual model

A summary of the initial conceptual site model for the construction phase and post construction of the site is presented in **Table 6.2** and Table 6.3 respectively.

Table 6.2: Conceptual model for the construction phase

Source		Pathway		Receptor
Demolition of existing building (with possible asbestos containing materials (ACM))	→	Inhalation of dust	→	Construction worker
			→	User of nearby site
Stockpiles of made ground (asbestos, metals, PAH, VOC, SVOC, hydrocarbons)	→	Inhalation of soil and soil dust	→	Construction work
			→	User of nearby site
		Dermal contact	→	Construction worker
		Ingestion	→	
		Inhalation of vapours	→	

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Source		Pathway		Receptor
		Leaching and runoff	→	River Medlock
		Leaching of soils	→	Sherwood Sandstone Principal Aquifer
Impacted shallow groundwater	→	Inhalation of vapours (in confined spaces)	→	Construction worker
		Dermal contact	→	
		Ingestion	→	

Table 6.3: Conceptual model post-construction

Source		Pathway		Receptor	Plausible Pollutant Linkage
Made ground (asbestos, metals, PAH, VOC, SVOC, hydrocarbons)	→	Direct contact, ingestion of soil/ soil dust, inhalation of soil/ soil dust	→	Future ground worker	PPL1
				Future site user	PPL2
		Inhalation of vapours	→	Future ground worker	PPL3
			→	Future site user	PPL4
		Leaching and infiltration through the unsaturated zone	→	Sherwood Sandstone Principal Aquifer	PPL5
		Leaching within the saturated zone	→	Sherwood Sandstone Principal Aquifer	PPL6
Impacted shallow groundwater	→	Lateral flow	→	River Medlock	PPL7
		Inhalation of vapours	→	Future site user	PPL8
Ground gases	→	Ingress and accumulation of gases in confined spaces to explosive/asphyxiating/ toxic concentrations	→	Future ground worker	PPL9
			→	Future site user	PPL10
Made ground/ impacted shallow groundwater	→	Direct contact and infiltration through cracks/ joints	→	Potable water supply pipes	PPL11
	→	Direct contact	→	Buried concrete	PPL12

6.3 Generic risk assessment of the data

6.3.1 Construction phase

Although the conceptual model for the construction phase had identified possible risks (**Table 6.2**), these temporary acute risks are not covered by the risk assessment presented in this section. Most of these acute risks will be controlled

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by good practice implemented through a Construction Environmental Management Plan.

6.3.2 Operational Phase

6.3.2.1 Human health

The human health risk assessment has been undertaken to assess the following pollutant linkages:

- PPL1 - exposure of future ground worker/ maintenance worker to soil via dermal contact, ingestion of soil/soil dust/inhalation of soil/soil dust
- PPL2 - exposure of future site users (in soft landscape area) to soil via dermal contact, ingestion of soil/soil dust/inhalation of soil/soil dust
- PPL3 - exposure of future ground workers via inhalation of vapours
- PPL4 - exposure of future site user via inhalation of vapours
- PPL8 - exposure of future users via inhalation of shallow groundwater vapours
- PPL9 - exposure of future ground worker to ground gases in confined spaces
- PPL10 - exposure of future site user to ground gases in confined spaces

6.3.2.2 Human health generic quantitative risk assessment (GQRA)

To simplify the assessment of ground contamination risks, the UK Statutory Guidance [10] endorses the use of generic quality guideline values for initial screening of contamination testing results. These generic assessment criteria (GAC) are based on conservative assumptions about exposure regarding intake and effect levels. Arup has developed GAC for various land use scenarios which cover a broad range of development scenarios. Further details on the development and justification of the Arup GAC can be provided upon request.

Contaminants which are below these scientific and appropriate guideline values, do not require further assessment if it is planned to retain these soils on the site.

A finalised masterplan for the proposed development has not been provided, however will likely comprise new commercial buildings and residential flats. Underlying assumptions for commercial GACs include human exposure to soil/water/gas contaminants during outdoor lunches. It is assumed that future residents of the proposed flats would have a similar exposure to this. This assumption is based on limited exposure to soils (with no gardens) and elevated positions (in high-rise apartments). Therefore, the primary pathways linking residents in apartments are via inhalation of soil dust/vapour pathways with minor contributions from exposure to soft landscaping areas. The use of commercial GACs is therefore appropriate for this assessment as the use of residential GACs would be too conservative and not representative of contaminant exposure pathways at the finished development. However, if the masterplan changes then this assumption should be re-evaluated.

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Soil organic matter (SOM) concentrations within soils can influence organic contaminant concentrations. The SOM within made ground was calculated to be 2.63% and was calculated from 51 total organic carbon results. Based on this, the appropriate screening criteria for this assessment is Commercial GAC at 2.5% SOM.

The screening identified a single sample where a contaminant exceeded the human health GAC. The contaminant was lead which was present in shallow soil (0.8mbgl) at a concentration of 2,400mg/kg, compared to the GAC of 2,300. The location of this exceedance, DS002, was within the footprint of the former Ardwick Bridge chemical works.

Asbestos was positively identified in 8 of 51 made ground samples tested for asbestos. Concentrations greater than 0.001% (the laboratory quantification limit) was detected in a sample collected from BH007 at 3.3mbgl, recording a concentration of 0.192wt%.

Full details of the assessment and screening spreadsheet can be found in **Appendix C**.

The Preliminary GI has provided soil chemical data for some of the areas of the site with highest potential for contamination (chemical works, infill of the River Medlock). Based on the data collected it is considered likely that a large proportion of the soils on site would be chemically suitable for use within this predominantly commercial scheme with minimal mitigation. This mitigation is likely to comprise a clean cover system (hard landscaping and validated clean soils in soft landscaping areas) to minimise exposure to soil contaminants such as asbestos. However, this conclusion will need to be validated through plot specific ground investigation.

6.4 Controlled waters

Controlled waters generic assessment criteria (CWGAC), suitable for controlled waters receptors comprising both groundwater in a Principal Aquifer (i.e. the Sherwood Sandstone bedrock) and freshwater watercourse (i.e. the River Medlock).

Several inorganic compounds detected above GWGAC are trace metals typical of mineral cements within the local aquifers. The Site data relative to aquifer baseline data is presented in **Table 6.4**. Metal concentrations found to be within baseline ranges are considered naturally occurring and not considered further within this assessment.

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Table 6.4: Summary of background contaminants within bedrock aquifer. Substances exceeding the baseline concentrations highlighted in red.

Contaminant detected in groundwater	Max Conc. in groundwater (µg/l)	Aquifer baseline range (µg/l)[2]	Comment
Arsenic	15	<0.05 to 215.5	Most metal concentrations are within baseline range
Cadmium	0.38	<0.05 to 42	
Chromium	9	<0.5 to 25	
Copper	2.4	<0.5 to 420	
Lead	3,100	<1 to 6.8	
Manganese	2600	0.3 to 6000	
Nickel	8.6	<0.2 to 59	
Selenium	22	<0.5 to 4.7	
Zinc	12.3	3.4 to 177.4	

Groundwater sampled from BH011 had a concentration of lead which exceeded the aquifer baseline values and CWGAC (3,100 µg/l). BH011 is located within the footprint of the former Ardwick Bridge Chemical Works which may be the source of the lead. Elevated concentrations of lead were reported in a sample of made ground at borehole DS001 which is also located within the footprint chemical works which may indicate leaching of these soils.

A single sample of selenium was also found to have a concentration which exceeded background values and CWGAC. The sample was from BH013, which is located in the west of the site, within the footprint of past industry.

Two cyanide samples were found in exceedance of CWGAC. One sample, from BH011, was found at 1,000µg/l, a concentration many times greater than CWGAC. This high concentration may again derive from the former Ardwick Bridge Chemical Works.

Two polycyclic aromatic hydrocarbons (PAH) contaminants were found to exceed CWGAC. PAH are very common in made ground and it is considered that the PAH detected in the groundwater is a result of leaching of made ground. This pathway is feasible as made ground was commonly found to directly overly sandstone, within which the groundwater sample was taken.

Leaching of made ground soils is considered to be the most likely cause of the elevated groundwater concentrations and these soils are likely to be discrete. Leaching will be minimised in the final development below buildings or hard surfacing (with surface water drainage system) which will mitigate the risk to controlled waters. Therefore, delineation of these soil sources and excavation and placement of the soils in appropriate areas of the development is considered appropriate.

[2] EA/BGS, 2003, Baseline Report Series: 8. The Permo-Triassic Sandstones of Manchester and East Cheshire

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Whilst it is considered that extensive groundwater remediation will not be required to mitigate the risks to controlled waters, further sampling and assessment of the contaminants noted above is recommended to confirm concentrations and inform further risk assessment (including Foundation Works Assessment).

A summary of the contaminants which exceeded their CWGAC is presented below in **Table 6.5**. The complete screening spreadsheet is found in **Appendix D**.

Table 6.5: Summary of controlled waters screening assessment

Contaminant Name	CWGAC (µg/l)	Source	No > GAC	Max concentration in groundwater (ug/l)
Metals				
Lead	1.2	EQS	1	3100
Selenium	10	DWS	1	22
Inorganics				
Cyanide	0.001	EQS	2	1000
Ammoniacal nitrogen	0.3	EQS	2	0.53
PAHs				
Naphthalene	2	EQS	1	4.9
Fluoranthene	0.0063	EQS	2	0.1

6.5 Ground gas

The conceptual model has identified risks to site receptors from exposure to ground gas via the following linkages:

- PPL9 - exposure of future ground worker to ground gases in confined spaces
- PPL10 - exposure of future site user to ground gases in confined spaces

Consequently, a ground gas risk assessment has been undertaken (in accordance with CIRIA C665 [18] and BS8485:2015+A1:2019) to estimate the level of risk posed to the future site users and determine the need for remedial action.

The gas monitoring was undertaken under a range of atmospheric pressures and included rising and falling pressure trends. The pressure ranged from 997 to 1031 mbar

The results of this gas monitoring have been assessed using the classification system presented within CIRIA C665. The classification system uses gas concentrations and recorded flow rates for methane and carbon dioxide to determine a gas screening value (GSV). The GSV is calculated by multiplying the maximum recorded flow rate (l/hr) against the maximum recorded gas concentration determining a value reflecting the worst-case scenario. The GSV is used in turn to determine a 'characteristic situation' (CS) for the Site which is used to inform the gas protection requirements.

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Based on the available data, the maximum gas concentrations and GSVs from standpipes located within the made ground are presented in **Table 6.6** below. The monitoring included four rounds over a seven-week period (see **Section 3.4.2**). The complete screening assessment from the recent monitoring rounds is presented in **Appendix E**.

Table 6.6: Summary of calculated maximum gas concentrations and flows from standpipes within the made ground

Borehole (response zone range mbgl)	Maximum Methane (%v/v)	Maximum Carbon Dioxide (%v/v)	Maximum Flow (l/hr)	Max GSV Methane	Max GSV Carbon Dioxide	Assessed gas situation
BH002 (0.5 to 2.5)	<0.1	0.3	0	0	0	CS1
BH002 (3.2 to 4)	<0.1	0.5	0	0	0	CS1
BH004A (1 to 4)	<0.1	1.3	0	0	0	CS1
BH008 (0.3 to 6.5)	<0.1	0.5	0	0	0	CS1
BH009 (0.5 to 1.7)	<0.1	0.1	0	0	0	CS1
BH012A (2 to 6)	<0.1	0.6	0	0	0	CS1
DS001 (2 to 4)	<0.1	0.4	0	0	0	CS1

The site is characterised as CS1.

6.6 Chemically aggressive ground

An assessment has been undertaken to evaluate the chemical environment for concrete in accordance with BRE Special Digest 1 [9] to assess the risks posed by concrete in contact with possibly chemically aggressive ground. The assessment is presented in **Appendix F** and a summary presented in **Table 6.7** below.

Characteristic values were determined from the arithmetic mean of the worst case 20% of pH and sulphate concentrations of soil and rock samples. The arithmetic mean was used, as opposed to using the single worst value, due to sufficiently large sample sets (greater than 10 samples).

At this preliminary stage the assessment has concluded a design sulphate class of DS-2 and an aggressive chemical environment for concrete of AC-1 for concrete placed in contact with made ground. A design sulphate class of DS-1 and an aggressive chemical environment for concrete of AC-1 is required for concrete placed in contact with sandstone.

Whilst the data collected as part of the Preliminary GI provides a good indication of the likely conditions, additional plot specific ground investigation is recommended to support the design of structural concrete.

Table 6.7: Summary of chemical aggressive ground assessment

Geology	No. Samples	Characteristic pH	Characteristic Sulphate	Design Sulphate Class	ACEC Class

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MG	19	7.97	717.5	DS-2	AC-1
SS	11	7.85	114	DS-1	AC-1

The pH from groundwater samples ranged from 4.8 to 7, however typically ranged from 6.7 to 7.

6.7 Surplus soil and waste

6.7.1 Approach

The most sustainable approach to managing surplus soils arising from construction excavation is to reuse suitable soils on site (in accordance with the CL:AIRE Definition of Waste Code of Practice). Where possible it is advisable to amend proposed levels to allow for reuse of surplus soils.

If surplus soil requires offsite disposal then it is likely to meet the legal definition of waste. Under current English waste regulatory requirements, there is a legal requirement to correctly classify material for disposal. For soils arising from brownfield sites soil test results are used to classify the material as hazardous or non-hazardous waste, following the procedure in the EA WM3 document [11]. The online waste classification tool (HazWasteOnline [12]) classifies material in line with WM3. A European Waste Catalogue (EWC) List of Waste code is then assigned, typically 17-05-03 for non-hazardous soils. Subsequently waste acceptance criteria (WAC) testing may be necessary if disposal at a landfill is intended.

This section summarises the results of an indicative screen of the made ground, to determine its waste classification using HazWasteOnline.

As there are currently no details in relation to earthworks and where waste may be generated it was considered inappropriate to undertake WAC analysis at this stage. However, this data could be collected as part of future plot specific ground investigation if it is likely that waste made ground requiring disposal at landfill will be generated as a result of construction.

6.7.2 Waste classification

An indicative waste classification exercise has been undertaken to provide information to assist in the assessment of the management of waste soils at the site.

As part of the investigation, 55 samples of made ground have been tested for a range of inorganic and organic contaminants of potential concern. The HazWasteOnline screening tool has been used to assess the hazardous properties of these materials. The results of the screening are presented in **Appendix G**. None of the samples screened were classified as hazardous.

The HazWasteOnline tool does not consider asbestos containing materials. However, ACM has been detected in 8 of soil samples of the 51 samples tested. As stated in WM3 guidance document, if the waste contains fibres that are free

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and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% or more asbestos. Where the waste contains identifiable pieces of asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% or more.

ACM has been detected in eight soil samples, however only one sample (BH007, 3.3mbgl) exceeded the hazardous waste threshold of 0.1%, recording 0.192wt%.

This assessment has concluded that a low proportion of the made ground soils at the site are likely to be classified as hazardous waste and this has resulted from asbestos above hazardous waste thresholds. Therefore, most of the made ground is likely to be classified as non-hazardous but requires further plot specific investigation to confirm this conclusion. Further analysis to determine whether the non-hazardous waste would be accepted at an inert waste landfill will be required in the future, if waste soils are likely to be generated, i.e. if the material is not planned to be re-used as part of the development.

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7 Conclusions

The University of Manchester commissioned additional investigation and assessments to help better define the risk posed by below ground constraints at the Site. This included:

- UXO risk assessment;
- Ground investigation data from adjacent sites; and
- A preliminary intrusive ground investigation specifically targeting features identified at desk study.

7.1 Summary of assessment findings

7.1.1 UXO

The desk study had identified a moderate risk of encountering UXO and therefore further assessment was warranted. Zetica was appointed to prepare a more detailed risk assessment. Zetica concluded that some areas of the site are low risk with the central and southern areas only considered to be a moderate risk (as seen in **Figure 2.1**). Zetica has recommended UXB detection in boreholes/ piles and UXO awareness briefings for shallow excavations in moderate risk areas.

7.1.2 Buried obstructions

Owing to the past industrial and more recent development history at the site there is high potential for buried obstructions. These obstructions fall into two categories, old obstructions resulting from historical foundations, basements, retaining walls for the River Medlock. More recent obstructions include buried service tunnels, foundations, basement slab, floor slabs which may remain following demolition.

Old obstructions

This may include features such as retaining walls associated with the former River Medlock, basements, foundations and old infrastructure. An old brick wall was encountered in TP001 and numerous observations of brick clasts within the made ground fill were observed during the Preliminary GI.

The fact that old buried obstructions were encountered as part of the Preliminary GI, given the limited scope, suggests further obstructions are likely to exist on-site. The risk of encountering historical obstructions is likely to be lower in the footprints of the existing buildings particularly where basements and deeper foundations have been constructed as these obstructions are likely to have been cleared for construction. In current external areas, the risk of encountering historical buried features is likely to be higher as removal of obstructions may not have been needed.

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Obstructions associated with the existing development

Buildings and infrastructure associated with the existing development will form obstructions if not removed prior to earthworks or foundation works. These will include existing foundations/ basements for the existing buildings, basement slabs and walls and utilities and utility tunnels.

Whilst these were not specifically targeted during the Preliminary GI, the ground investigation encountered an extensive concrete obstruction in the east of the site (BH006, BH006A, and BH006B) between 0.7 to 1.6mbgl. This may be a utility tunnel or a foundation.

Implications for new development

Earthworks and excavations will need to be carefully designed and managed to mitigate risks associated with instability when digging out large slabs or brick walls. However, there is high potential to re-use these obstructions as an engineering fill within site earthworks following crushing and processing. and may cause instability during earthworks or excavation, particularly where the obstruction overlaps boundaries of the development phases.

Where piling is required, piling and drilling methods will need to take into consideration these features. Where the obstructions remain in situ they are likely to restrict the use of driven and CFA bored piles.

Further plot specific investigations are likely to be needed to inform the design and construction methodology for any basement and piling works.

7.1.3 Former River Medlock

In the 1960's the River Medlock was culverted (see Drawing **UMNC-ARUP-ZZ-XX-DR-CG-0002**). The desk study identified uncertainty regarding the status and method of backfilling of the former Medlock channel and therefore potential for voids, soft ground and contamination.

The Preliminary GI found made ground within exploratory locations within the former Medlock was deeper (6.3 to 8.9 mbgl) than surrounding areas (4 to 4.6 mbgl). The composition of the infill was consistent with surrounding made ground, and no voids or soft spots were encountered. In situ soil density testing (SPT) indicates a range in soil strength/ density and with a range of particle sized which is typical of made ground deposits. The made ground was generally granular in nature suggesting that treatment by excavation and compaction or vibro ground improvement might be an option for treatment subject to proposed loading.

7.1.4 Shallow rockhead

The depth to the Sherwood Sandstone rockhead but is generally at 28 to 30mOD however the depth to rockhead from the ground surface varies as a function of the ground levels which vary significantly. South of Altrincham Street, where ground levels drop, rockhead is around 3.1 to 4.6 mbgl. A geological rockhead contour

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plan, produced in the 1960s by C.S. Allott & Son Consulting Engineers [6], was obtained during the Arup desk study. The recent ground investigation has been compared to the rockhead drawing. Generally, the rockhead levels encountered are consistent with those estimated. An updated rockhead drawing based on the latest data is presented in **Drawing UNMC-ARUP-ZZ-XX-DR-CG-1002** and **UNMC-ARUP-ZZ-XX-DR-CG-1002**.

As the rockhead is generally around 3 to 7.5mbgl shallow piled foundations are likely the most appropriate foundation solution. Areas of shallower and deeper rockhead are present and different foundation solutions may be more appropriate in these locations. The upper section of the sandstone bedrock was found to be highly weathered and weak, and likely to be excavatable without the need for specialist equipment.

7.1.5 BT tunnel

The BT/Guardian tunnel passes approximately NW-SE through the central part of Site (see **Drawing UMNC-ARUP-ZZ-XX-DR-CG-0002**) at a depth of around 6.5mOD [13]. This is between 26.5mbgl (in the centre/south of the site) and 31.5mbgl (in the north of the site) and 19.5 to 27mbgl.

Safeguard restrictions [5] have been identified which require more care to be taken during construction over or adjacent to the tunnels. This might restrict pile depths and locations.

The Preliminary GI included five boreholes located nearby to the BT tunnel to determine the nearby rockhead level including one deeper borehole to provide data on the rock properties around tunnel depth. This information should be used to inform the scheme designs of any structures on or adjacent to the tunnel.

7.1.6 Contamination associated with past industry

Several former industrial uses with contamination potential were located within the site, including a former chemical works and oil works.

As well as providing data on made ground across the site the Preliminary GI targeted areas of high contamination potential such as the Ardwick Bridge Chemical works and River Medlock infill. No visual or olfactory evidence of contamination was observed during the investigation fieldwork; no high PID readings were measured; only a single chemical soil exceedance was identified (at the site of the former Ardwick Bridge Chemical works). The ground investigation data suggests that gross contamination is not widespread and that the contamination potential at the former Ardwick Bridge Chemical Works and the infilled River Medlock is less than inferred at desk study.

Contaminant concentrations within groundwater generally suggest no gross contamination. However, groundwater from BH011, on the former Ardwick Bridge Chemical Works site, was found to have elevated lead and cyanide. Selenium, ammoniacal nitrogen and PAHs (naphthalene and fluoranthene) were also found to exceed CWGAC. Whilst it is considered that extensive groundwater remediation is unlikely to be required to mitigate the risks to controlled waters, it

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is recommended that further water samples are collected to confirm these measurements, and inform further risk assessment.

Across the site, ground gas levels were found to be consistent with CS1. No special precautions or protective measures are required for sites characterised as CS1 [18].

7.1.7 Retaining structures

The Altrincham Street retaining wall was found to be greater than 2m thick, but likely less than 4.3m thick. The wall is faced by newer stronger brick wall, occasional concrete, and an older weaker brick structure. The material behind the wall was identified as made ground comprised of a clayey gravelly sand.

The Pariser Building access ramp wall situated in the south of the site was found to be very strong, comprised of a 40cm concrete wall with rebar support. Behind the wall was a hardcore fill.

7.2 Updated risk register

The desk study identified key site risks which were documented within a risk register. Some of these risks were addressed as part of this preliminary investigation. These have been summarised above in **Section 7.1**, and further details can be found in the constraints tracker [15].

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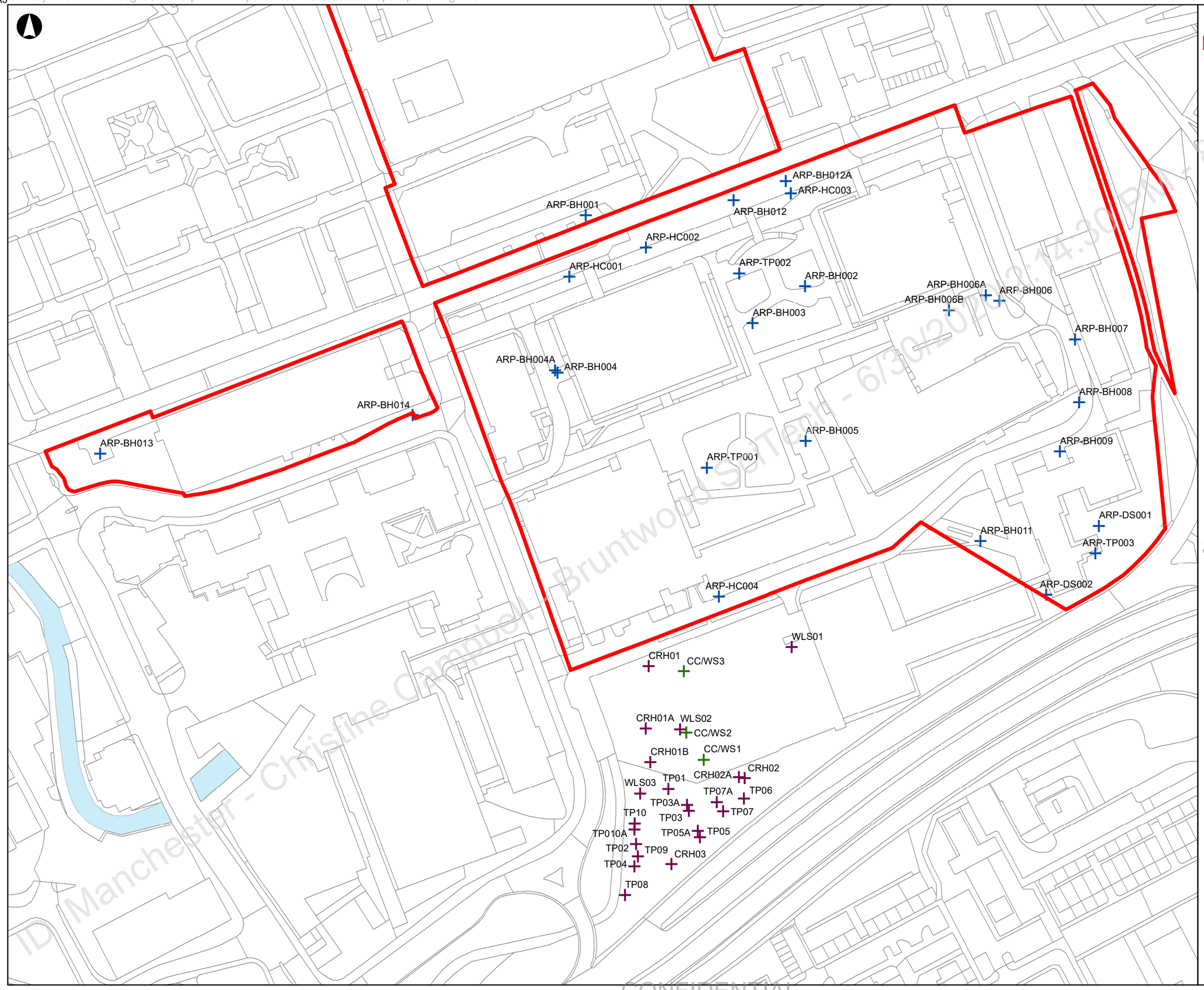
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Legend

- Site Boundary

Ground Investigation Locations

- Preliminary Ground Investigation (AEG 2019)
- Constructive Evaluation 2015
- Geotechnics 2015

Issue	Date	By	Chkd	Appd
P1	09/04/2020	JW	MG	MG

Metres

0 20 40 80

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ID Manchester

Drawing Title
Ground Investigation Locations

Scale at A3
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Arup Job No	Suitability	Rev
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A3

The inferred rockhead surface contours were produced by interpolating data from the Allott & Son (ca. 1968) rockhead contour plan and data from the 2019 AEG preliminary ground investigation and 2015 Geotechnics ground investigation

Variations in Rockhead surface:

The rockhead surface is an interpolated surface and therefore local variation in rockhead may be present

Basements and the former River Medlock may extend into the sandstone bedrock and therefore rockhead could be found at deeper depths in these areas.

Basements of varying depths (level 1 to level 3) are found across the site. The base of the infilled River Medlock has been found to extend from 6.3 to 8.9mbgl (25.3 to 27.8mOD)

ARP_BH001
ARP_BH002
ARP_BH003
ARP_BH004
ARP_BH005
ARP_BH007
ARP_BH008
ARP_BH009
ARP_BH011
ARP_BH012A
ARP_BH013
ARP_BH014
ARP_DS001
ARP_DS002
GEO-2015-WLS01
GEO-2015-WLS02
GEO-2015-CRH01B
GEO-2015-TP01
GEO-2015-CRH02A
GEO-2015-CRH03

Legend

- Site boundary
- Extent of rockhead data

Ground investigations which extended into rockhead

- GI Not located on former River Medlock
- GI located on former River Medlock

Basements and Former River Medlock

- GEO0005 Former River Medlock infill
- GEO0008a Basement (Level 1)
- GEO0008b Basement (Level 2)
- GEO0008c Basement (Level 3)

Depth to Rockhead (mbgl)

- <1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- 10 - 11
- >11
- Rockhead Contour (mbgl)

Issue	Date	By	Chkd	Appd
P2	09/04/2020	JW	MG	MG

Metres

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Drawing Title
Inferred Depth to Rockhead (mbgl)

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Name	Rev
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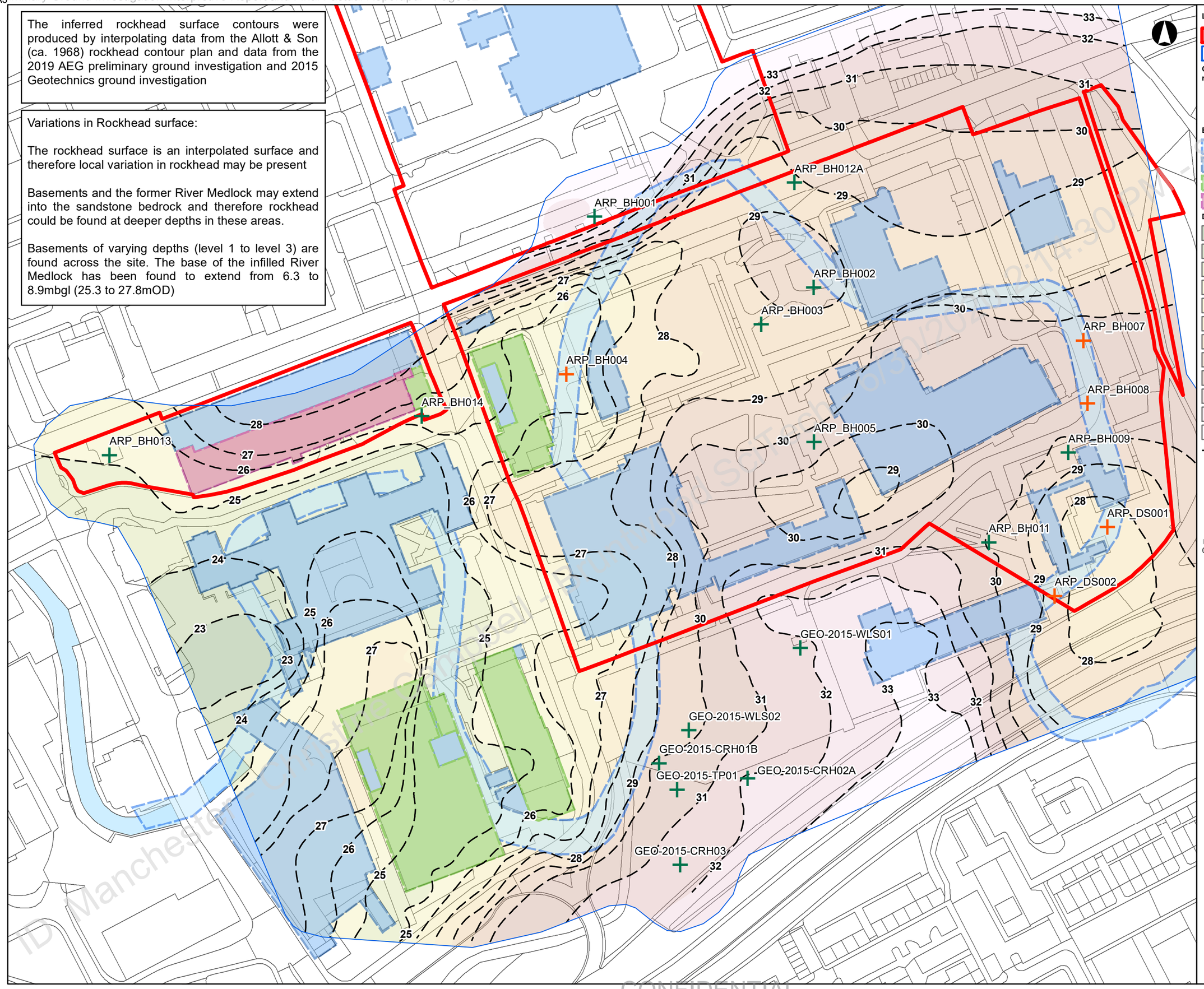
The inferred rockhead surface contours were produced by interpolating data from the Allott & Son (ca. 1968) rockhead contour plan and data from the 2019 AEG preliminary ground investigation and 2015 Geotechnics ground investigation

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Basements and the former River Medlock may extend into the sandstone bedrock and therefore rockhead could be found at deeper depths in these areas.

Basements of varying depths (level 1 to level 3) are found across the site. The base of the infilled River Medlock has been found to extend from 6.3 to 8.9mbgl (25.3 to 27.8mOD)



Legend

- Site boundary
- Extent of rockhead data

Ground investigations which extended into rockhead

- GI Not located on former River Medlock
- GI located on former River Medlock

Basements and Former River Medlock

- GEO0005 Former River Medlock infill
- GEO0008a Basement (Level 1)
- GEO0008b Basement (Level 2)
- GEO0008c Basement (Level 3)

Depth to Rockhead (mOD)

- <23
- 23 - 24
- 24 - 25
- 25 - 26
- 26 - 27
- 27 - 28
- 28 - 29
- 29 - 30
- 30 - 31
- 31 - 32
- 32 - 33
- >33
- Rockhead Contours (mOD)

Issue	Date	By	Chkd	Appd
P2	09/04/2020	JW	MG	MG

Metres

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Drawing Title
Inferred Depth to Rockhead (mOD)

Scale at A3
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Arup Job No	Suitability
265190-00	**Preliminary**

Name	Rev
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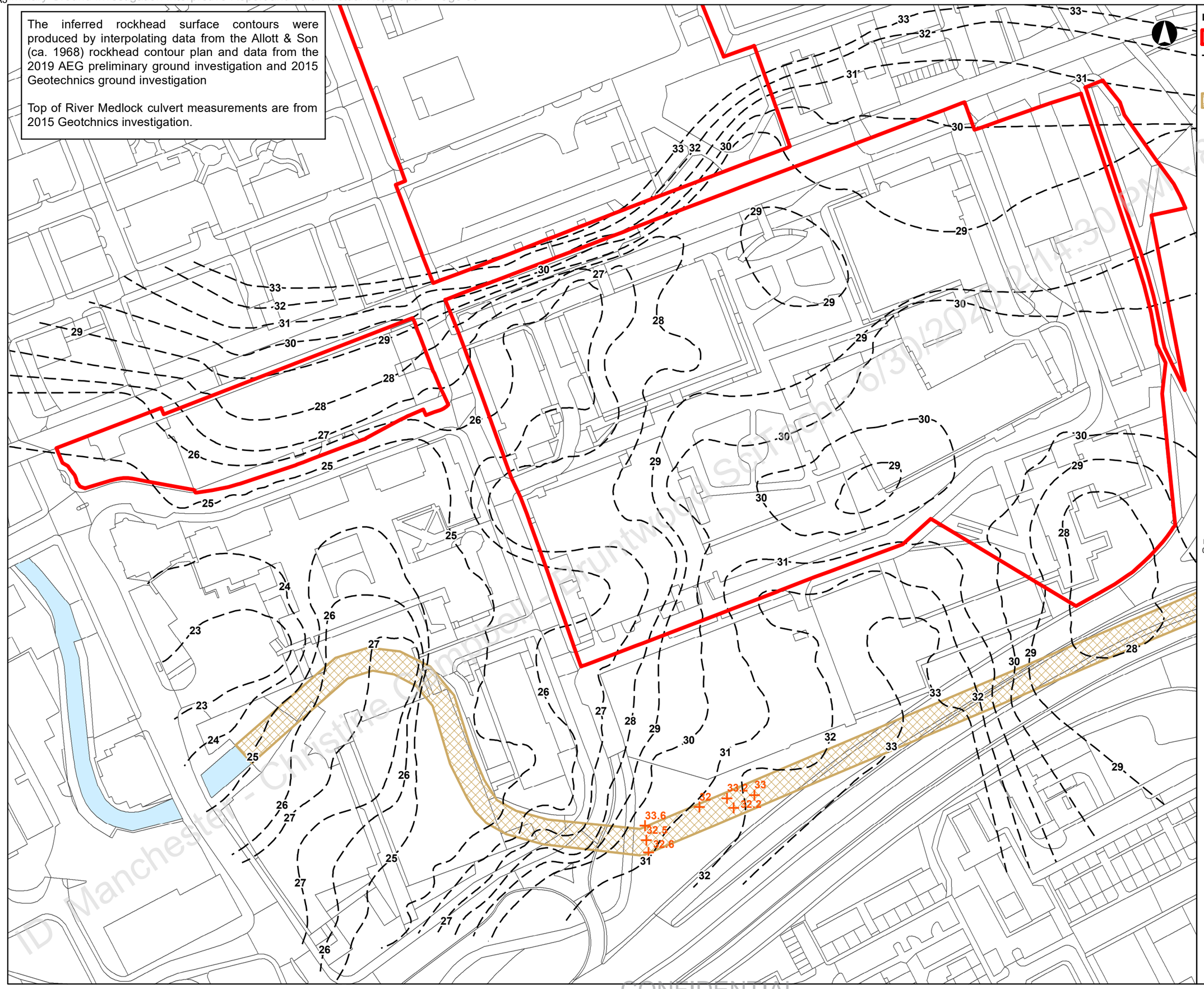
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The inferred rockhead surface contours were produced by interpolating data from the Allott & Son (ca. 1968) rockhead contour plan and data from the 2019 AEG preliminary ground investigation and 2015 Geotechnics ground investigation

Top of River Medlock culvert measurements are from 2015 Geotchnics investigation.



Legend

- Site Boundary
- Rockhead Contours (mOD)
- Culvert Depth Trial Pit (Geotechnics 2015)
- GEO0001 Culverted River Medlock

Issue	Date	By	Chkd	Appd
P1	09/04/2020	JW	MG	MG

Metres

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Drawing Title
Depth to top of River Medlock culvert (mOD)

Scale at A3
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265190-00	**Preliminary**

Name	Rev
UNMC-ARUP-ZZ-XX-DR-CG-1004	**P1**

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The inferred rockhead surface contours were produced by interpolating data from the Allott & Son (ca. 1968) rockhead contour plan and data from the 2019 AEG preliminary ground investigation and 2015 Geotechnics ground investigation

Top of River Medlock culvert measurements are from 2015 Geotchnics investigation.

Legend

- Site Boundary

Depth to Rockhead (mbgl)

- Rockhead <3mbgl - shallow foundations may be possible
- Rockhead >3mbgl <7.5mbgl - shallow piles (c. 10m) may be possible
- Rockhead >7.5mbgl - deeper piles (c.15m) may be required

Issue	Date	By	Chkd	Appd
P1	09/04/2020	JW	MG	MG

Metres

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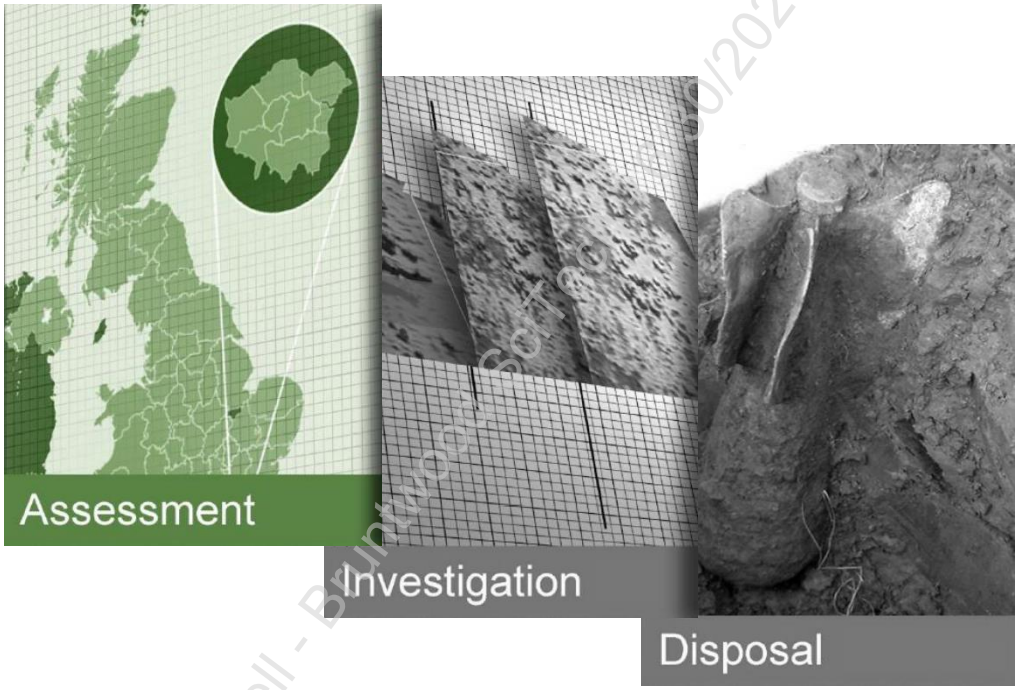
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Appendix A

UXO Desk Study and Risk Assessment

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ID Manchester - UXO Desk Study & Risk Assessment

Drafted by Joe Lingard
Checked by Lucy Warwick
Authorised by Stefan Lang

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Document Title	**UXO Desk Study & Risk Assessment**
Document Ref.	**P8155-19-R1**
Revision	**A**
Project Location	**ID Manchester**
Client	**Arup**
Date	**6th September 2019**

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UXO DESK STUDY & RISK ASSESSMENT

EXECUTIVE SUMMARY

Key findings: Potential hazard from Unexploded Bombs (UXB) on the central and southern parts of the Site.

Key actions: Deep UXB detection is required to clear borehole and pile locations and an Explosive Ordnance Clearance (EOC) Engineer is required to supervise excavations in the moderate risk areas.

UXO Hazard Assessment

Records have been found indicating that 12No. High Explosive (HE) bombs fell on the Site during World War Two (WWII). The bombing caused significant damage to buildings on the central and southern parts of the Site, which may have masked the impact of a UXB.

Given this, it is considered prudent to assign these parts of the Site a moderate UXO hazard level.

No significant bombing or other military activity is recorded on the remainder of the Site, which is assigned a low UXO hazard level.

It is considered that the UXO hazard level on the Site can be zoned from low to moderate, as shown in the following Figure, reproduced as Figure 4 in the main report.

Figure	UXO hazard zone plan of the Site



Source: Google Earth *Not to Scale*

Legend					
	Very Low		Low		Moderate
	High		Very High		Site boundary

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Note that the UXO hazard will have been mitigated within the depth and extents of any post-WWII intrusive works. Outside the footprint of these works, between piles and below shallow raft foundations and basements, the UXO hazard level remains unchanged to the maximum bomb penetration depth.

The main findings of the report are summarised below.

- No records of bombing or military activity on the Site during World War One (WWI) have been found.
- During WWII there were many strategic targets in the vicinity of the Site. These included iron and steel works, rubber works, munitions factories, major transport infrastructure and gas works.
- Records have been found indicating that 12No. HE bombs fell on the Site during WWII, in addition to several Incendiary Bombs (IBs).
- No records of any significant post-WWII military activity on the Site have been found.

Data Confidence Level

The findings of this report were based on good corroborative evidence of the military activity and bombing on the Site.

Proposed Works

It is understood that initial works on the Site will comprise an intrusive ground investigation, including boreholes and trial pits.

Future works on the Site are likely to include the demolition of existing structures, bulk excavations and piling.

Risk Assessment

The Table below, reproduced as Table 5 in the main report, provides a UXO risk assessment for the proposed works on the Site.

Further details on the methodology for the risk assessment are provided in Section 7.2 of the main report.

Table	UXO risk assessment for the Site								
Hazard Zone	**Potential UXO Hazard**	**Anticipated Works**	**PE**	**PD**	**P = PE x PD**	**Likelihood**	**Severity**	**Risk Rating**	**UXO Risk**
Moderate	UXB	Shallow Excavations	1	1	1	1	5	5	**Low**
		Deep Excavations	3	2	6	3	5	15	**Moderate**
		Boreholes/Piling	2	3	6	3	4	12	**Moderate**
	Other UXO	Shallow Excavations	1	1	1	1	4	4	**Low**
		Deep Excavations	1	1	1	1	4	4	**Low**
		Boreholes/Piling	1	1	1	1	3	3	**Low**
Low	UXB	Shallow Excavations	1	1	1	1	5	5	**Low**
		Deep Excavations	1	1	1	1	5	5	**Low**
		Boreholes/Piling	1	1	1	1	4	4	**Low**
	Other UXO	Shallow Excavations	1	1	1	1	4	4	**Low**
		Deep Excavations	1	1	1	1	4	4	**Low**
		Boreholes/Piling	1	1	1	1	3	3	**Low**
PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)									
Shallow Excavations defined as <1.0m bgl.									

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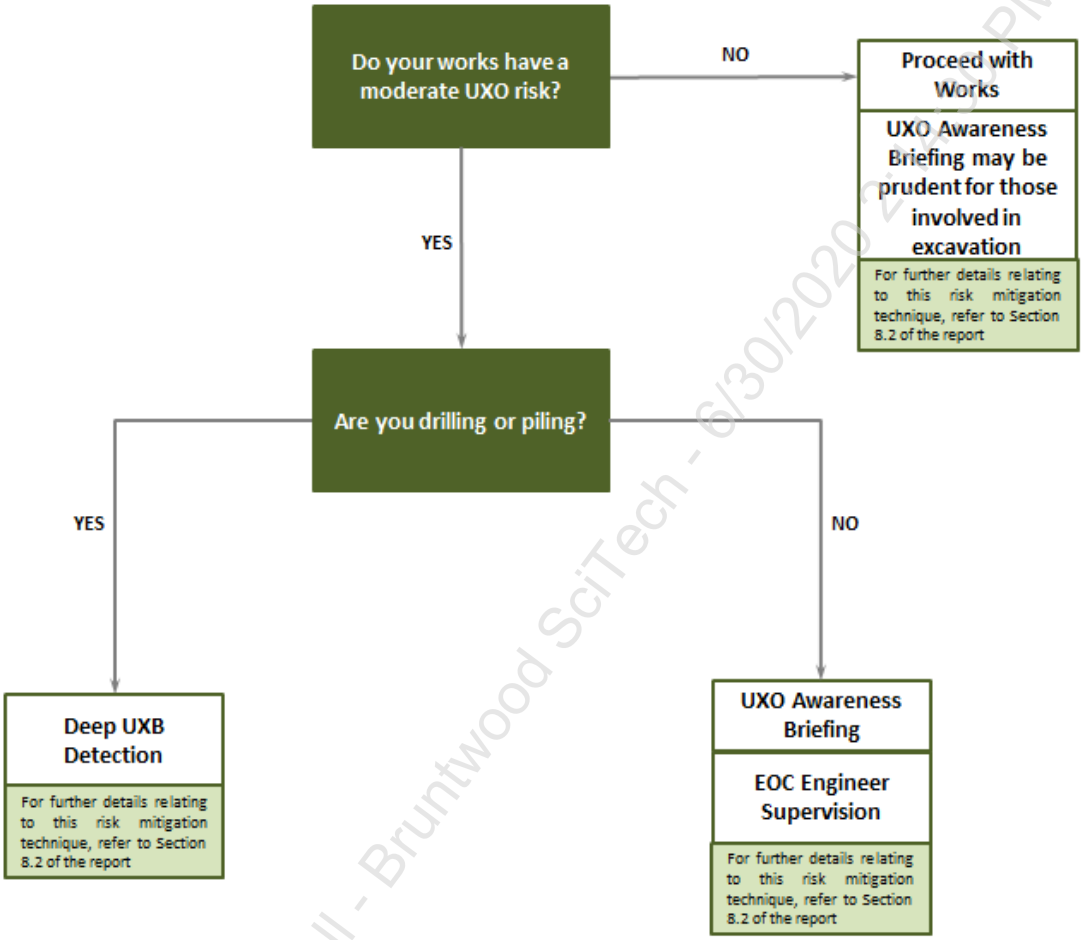
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Risk Mitigation Plan

The Figure below, reproduced as Figure 5 in the main report, provides a risk mitigation plan to ensure that the UXO risk for the proposed works is reduced to As Low As Reasonably Practicable (ALARP).

Figure Recommended risk mitigation plan for the Site



Further details on the recommended risk mitigation techniques are given in Section 8.2 of this report.

The Table below, reproduced as Table 6 in the main report, summarises the UXO risk for proposed works on the Site and recommended techniques to mitigate the risk.

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Table	Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		**Proceed with works** – if additional comfort is required to address the residual UXO hazard, a formal UXO awareness briefing can be provided.
Boreholes/Piling		**Proceed with works**
Excavations		**EOC Engineer Supervision** – to ensure safety and minimise delays, Explosive Ordnance Clearance (EOC) Engineer supervision is recommended.
Boreholes/Piling		**Deep UXB detection –** to clear borehole or pile locations of potential UXB, an intrusive magnetometer survey should be undertaken until either the maximum bomb penetration or maximum drilling/piling depth is reached.

In summary, it is recommended that the excavations proposed within the moderate risk areas are supervised by an EOC Engineer.

As part of borehole or pile construction, we recommend that deep UXB detection is undertaken to ensure the safety of those working on Site and in the surrounding area.

What Do I Do Next?

If you wish to proceed with UXO risk mitigation, Zetica would be happy to assist. Just contact us via phone (01993 886682) or email (uxo@zetica.com) and we can provide a proposal with options and prices.

If you have other requirements (such as utility services mapping or mapping buried obstructions) we can also provide these surveys, often saving costs if combined with a UXO survey.

If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

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Appendix 2 Sources of UXO Hazard

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Appendix 4 Glossary and Definitions

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Appendix 5 WWII Bombing Incident List

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Figure 1 Site location map

Figure 2 Compiled bomb impact map for the vicinity of the Site

Figure 3 Potential burial setting of UXB on the Site

Figure 4 UXO hazard zone plane of the Site

Figure 5 Recommended risk mitigation plan for the Site

Plate 1 Recent aerial photograph of the Site

Plate 2 Luftwaffe target photograph of central Manchester, 4th October 1940

Plate 3 Aerial photograph, 16th May 1948

Plate 4 Aerial photograph, 13th May 1953

Table 1 Luftwaffe targets in the vicinity of the Site

Table 2 Bombing statistics

Table 3 Estimated average maximum bomb penetration depths (north-west and south)

Table 4 Estimated average maximum bomb penetration depths (south-east and central)

Table 5 UXO risk assessment for the Site

Table 6 Summary of UXO risk and mitigation recommendations

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ABBREVIATIONS

AA	Anti-Aircraft
ACPO	Association of Chief Police Officers
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
CMD	Conventional Munitions Disposal
DCLG	Department of Communities and Local Government
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FFE	Free From Explosives
GUTE	Guardian Underground Telephone Exchange
HAA	Heavy Anti-Aircraft
HE	High Explosive
HSE	Health and Safety Executive
JSEODOC	Joint Services EOD Operations Centre
IB	Incendiary Bomb
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
LAA	Light Anti-Aircraft
MoD	Ministry of Defence
PM	Parachute Mine
PUCA	Pick Up and Carry Away
RAF	Royal Air Force
TEP	Time Expired Pyrotechnics
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
WWI	World War One
WWII	World War Two

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UXO DESK STUDY & RISK ASSESSMENT

Please read: Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Boxed paragraphs in a dark green text with a green background are paragraphs providing general information and, where appropriate, links to online resources giving further detail. These are all available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by Arup to carry out a detailed Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 11.6 hectares (ha) centred on Sackville Street in Manchester ('the Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

Where appropriate, this hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance.
- Probable location.
- Ordnance condition.

It should be noted that some military activity providing a source of UXO hazard may not be recorded and therefore there cannot be any guarantee that all UXO hazards affecting the Site have been identified in this report.

1.2 Sources of Information

Zetica Ltd researched the military history of the Site and its surrounding area using a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

1.2.1 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

1.2.2 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on Zetica's website (http://zeticauxo.com/downloads-and-resources/risk-maps/

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1.2.3 Ministry of Defence and Government Records

Government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Department of Communities and Local Government (DCLG) records of abandoned bombs.

1.2.4 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, the US National Archives & Records Administration (NARA), the Imperial War Museum (IWM), Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.

1.2.5 Local Authority Records

Information has been obtained from Manchester City Council.

1.2.6 Local Record Offices and Libraries

Information was obtained from The Greater Manchester County Record Office, Manchester Central Library Archive and Manchester University.

1.2.7 Local Historical and Other Groups

Local history groups and archaeological societies were consulted, including the Greater Manchester Historic Environment Record (HER).

1.3 Data Confidence Level

In general, there is a high level of confidence in the researched information sources used for this report.

It should be noted that a small number of the WWII Manchester Bomb Damage cards are missing.

Various other sources (including bomb census maps, anecdotal accounts and historical aerial photographs) have been used to provide a corroborative assessment of the UXO hazard level on the Site.

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2 THE SITE

2.1 Site Location

The Site is centred on Ordnance Survey National Grid Reference (OSNGR) SJ 845975. It is centred on Sackville Street, Manchester, approximately 0.2km southwest of Manchester Piccadilly railway station and approximately 3.1km east of Salford Quays.

The Site comprises University of Manchester premises, railway and residential buildings. It is bounded to the north by Aytoun Street, to the east by London Road, to the south by Mancunian Way and to the west by Princess Street.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1	Site location map



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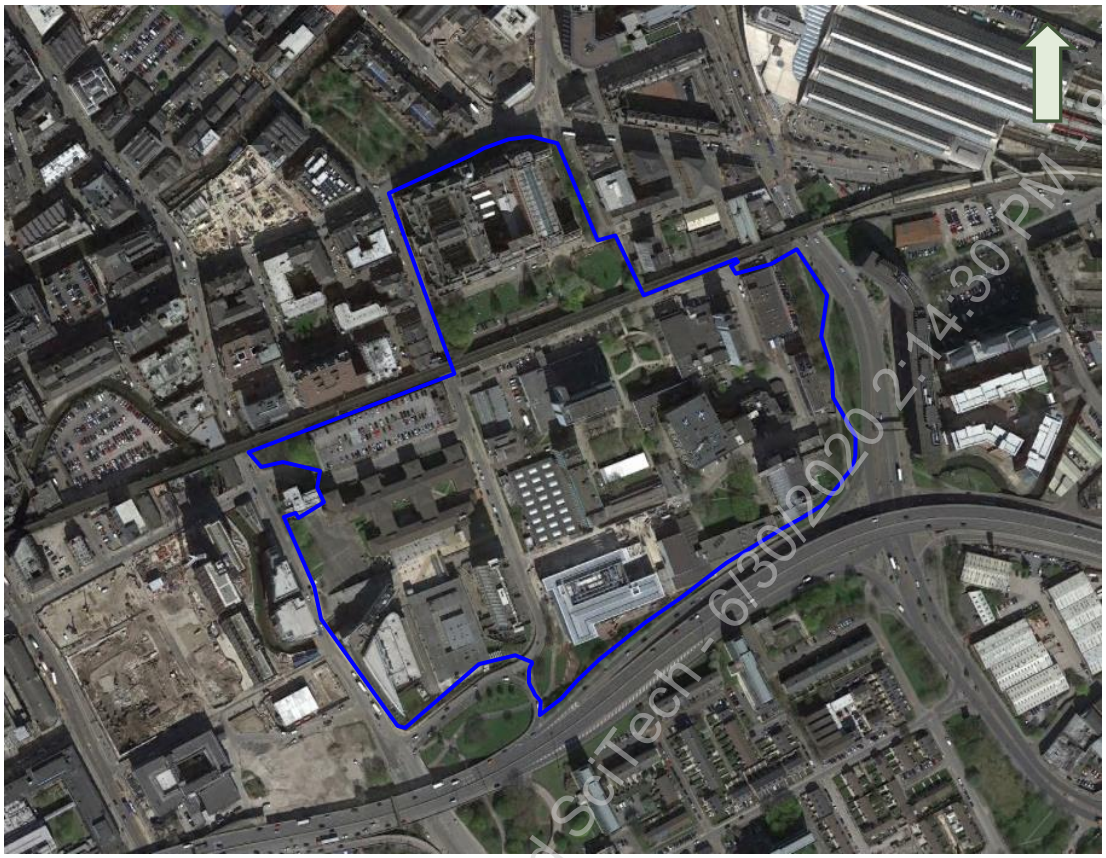
Legend	Site boundary

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Plate 1	Recent aerial photograph of the Site



Source: Google Earth *Not to Scale*

Legend	Site boundary

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3 MILITARY ACTIVITY

The following sections outline the recorded military activity in the vicinity of the Site. The potential UXO hazard from WWI and WWII bombing is detailed in Section 4.

Each sub-section provides hyperlinks to further information on potential sources of UXO hazard. These are also available at www.zeticauxo.com. If you cannot gain access to these resources, Zetica can forward them on request.

3.1 Defences

For further information on military defences, and the potential UXO hazards associated with them, follow the links below:

- Anti-Aircraft Guns
- Anti-Invasion Defences
- Barrage Balloons
- Bombing Decoys
- Home Guard
- Mined Locations
- Mortar & Gun Emplacements
- Pillboxes

No military defences have been identified on the Site.

3.1.1 Anti-Aircraft Guns

Records indicate that there were at least 10No. Anti-Aircraft (AA) gun batteries within 10km of the Site during WWI. The nearest was located at Pendleton (SJ 812991), approximately 3.5km northwest of the Site. It was armed with 1No. 18-pounder (-pdr) gun.

During WWII there were 27No. Heavy AA (HAA) and ZAA rocket batteries within 10km of the Site. The nearest was located in Fallowfield (SJ 858948), approximately 2.8km south of the Site.

The nearest recorded WWII AA shell incidents to the Site are described below.

22nd-23rd December 1940

1No. AA shell fell on Pritchard Street, adjacent to the western boundary of the Site.

1No. AA shell fell on Russel Street, approximately 0.1km south of the Site.

Potential UXO Hazard

Given the number of HAA gun batteries in the surrounding area during WWII, the potential for a UXAA shell to have fallen on the Site unnoticed cannot be totally discounted.

3.1.2 Bombing Decoys

The nearest recorded bombing decoy was located at Reddish (SJ 912939), approximately 7.3km southeast of the Site.

Bombing decoys are not considered to provide a source of UXO hazard to the Site.

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3.2 Military Airfields

For further information on military airfields, and the potential UXO hazards associated with them, follow the links below:

- Military Airfields

No records of any military airfields on or in close proximity to the Site have been found.

Between 1918 and 1924 an aerodrome was operational at Alexandra Park (SJ 835950), approximately 2.9km south of the Site. This was used as a testing station for aircraft produced at the Avro works at Trafford Park, including Avian, Cadet, Tudor and Anson types. The airfield closed in 1924, the buildings were demolished and the area was converted into a public park.

The nearest military airfield during WWII was Royal Air Force (RAF) Ringway (SJ 815844), approximately 12.6km south of the Site. This was an aircraft assembly airfield used by the Fairey and Avro companies, in addition to No. 1 Parachute Training School.

Military airfields are not considered to provide a source of UXO hazard to the Site.

3.3 Aircraft Crashes

For further information on military aircraft crashes, and the potential UXO hazards associated with them, follow the links below:

- Aircraft Crashes

No records of any aircraft crashes on or in close proximity to the Site have been found.

3.4 Explosives Factories, Munitions Depots and Disposal Areas

For further information on explosives factories, munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- Explosives Factories
- Munitions Depots
- Munitions Disposal Areas

No records of any explosives factories, munitions depots or munitions disposal areas on or in close proximity to the Site have been found.

3.5 Firing Ranges and Military Training Areas

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- Artillery Ranges
- Bombing Ranges
- Military Training Areas
- Small Arms Ranges

No records of any firing ranges or military training areas on or in close proximity to the Site have been found.

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3.6 Other Military Establishments

Military establishments have been identified on and in close proximity to the Site.

3.6.1 Guardian Underground Telephone Exchange

During the 1950s a secure tunnel was established underneath the Site as part of the Guardian Underground Telephone Exchange (GUTE), a cable system designed to maintain communications in the event of a nuclear attack. The tunnels were established at a depth of approximately 30 metres.

GUTE is not considered to provide a source of UXO hazard to the Site.

3.6.2 Ardwick Barracks

The Ardwick Barracks were established in 1886, approximately 0.3km south of the Site. They were home to the 5th (Ardwick) Volunteer Battalion, becoming the 8th battalion Manchester Regiment in 1908.

During WWII the barracks were used as a detention centre for deserters before being returned to 8th battalion in 1945.

Ardwick Barracks is not considered to provide a source of UXO hazard to the Site.

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4 BOMBING

4.1 WWI Bombing

For further information on WWI bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.1. Alternatively, use the following link.

- WWI Bombing

No records have been found indicating that the Site was bombed during WWI.

4.2 WWII Bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2. Alternatively, use the following link.

- WWII Bombing

4.2.1 Bombing in Manchester

Manchester's industrial conurbations and port made it a principal target for enemy bombers. The Luftwaffe possessed detailed target photographs of many industrial complexes from as early as 1937.

Air raids on Manchester began in August 1940 and continued until 1945. The heaviest raid on the city occurred between the 22nd and 24th December 1940, the 'Manchester Blitz', during which more than 400No. HE bombs fell on the city.

More than 1,710No. High Explosive (HE) bombs and 115No. Parachute Mines (PMs) fell across the Manchester region during WWII.

Bombing was concentrated on the city centre and in West Manchester, where the Salford Docks and major industrial works at Trafford Park attracted heavy raids.

Bombing densities generally decreased away from the city centre and far less damage was sustained by properties in these areas.

4.2.2 Strategic Targets

The Site was located in an area which contained several strategic targets, including iron and steel works, rubber works, munitions factories, major transport infrastructure and gas works.

Plate 2 is a Luftwaffe target photograph of central Manchester, dated the 4th September 1940.

It identifies several targets in the vicinity of the Site, including Victoria Station (A), approximately 1.2km north of the Site, and Central Station (B), approximately 0.6km west of the Site.

Other identified targets are listed in Table 1.

Table 1 Luftwaffe targets in the vicinity of the Site

Target No.	Target
A	Victoria Station
B	Central Station
GB 717	Copper Works
GB 829	Foundry
GB 52 86	Gas Works

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Plate 2	Luftwaffe target photograph of central Manchester, 4th October 1940



Source: NARA *Not to Scale*

4.2.3 Bombing Densities and Incidents

Table 2 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site and surrounding districts. These were categorised as Rural Districts (RD), Urban Districts (UD), Municipal or Metropolitan Boroughs (MB) and County Boroughs (CB). WWII bomb density levels are defined below:

<5 bombs per 405ha is a Very Low regional bombing density.

5-15 bombs per 405ha is Low.

15-50 bombs per 405ha is Moderate.

50-250 bombs per 405ha is High.

>250 bombs per 405ha is Very High.

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Table 2	Bombing statistics				
Area	Bombs Recorded				
	High Explosive	Parachute Mines	Other	Total	Bombs per 405ha (1000 acres)
Manchester CB	**712**	**18**	**7**	**737**	**27.0**
Stretford MB	456	64	0	520	147.3
Salford CB	406	29	16	451	86.7

Note that Table 2 excludes the figures for V1s (Pilotless Aircraft or Flying Bombs), V2s (Long Range Rockets) and Incendiary Bombs (IBs). Discrepancies between this list and other records, such as bomb clearance records, demonstrate that this data is likely to under-represent actual bombing.

Details of the nearest recorded bombing incidents to the Site are given in the following section.

31st August 1940

1No. HE bomb fell on the College of Technology, on the Site.

1No. HE bomb fell on 53 Sackville Street, on the north-western boundary of the Site.

1No. HE bomb fell on the corner of Bombay Street and Venice Street, approximately 60m west of the Site.

22nd-23rd December 1940

Manchester and Salford were heavily bombed between the 22nd and 24th December 1940 (the 'Manchester Blitz'). Over 400No. HE bombs and more than 30,000No. IBs fell across the region.

1No. HE bomb fell on the East India Finishing Works, on the Site.

2No. HE bombs fell near The Albion Inn, Temple Street, on the Site.

1No. HE bomb fell on the junction of Jackson Street and Temple Street, on the Site.

1No. HE bomb fell on 85 Sackville Street, on the Site.

IBs (unspecified number) fell across Sackville Street, on the Site.

HE bombs (unspecified number) fell between Cooke Street, Gray Street and Grosvenor Street, adjacent to the south-western boundary of the Site.

IBs (unspecified number) fell on Whitworth Street, adjacent to the northern boundary of the Site.

IBs (unspecified number) fell on Princess Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on the Manchester South and Altrincham Railway Viaduct, adjacent to the north-eastern boundary of the Site.

IBs (unspecified number) fell on Cooke Street, adjacent to the south-western boundary of the Site.

1No. HE bomb fell on 17 Cooke Street, adjacent to the south-western boundary of the Site.

1No. HE bomb and 1No. IB fell on 4 Whitworth Street, approximately 40m northwest of the Site.

1No. HE bomb and IBs (unspecified number) fell on 10 Charles Street, on the north-western boundary of the Site.

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11th March 1941

1No. HE bomb fell on 2 Cooke Street, adjacent to the south-western boundary of the Site.

1st-2nd June 1941

Approximately 110No. bomber aircraft attacked Manchester, dropping 42No. HE bombs and many IBs.

1No. HE bomb fell on 20 Temple Street, on the Site.

2No. HE bombs and 2No. IBs fell on Mount Street, on the Site.

1No. HE bomb fell on the Jackson Street Cotton Mills, on the Site.

1No. HE bomb and 1No. IB fell on the College of Technology, on the Site.

1No. HE bomb fell at the junction of London Road and Jackson Street, adjacent to the south-eastern boundary of the Site.

1No. HE bomb fell on Princess Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on 63 Sackville Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on 25 Granby Row, adjacent to the north-eastern boundary of the Site.

1No. HE bomb fell on the Police Headquarters, approximately 60m northeast of the Site.

It should be noted that during WWII, many UXB were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 2 is a map showing the approximate location of recorded bomb impacts in the immediate vicinity of the Site. IBs shown are indicative of larger numbers of similar devices that fell within the given area.

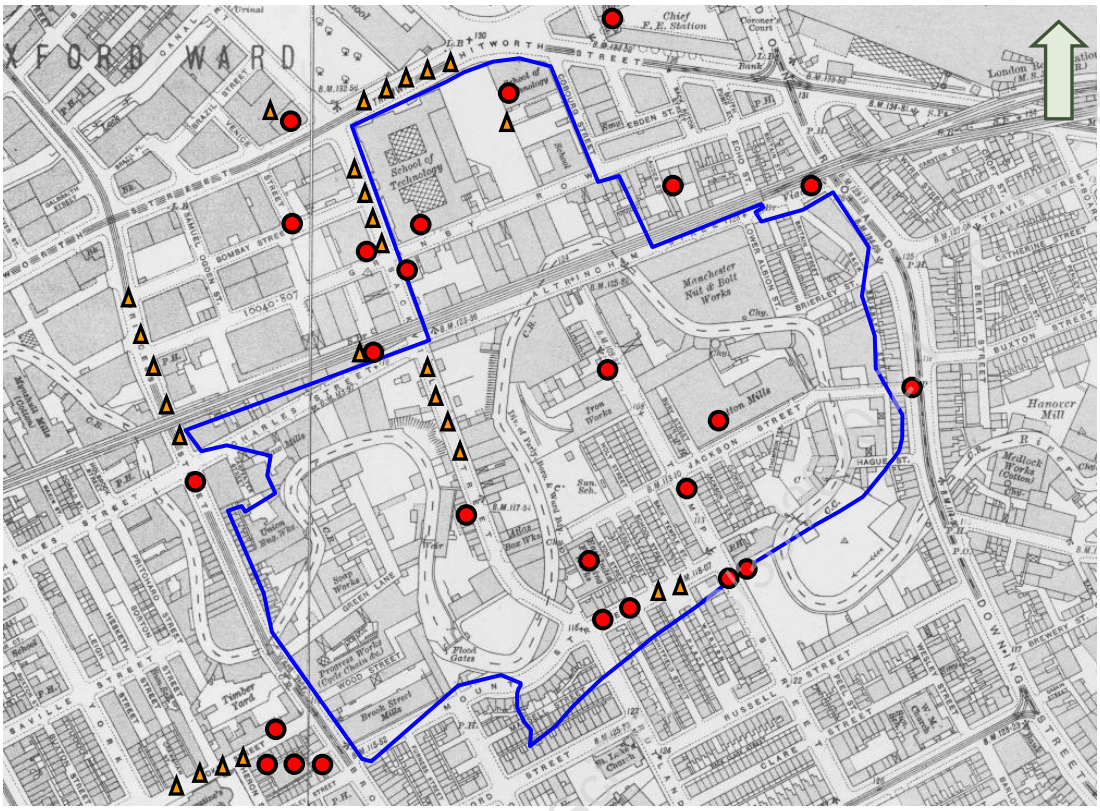
The map has been compiled from a number of different sources including air raid incident reports, historical aerial photographs and bomb census maps.

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Figure 2	Compiled bomb impact map for the vicinity of the Site



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Legend	Site boundary	HE bomb	IBs

Plates 3 and 4 are aerial photographs, dated the 16th May 1948 and 13th May 1953 respectively.

Extensive areas of demolished buildings have been identified on the Site. Some of these relate to damage sustained during WWII air raids and others are likely to be the result of pre-WWII slum clearance.

An evaluation of historical maps from before and after WWII has enabled an estimation of which demolished areas are more likely to be due to planned slum clearance.

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Plate 3	Aerial photograph, 16th May 1948



Source: Historic England *Not to Scale*

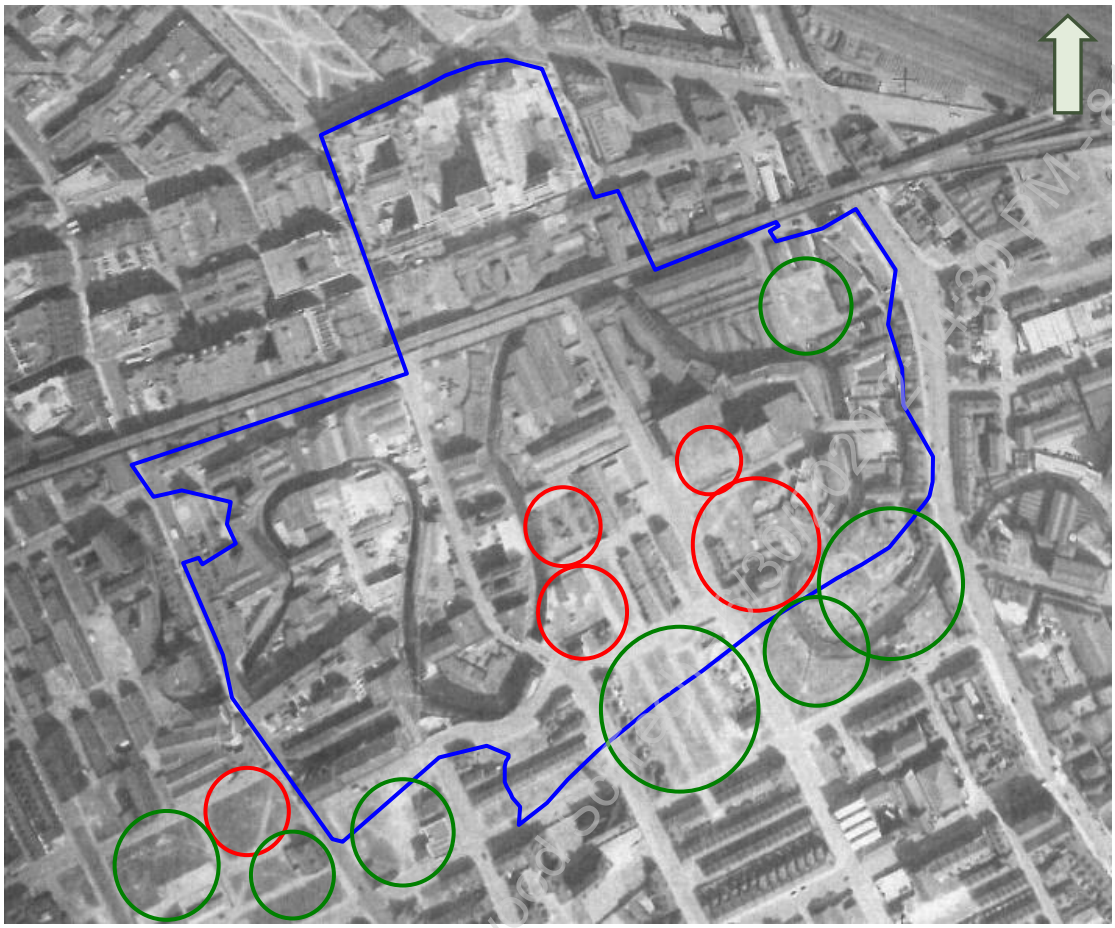
Legend	Site boundary	Possible bomb damage	Possible slum clearance

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Plate 4	Aerial photograph, 13th May 1953



Source: Historic England *Not to Scale*

Legend	Site boundary	Possible bomb damage	Possible slum clearance

Potential UXO Hazard

Records indicate that at least 12No. HE bombs fell on the Site. Most of these fell during the very heavy 'Christmas Blitz' of December 1940 and the remainder fell during another heavy air raid in June 1941.

The bombing resulted in significant damage being caused to buildings on the central and southern parts of the Site.

Given the intensity of the raids on central Manchester, the conflagrations caused by numerous IBs, and the extent of the damage, it is possible that a UXB may have fallen on these parts of the Site unnoticed.

No significant bomb damage likely to mask the impact of a UXB has been identified on the remainder of the Site.

WWII bombing is considered to provide a possible source of UXO hazard to the central and southern parts of the Site.

4.2.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present at the time that a bomb was dropped in order to establish its maximum penetration depth.

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British Geological Survey (BGS) 1:50,000 Sheet 85, Manchester (Solid & Drift) and BGS borehole records from nearby investigations have been consulted to get an indicative overview of the Site geology.

The geology of the north-western and southern parts of the Site is understood to consist of Made Ground, over Glacial Till overlying the Sherwood Sandstone Group.

Table 3 provides an estimate of average maximum bomb penetration depths assuming ground conditions during WWII of 3m of Made Ground, over 4m of stiff to very stiff clay and 2m of weathered sandstone, overlying thick deposits of weak sandstone.

Table 3	Estimated average maximum bomb penetration depths (north-west and south)	
Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	2.5m
	250kg	4.0m
	500kg	8.0m

The geology of the south-eastern and central parts of the Site is understood to consist of Made Ground, over Alluvium, overlying the Sherwood Sandstone Ground.

Table 4 provides an estimate of average maximum bomb penetration depths assuming ground conditions during WWII of 2m of Made Ground, over 1m of soft to firm clay and 1m of loose gravely sand, over 2m of weathered sandstone overlying thick deposits of weak sandstone.

Table 4	Estimated average maximum bomb penetration depths (south-east and central)	
Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	3.0m
	250kg	5.0m
	500kg	8.0m

These calculations can be refined on receipt of further Site-specific borehole logs.

The estimated bomb penetration depths given in Tables 3 and 4 are from the WWII ground level and are based on the following assumptions:

a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).

b) A strike angle of 10 to 15 degrees to the vertical.

c) That the bomb is stable, both in flight and on penetration.

d) That no retarding units are fitted to the bomb.

e) That the soil type is homogenous.

A high altitude release of a bomb will result in ground entry at between 10° and 15° to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

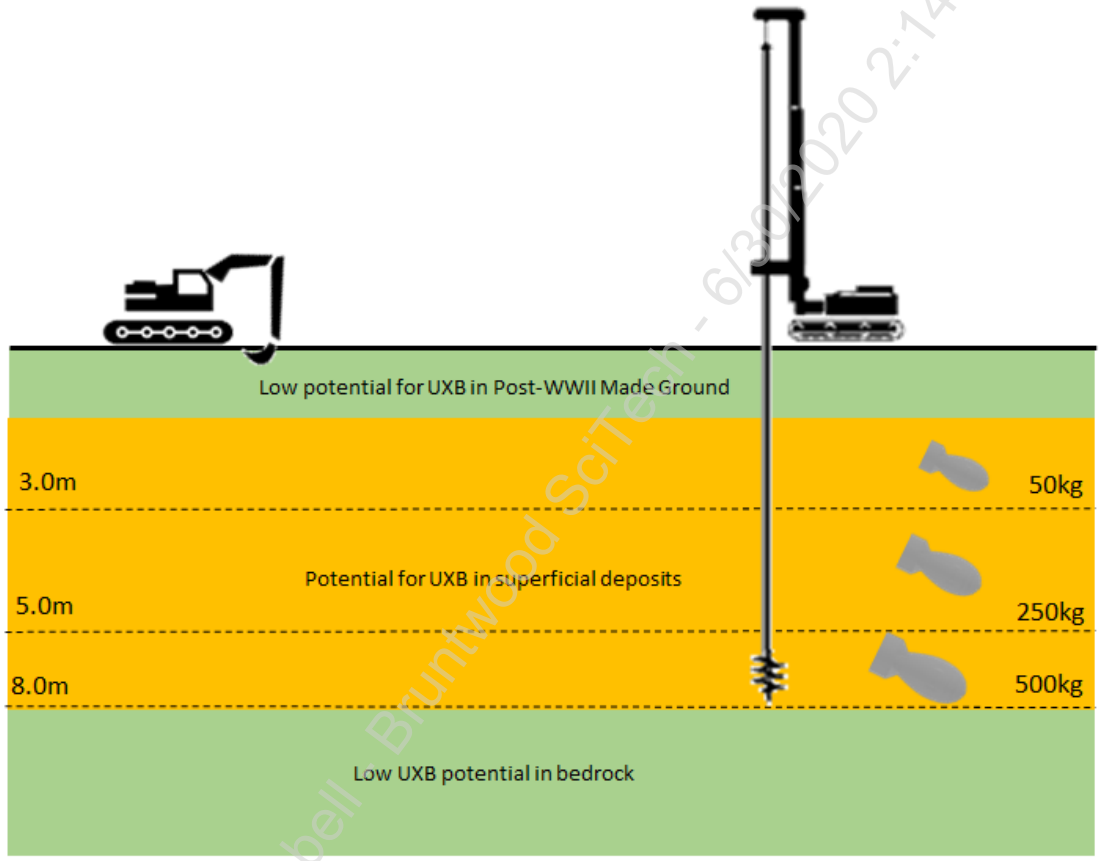
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The average offset is one third of the penetration depth, i.e. an offset of 2m may be expected for a 50kg bomb in dry silts and clays. If hard standings or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

Figure 3 demonstrates the potential burial setting for a UXB in the moderate hazard zone on the Site, based on the anticipated ground conditions and average maximum bomb penetration depth.

Figure 3 Potential burial setting of UXB on the Site



Source: Zetica *Not to Scale*

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5 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% of UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear. Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported. The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

5.1 Abandoned Bombs

For further information on abandoned bombs, and the potential UXO hazard associated with them, follow the link below:

- Abandoned Bombs

No records have been found indicating that any officially abandoned bombs are located on the Site.

5.2 EOC Tasks

Records held by Zetica Ltd show that the following post-WWII EOC tasks have taken place in the vicinity of the Site.

1960

1No. 1kg IB was discovered on the roof of St Ann's Church, approximately 0.9km northwest of the Site. It was removed.

3rd April 2007

1No. WWII mortar bomb was found on a building site in Cambridge Street, approximately 0.5km west of the Site. It was removed.

8th October 2007

1No. suspected UXB was found on a building site in Middlewood Street, Salford, approximately 1.9km west of the Site. It was made safe and removed.

24th October 2018

1No. WWII anti-tank round was found on a building site in Newquay Street, Salford, approximately 1.5km northwest of the Site. It was removed.

The MoD has provided no additional information on official EOC tasks on the Site.

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6 UXO HAZARD ASSESSMENT

6.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

Definitions of UXO Hazard Level for a Site	
Hazard Level	**Definition**
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present or that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

Records have been found indicating that 12No. HE bombs fell on the Site during WWII. The bombing caused significant damage to buildings on the central and southern parts of the Site, which may have masked the impact of a UXB.

Given this, it is considered prudent to assign these parts of the Site a moderate UXO hazard level.

No significant bombing or other military activity is recorded on the remainder of the Site, which is assigned a low UXO hazard level.

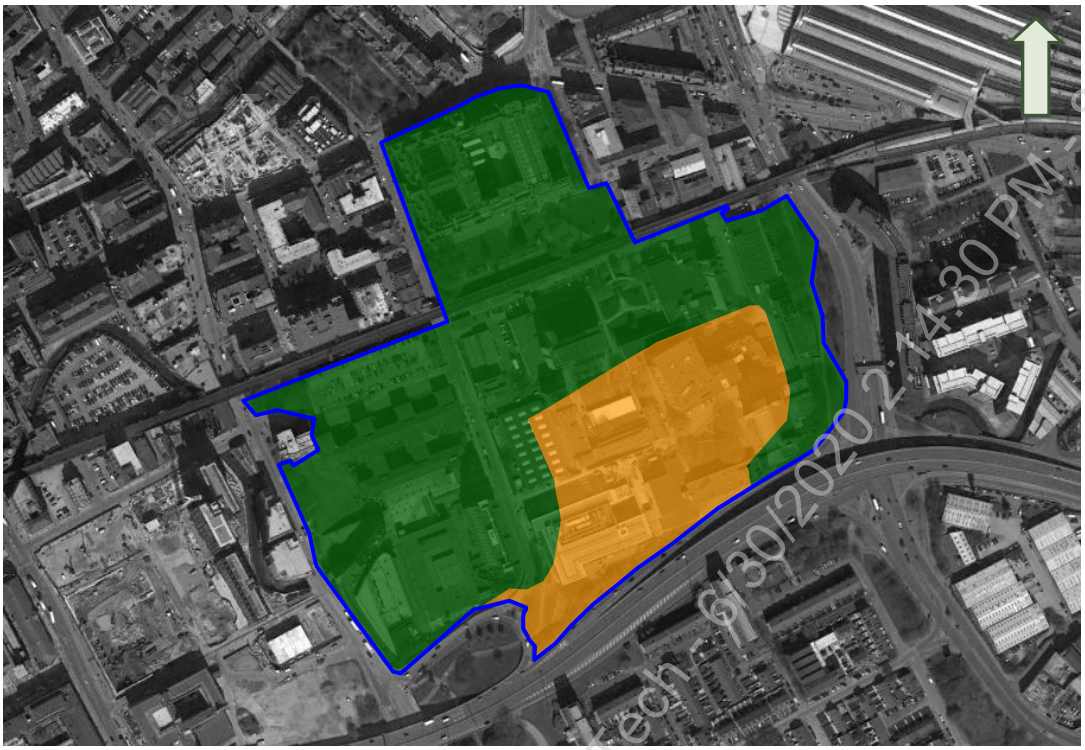
It is considered that the UXO hazard level on the Site can be zoned from low to moderate, as shown in Figure 4 below.

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Figure 4	UXO hazard zone plan of the Site



Source: Google Earth *Not to Scale*

Legend					
	Very Low		Low		Moderate
	High		Very High		Site boundary

Note that the UXO hazard will have been mitigated within the depth and extents of any post-WWII intrusive works. Outside the footprint of these works, between piles and below shallow raft foundations and basements, the UXO hazard level remains unchanged to the maximum bomb penetration depth.

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7 UXO RISK ASSESSMENT

7.1 Proposed Works

It is understood that initial works on the Site will comprise an intrusive ground investigation, including boreholes and trial pits.

Future works on the Site are likely to include the demolition of existing structures, bulk excavations and piling.

7.2 Risk Assessment Methodology

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
21 to 25	Frequent, highly likely, almost certain.	5
16 to 20	Probable, more likely to happen than not.	4
6 to 15	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0
P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.		

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

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Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix							
		SEVERITY (S)					
		5	4	3	2	1	0
LIKELIHOOD (P)	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

7.3 UXO Risk Level

The UXO risk assessment for proposed works on the Site is given in Table 5.

Table 5 UXO risk assessment for the Site

Hazard Zone	Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
Moderate	UXB	Shallow Excavations	1	1	1	1	5	5	Low
		Deep Excavations	3	2	6	3	5	15	Moderate
		Boreholes/Piling	2	3	6	3	4	12	Moderate
	Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
		Deep Excavations	1	1	1	1	4	4	Low
		Boreholes/Piling	1	1	1	1	3	3	Low
Low	UXB	Shallow Excavations	1	1	1	1	5	5	Low
		Deep Excavations	1	1	1	1	5	5	Low
		Boreholes/Piling	1	1	1	1	4	4	Low
	Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
		Deep Excavations	1	1	1	1	4	4	Low
		Boreholes/Piling	1	1	1	1	3	3	Low

PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow Excavations defined as <1.0m bgl.

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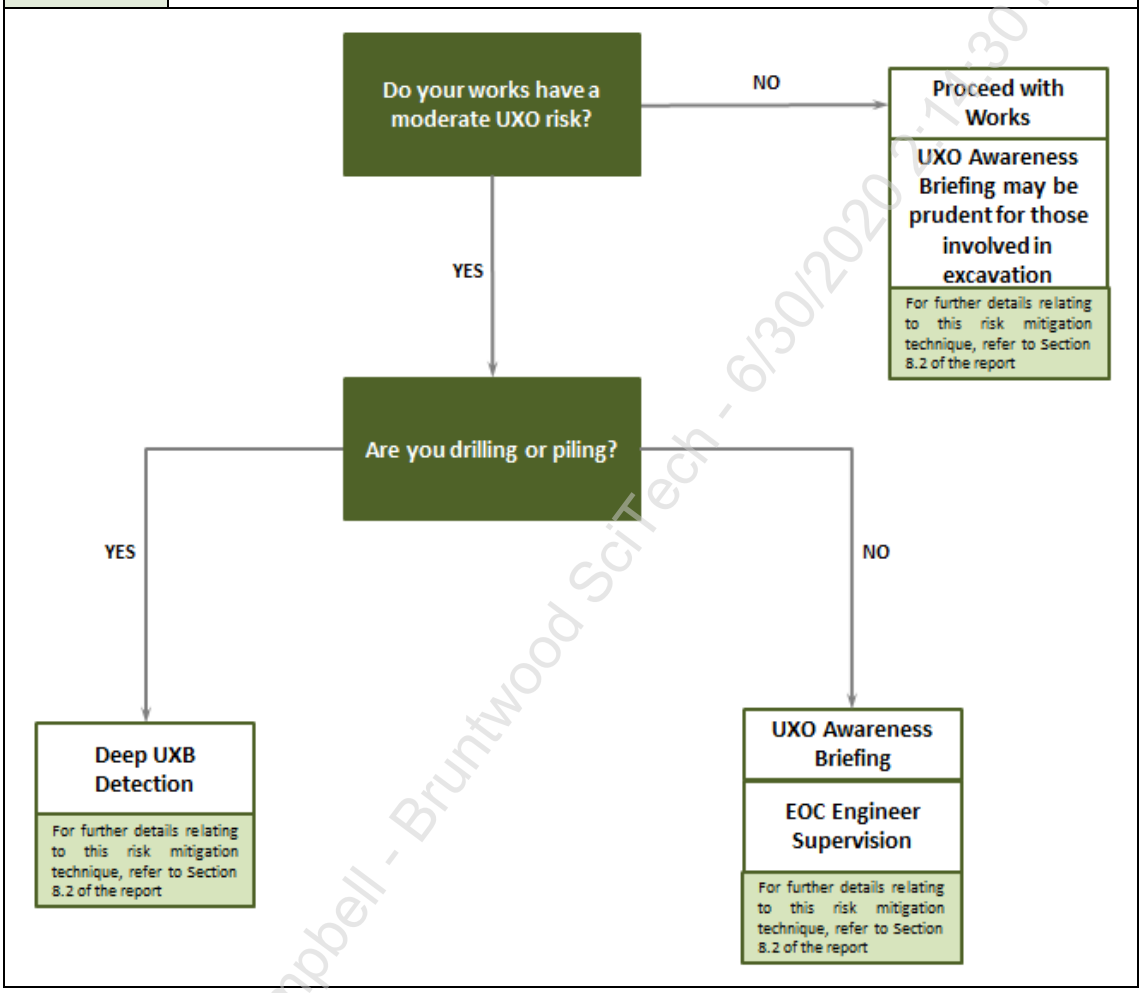
8 RISK MITIGATION PLAN

Key findings: Potential hazard from UXB on the central and southern parts of the Site.

Key actions: Deep UXB detection is required to clear borehole and pile locations and an EOC Engineer is required to supervise excavations in the moderate risk areas.

Figure 5 outlines the recommended steps to reduce the UXO risk to ALARP.

Figure 5 Recommended risk mitigation plan for the Site



8.1 UXO Risk Summary

Table 6 summarises the most appropriate risk mitigation recommendations for the proposed works on the Site.

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Table 6	Summary of UXO risk and mitigation recommendations

Proposed Works	UXO Risk	Recommended Mitigation
Excavations		**Proceed with works** – if additional comfort is required to address the residual UXO hazard, a formal UXO awareness briefing can be provided.
Boreholes/Piling		**Proceed with works**
Excavations		**EOC Engineer Supervision** – to ensure safety and minimise delays, Explosive Ordnance Clearance (EOC) Engineer supervision is recommended.
Boreholes/Piling		**Deep UXB detection –** to clear borehole or pile locations of potential UXB, an intrusive magnetometer survey should be undertaken until either the maximum bomb penetration or maximum drilling/piling depth is reached.

In summary, it is recommended that the excavations proposed within the moderate risk areas are supervised by an EOC Engineer.

As part of borehole or pile construction, we recommend that deep UXB detection is undertaken to ensure the safety of those working on Site and in the surrounding area.

8.2 Risk Mitigation Techniques

The section below provides further details of the recommended techniques for mitigating the UXO risk on the Site.

8.2.1 UXO Awareness Briefing

Typically ~1hour in duration, these briefings will be expected to provide site workers with:-

- Background to the potential UXO hazards that could be encountered.
- Awareness of how the UXO hazard could present a risk.
- Knowledge of what to do in the event that a suspect item is encountered.

The briefing is to be provided along with back-up materials such as UXO awareness posters, emergency contact numbers and other background information to assist site workers in becoming familiar with what potential UXO can look like.

The materials can also be used by key staff to pass on the relevant points of the induction to others who visit or work on the Site.

By providing the UXO awareness briefing, it ensures that in the unlikely event that UXO is encountered:-

- All site staff take appropriate action.
- A support mechanism and points of contact are established.
- The likelihood of harm to people or property is reduced.
- Significant delays to site work are prevented.

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8.2.2 EOC Engineer Supervision

Given the amount of Made Ground and the increased potential for buried obstructions on the Site, the effectiveness of a non-intrusive UXO detection survey is likely to be reduced.

It is considered more practical for an EOC Engineer to attend site and supervise during excavation works if required.

The EOC Engineer will carry out a visual assessment on any suspect items uncovered during the excavation works and classify them as potential UXO or other material.

If an item of UXO is uncovered, the EOC Engineer will liaise with the authorities and arrange for its disposal as appropriate.

8.2.3 Deep UXB Detection

To clear borehole or pile positions of potential UXB, an intrusive magnetometer survey should be undertaken.

The survey should be carried out to either the maximum bomb penetration depth or maximum drilling/piling depth, whichever is shallower.

There are two main systems available:-

MagDrill (Boreholes) – this is a system that is suitable for working with ground investigation drillers.

It allows a magnetometer to be lowered into the borehole to ensure the route is clear of potential UXB.

MagCone (Piles) – this is a CPT-based system that facilitates the pushing of a magnetometer into the ground at the proposed location of a pile.

MagCone is suitable for cohesive/loose soils and has a much higher speed of operation compared to MagDrill. It should be noted that where dense soils or buried obstructions are encountered, MagCone is unlikely to be able to penetrate to the required depth.

Detection - Typical radius of detection should be assumed as approximately 1.0m for a 50kg UXB until site conditions are confirmed.

Assuming no objects comparable to the UXB detection range are identified, then the borehole or pile position can be considered clear of UXB.

If any ferrous anomalies are identified at the borehole or pile position, then it may need to be relocated or the anomaly investigated.

It should be noted that in Made Ground or close to buried/adjacent structures, effective UXB detection is compromised due to geophysical noise.

A clearance report should be issued on completion of the site works.

8.3 What Do I Do Next?

If you wish to proceed with UXO risk mitigation, Zetica would be happy to assist. Just contact us via phone (01993 886682) or email (uxo@zetica.com) and we can provide a proposal with options and prices.

If you have other requirements (such as utility services mapping or mapping buried obstructions) we can also provide these surveys, often saving costs if combined with a UXO survey.

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If proposed works on the Site change, or additional works are planned, contact Zetica for a re-assessment of the UXO risk and the risk mitigation requirements.

APPENDICES

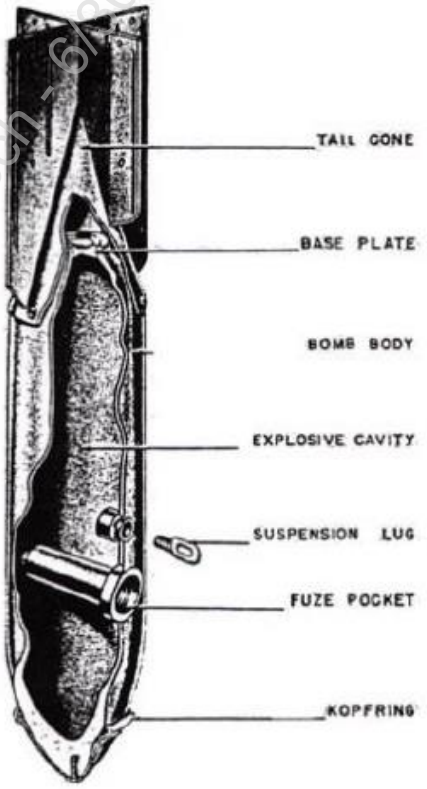
Appendix 1 Anticipated Ordnance Types

The most likely ordnance types to be encountered on the Site are detailed below. For a more comprehensive set of ordnance data sheets, see http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/.

Information Data Sheet

Category Bomb (Luftwaffe)
Type Sprengbombe-Cylindrisch (SC) 50kg

Variants	8
Body Dimensions	762 x 200mm (30" x 7.9")
Weight	55kg (122lbs)
Charge Weight	25kg (54lbs)
Fuze	Single electric impact fuze. Some have short time delay
Composition	Sheet steel
Description	Thick nose welded to a steel body. Nose may be attached to Kopfring (a triangular section steel ring) or spike. Suspension bolt in eye/body and sheet metal tail attached to body with rivets/screws. Originally painted green-grey with a yellow stripe on the tail. Cast TNT, Amatol or Trialen filling.
Function	Designed to maximise shock waves through air, water and earth and for general demolition. Used against easily damageable targets, including roads, aircraft hangars, rolling stock and small buildings. Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) were used against rail lines and country roads, with Kopfring used against naval targets.







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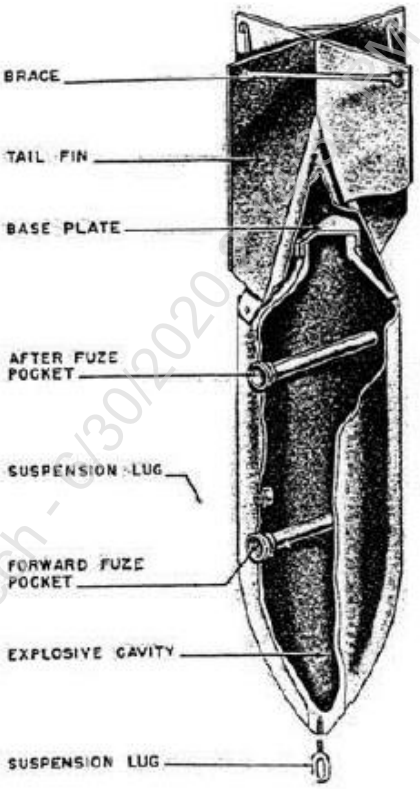
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Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 250kg

Variants	8
Body Dimensions	1194mm x 368mm (47" x 14.5")
Weight	249-264 kg (548-582lbs)
Charge Weight	130-145 kg (287-320lbs)
Fuze	Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze
Composition	Sheet steel with stays
Description	Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring) or spike. Sheet metal tail attached to body with rivets/ screws. Suspension eye bolt in the nose/body. Originally painted green-grey with a yellow stripe on the tail. TNT; amatol; TNT and aluminium powder, naphthalene, ammonium nitrate and wax/ wood meal filling.
Function	Designed to maximise shock waves through air, water and earth and general demolition. Used against railway installations, large buildings, ammunition depots and below-ground installations (to 8m). Spike bombs/ 'Stabo' (SC 50 with spikes attached to nose) used against rail lines and country roads.







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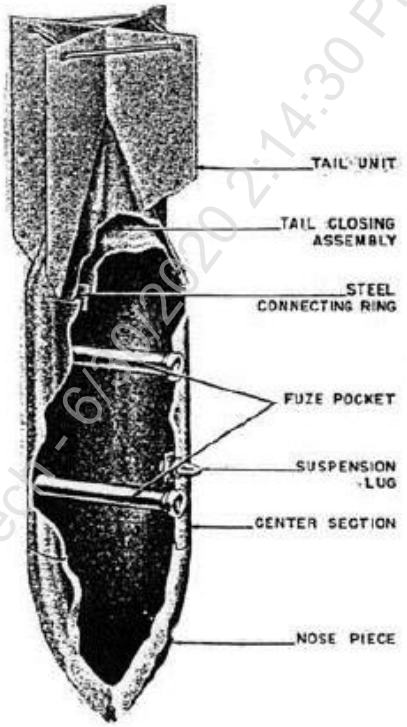
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Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 500kg

Variants	-
Body Dimensions	1414–1486mm x 470mm (55.7-58.5" x 18.5")
Weight	500kg (1,100lbs)
Charge Weight	220kg (484lbs)
Fuze	Electric impact fuze/electric clockwork time fuse & electric anti-disturbance fuze.
Composition	Sheet steel with stays or drum
Description	Thick nose welded to steel body. Nose may be attached to Kopfring (triangular section steel ring). Tail either steel sheet or drum-shaped. Suspension band. Originally painted green-grey/ buff (some later versions sky blue) with yellow stripe on tail. Filled with amatol, TNT or trialen.
Function	Designed to maximise shock waves through air, water and earth and for general demolition. Used against railway property, large buildings, shipping and below-ground installations.







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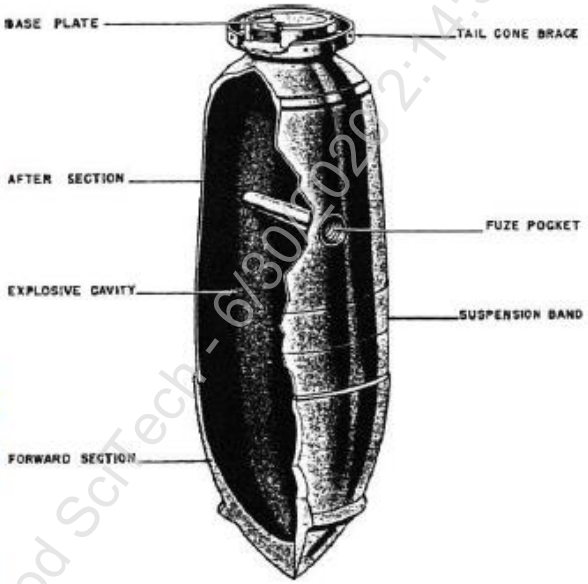
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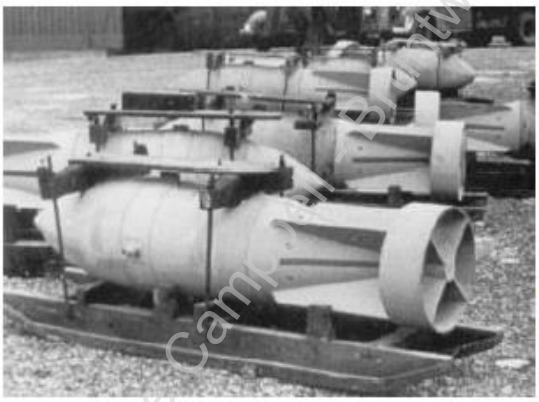
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Information Data Sheet

Category Bomb
Type Sprengbombe-Cylindrisch (SC) 1,000kg (HERMANN)

Variants	3
Body Dimensions	1742-1905mm x 648–660mm (68.6-75" x 25.5-26")
Weight	1,000-1,088kg (2,204-2,398lbs)
Charge Weight	529-619kg (1,166-1,364lbs)
Fuze	Electric impact fuze/ electric clockwork time fuze & electric anti-disturbance fuze
Composition	Magnesium alloy with drum
Description	Thick nose welded to steel body. Nose attached to Kopfring (triangular section steel ring). Drum-shaped tail made of magnesium alloy. Suspension band. Originally painted sky-blue. Filled with amatol, TNT/aluminium/wood meal or trialen.
Function	Designed to maximise shock waves through air, water and earth and for general demolition.







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Information Data Sheet

Category Projectile
Type 3.7" Anti-Aircraft Shell

Variants	6
Body Dimensions	94mm x 360mm (3.7 x 14.7")
Weight	12.7kg (28lb)
Fuze	Mechanical time fuze
Composition	Cast steel
Description	Brass cartridge case. Square-based shell with tapered nose, filled with Amatol, TNT or RDX/TNT. MK6 had forward centring bands and a wider driving band.
Function	Used as a defence against enemy aircraft, fired from fixed batteries and mobile mountings. Could fire approximately 20 rounds per minute with a maximum ceiling of 41,000ft and horizontal range of 20,600 yards.







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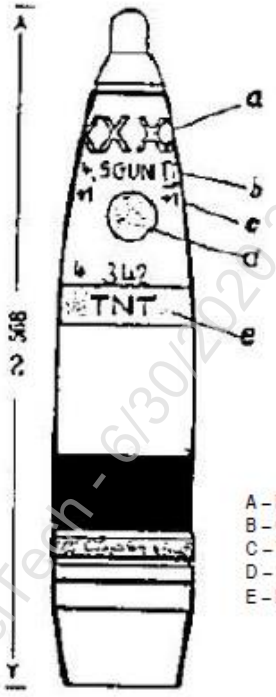
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Information Data Sheet

Category Projectile
Type 4.5" Shell (Mark II – Anti-Aircraft)

Variants	-
Body Dimensions	114mm x 566mm (4.5" x 21.9")
Weight	24.9kg (55lb)
Fuze	Mechanical time fuze
Composition	Cast steel
Description	Square-based, tapered-nosed shell filled with TNT or Amatol. Steel casing, rotating band of either copper or gilding metal located 3.5" in front of the base end with single groove.
Function	Used as field artillery and adapted for use in anti-aircraft defence from fixed batteries. Rate of fire of 8 rounds per minute, maximum ceiling of 44,000ft and horizontal range of 22,800 yards.



A – Missile Identification
B – Gun and Bullet Type
C – Weight
D – Smoke pot
E – Explosives Ring







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Appendix 2 Sources of UXO Hazard

The sections below provide background information on the most likely sources of UXO hazard affecting the Site. For a more comprehensive set of UXO information sheets, see http://zeticauxo.com/downloads-and-resources/uxo-information-sheets/.

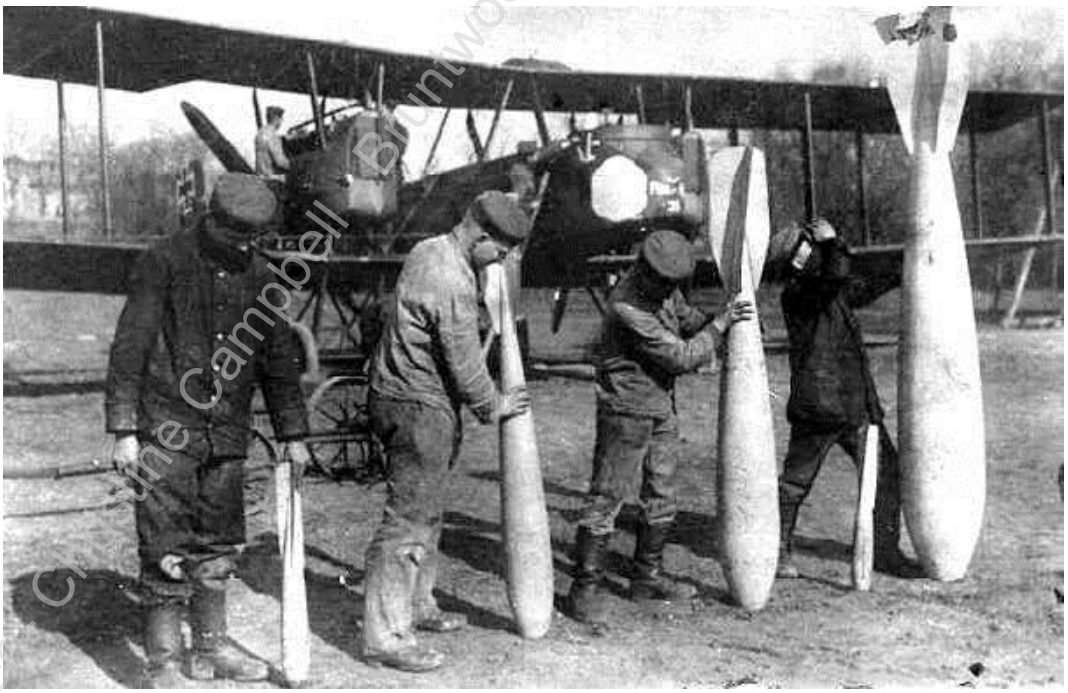
Appendix 2.1 WWI Bombing

It is not generally realised that during World War One (WWI) significant bombing took place across some areas of the UK. An estimated 9,000No. German bombs were dropped on Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used. More than 1,400No. people were killed during these raids.

Most air raids were carried out on London and Southeast England. Areas along the East Coast were also targeted regularly due to their proximity to the European continent. Bombing raids further inland were rare and West England and Wales were out of reach for German aircraft of the time.

Aerial bombing during WWI initially relied on visual aiming, with bombsights not developed until later in the war. The inaccuracy inherent in this method meant that bombs often fell some way from their intended targets.

The first recorded raid against England occurred on the 21st December 1914 when 2No. high explosive bombs fell near the Admiralty Pier at Dover. Zeppelin raids intensified during 1915 and 1916, with aircraft raids becoming more frequent after 1917. The last raid of WWI took place on the 19th May 1918, when 38 Gotha and 3 Giant aircraft bombed London and surrounding districts, dropping a total of more than 2,500lbs of bombs.



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The potential of coming across an Unexploded Bomb (UXB) from WWI is far less likely than a WWII UXB given the lower bombing densities during raids in the Great War.

Some areas which were subjected to sustained bombing raids, such as parts of London and coastal towns, recorded a higher number of UXB. In these areas, where there has been no significant development for the last century, the potential of a UXB remaining from WWI cannot be totally discounted.

Appendix 2.2 WWII Bombing

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, harbours, industrial premises, power stations and airfields. In addition to London, industrial cities and ports, including Birmingham, Coventry, Southampton, Liverpool, Hull and Glasgow, were heavily targeted, as well as seaside towns such as Eastbourne and cathedral cities such as Canterbury.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied Incendiary Bombs (IBs) to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.



Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact. PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration.

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Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

In 1944, the Germans introduced new weapons; the V1, a 'flying bomb' and guided missile, and the V2, a ballistic missile rocket that travelled at such speed that no one could see or hear its approach. London was the main target for these attacks.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.



It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any Unexploded Bombs (UXB) or other UXO. In more rural areas, fewer bombing raids occurred. It is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling in rural and coastal areas. Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid anti-aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural and coastal areas often went unrecorded or entered as 'fell in open country' or 'fell in the sea'. The Luftwaffe are thought to have dropped approximately 75,000 tons of bombs on Britain throughout the Second World War and an estimated 11% of all bombs dropped during the war failed to detonate.

The potential for a UXB hazard to exist on a site depends on a variety of factors. Were there strategic targets in the surrounding area? Was the site bombed? Could a UXB impact have been missed? Even in rural areas, the potential for UXB cannot be totally discounted and therefore it is essential that detailed local bombing records are obtained when assessing the UXB hazard on any site.

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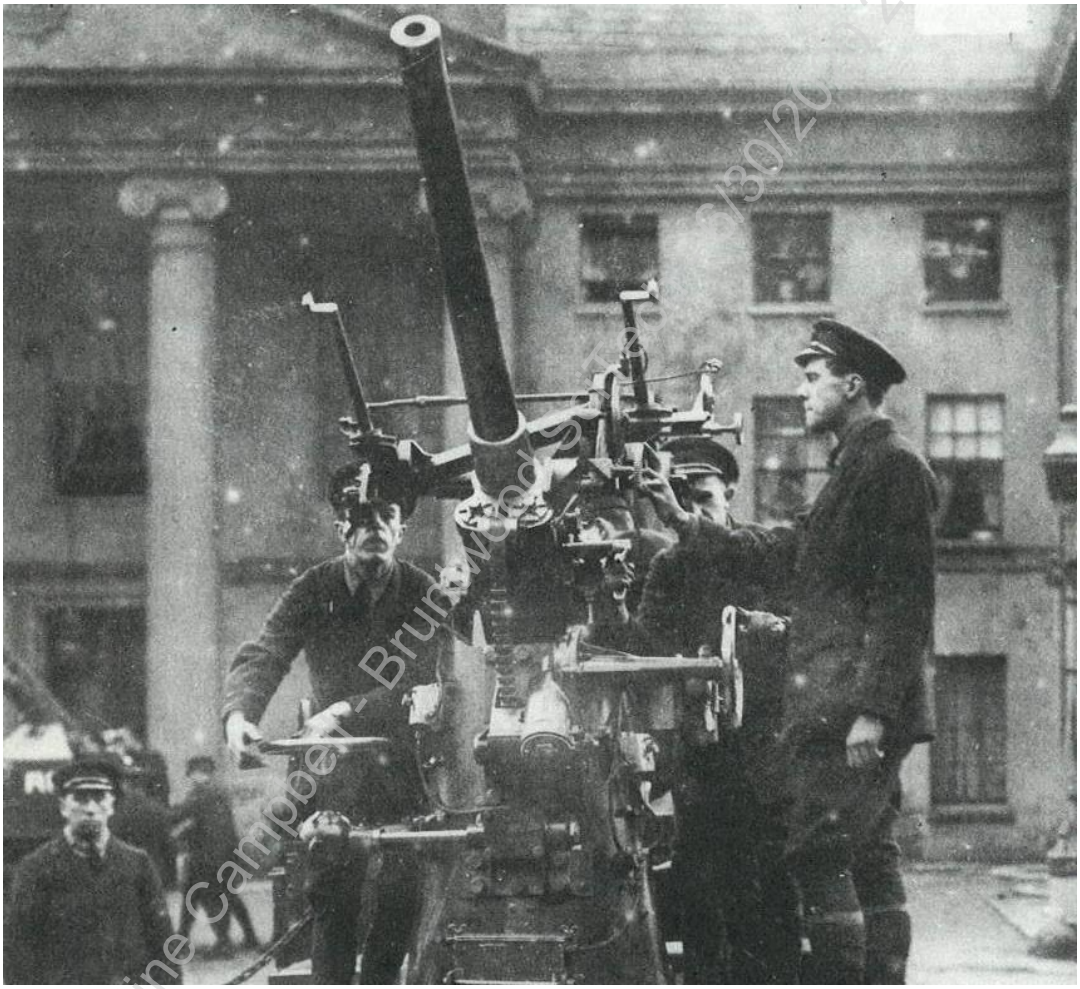
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Appendix 2.3 Anti-Aircraft Guns

As aerial bombardment first began during WWI, Anti-Aircraft (AA) gun batteries were established were gradually established throughout much of England to counter German bombing raids. By June 1916, there were approximately 271No. AA guns and 258No. searchlight installations defending London alone.

Common AA defences during WWI included 3-inch, 75 millimetre, 6-pounder and 1-pounder guns. Many of these guns were mobile, being mounted on lorry chassis. They were driven about following the course of an airship and fired from any area of open land.

During WWI, Unexploded AA (UXAA) shells, could land up to 13km from the firing point, although more typically fell within 10km.



AA gun batteries were used extensively during WWII to counter the threat posed by enemy aircraft. In many instances, AA shells caused damage to Allied territory and in some areas caused significant numbers of civilian fatalities.

During WWII, AA shells could land up to 27km from the firing point, although more typically fell within 15km. These could be distributed over a wide area.

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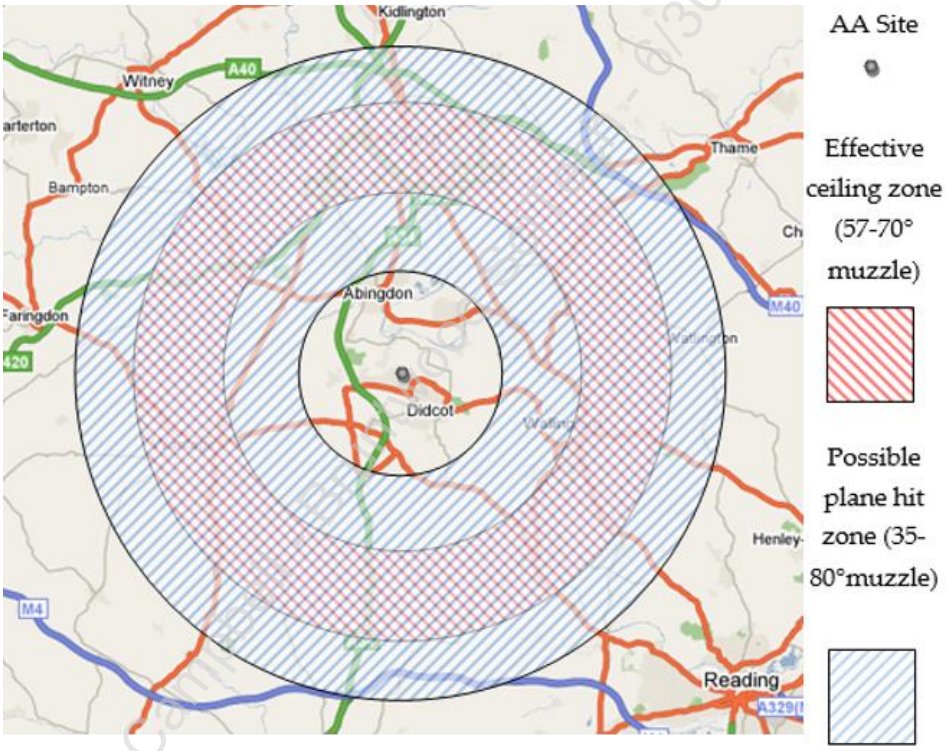
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3No. types of AA batteries existed:

- **Heavy Anti-Aircraft (HAA)** batteries of large guns (typically 3.7", 4.5" and 5.25" calibre) designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- **Light Anti-Aircraft (LAA)** weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields. They typically fired 40mm shells and machine gun ammunition.
- **Rocket batteries (ZAA)** firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were typically permanent emplacements.

Unexploded AA (UXAA) shells were a common occurrence during WWII. As the figure below demonstrates, shells were unlikely to fall in the immediate vicinity of a gun battery but in the surrounding area. This would be dependent upon the angle of fire and the flight height of the attacking aircraft.



AA batteries were deliberately targeted by the Luftwaffe and therefore areas surrounding a gun battery may have a greater risk of UXB being present.

Munitions stores were also established around AA batteries. These stored the shells for the batteries and small arms ammunition for troops manning the position. Such stores were typically removed at the end of WWII, although some disposal may have occurred in the immediate vicinity of the gun battery.

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Appendix 3 Recent UXO Finds

UXO finds in the UK are a regular occurrence, although they almost never result in an accidental detonation.

It is still important to note that explosives rarely lose effectiveness with age. In some instances, mechanisms such as fuzes and gaines can become more sensitive and more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of an accidental UXO detonation are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved. Such occurrences are largely restricted to current theatres of war and overseas minefields, with occasional events in mainland Europe.

The sections below provide a brief summary of recent significant UXO finds in the UK. To keep up to date with the latest UXO finds, visit http://zeticauxo.com/news/.

On the 15th May 2017, 1No. suspected 250kg German UXB was found on a building site in Aston, Birmingham. Due to the corrosion of the fuzes, the UXB was destroyed in situ on the 17th May 2017.

On the 4th September 2017, 1No. 50kg UXB was found in a ragstone quarry at Kings Hill near West Malling in Kent. It was destroyed in situ in a controlled explosion by an EOD team.

On the 11th February 2018, 1No. 500kg UXB was found in King George V Dock in London, resulting in the temporary closure of the adjacent London City Airport. The UXB was freed from a silt bed and towed along the River Thames to Shoeburyness where it was destroyed in a controlled explosion.

On the 26th February 2018, an EOD team destroyed numerous items of ordnance including shells and 20mm ammunition which had been exposed by storms on Selsey beach. A similar operation was required after more UXO finds on the beach in April 2018.

On the 31st March 2018, 2No. 870lb British PMs were found in waters off Guernsey. They were destroyed in controlled explosions.

On the 20th May 2018, a 1,000kg German sea mine washed ashore at Elmer beach near Bognor Regis, West Sussex. A 1 mile exclusion zone was enforced before an EOD team towed the device out to sea for a controlled explosion.

On the 24th May 2018, numerous ordnance-related items were found on a proposed residential development in Burntwood, Staffordshire.

On the 10th July 2018, a suspected 1,000kg German UXB was found by scuba divers near Teignmouth Pier in Devon. The UXB was towed out into open sea by a RN EOD team for a controlled explosion.

On the 30th August 2018, a 2,000lb German PM was trawled up by a fishing vessel off Mersea in Essex. The PM was moved to an area of open sea where it was destroyed in a controlled explosion by a RN EOD team.

On the 29th November 2018 a large naval projectile was found at Wembury Point, Plymouth. It was destroyed in a controlled explosion.

During January and February 2019 a military EOD was called out to deal with several items of UXO washed up at Medmerry Beach in Selsey. The site of a former gunnery range, it followed on from several similar incidents in 2018.

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On the 21st January 2019 a suspected 1,000lb torpedo was brought into Brixham Harbour by a fishing trawler. It was towed back out to sea and destroyed by a Naval EOD team.

On the 6th February 2019 3No. WWII projectiles were found on Chalkwell Beach near Southend-on-Sea, Essex. They were destroyed in a controlled explosion.

On the 19th February 2019 6No. projectiles were found on the beach at Lilstock, Somerset.

On the 14th March 2019 an unexploded pipe mine was found at the former RAF Manston airfield near Ramsgate, Kent. It was destroyed in a controlled explosion.

On the 21st March 2019 2No. unexploded shells were found on a building site in Brighton. They were removed by an EOD team.

On the 25th March 2019 an unexploded shell was found in Stechford, Birmingham. It was removed to a field and destroyed in a controlled explosion.

On the 22nd May 2019 70No. Self-Igniting Phosphorus (SIP) grenades were found during development works at Tongland Dam in Dumfries & Galloway, Scotland. They were destroyed in a controlled explosion.

On the 23rd May 2019 a 250kg German UXB was found by workers on a building site at Kingston University in London (see plate below). The UXB could not be safely removed and was consequently destroyed in situ by an EOD team.



On the 27th May 2019 24No. SIP grenades were found in a field near Sibton in Suffolk. An EOD team constructed a 2ft deep trench into which the grenades were placed before being destroyed in a controlled explosion.

On the 7th June 2019 a 50kg German fragmentation UXB was found at a building site in Kings Hill at the former RAF West Malling airfield. It was destroyed in a controlled explosion by an EOD team the following day.

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Appendix 4 Glossary and Definitions

Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Conflagration	A very large self-sustaining destructive fire.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.
Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

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Explosive Substances and Articles (ESA)	Explosive substances are solid or liquid substances (or a mixture of substances), which are either: • capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. • designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction. Explosive article is an article containing one or more explosive substances.
Fuze	A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.
Gaine	Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.
Geophysical survey	A geophysical survey is essentially a range of methods that can be used to detect objects or identify ground conditions without the need for intrusive methods (such as excavation or drilling). This is particularly suited to ordnance as disturbance of ordnance items is to be avoided where ever possible.
Gold line	This is the estimated limit of blast damage from an explosive storage magazine. It usually means that development within this zone is restricted.
High Explosive	Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).
Munition	Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:- • inert - contain no explosives whatsoever. • live - contain explosives and have not been fired. • blind - have fired but failed to function as intended.

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Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.
Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.
Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Small Arms Ammunition (SAA)	SAA includes projectiles around 12mm or less in calibre and no longer than approximately 100mm. They are fired from a variety of weapons, including rifles, pistols, shotguns and machine guns.
Unexploded Anti-Aircraft (UXAA) Shell	UXAA shells are army ordnance commonly containing HE, though they can also contain pyrotechnic compounds that produce smoke. Most commonly, these were 3.7" and 4.5" HE shells, although they ranged from 2" to 5.25" calibre.
Unexploded Bomb (UXB)	UXB is a common term for unexploded air-dropped munitions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.
V1	The Vergeltungswaffe-1, V-1, also designated Fieseler Fi 103/FZG-76, known colloquially in English as the Flying Bomb, Buzz Bomb or Doodlebug, was the first guided missile used in WWII and the forerunner of today's cruise missile.
V2	The Vergeltungswaffe 2 (V-2) ('Reprisal Weapon 2') was the first ballistic missile. It was used by the German Army primarily against Belgian and British targets during the later stages of WWII. The V-2 was the first man-made object launched into space, during test flights that reached an altitude of 189km (117 miles) in 1944.

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Appendix 5 WWII Bombing Incident List

31st August 1940

1No. HE bomb fell on the College of Technology, on the Site.

1No. HE bomb fell on 53 Sackville Street, on the north-western boundary of the Site.

1No. HE bomb fell on the corner of Bombay Street and Venice Street, approximately 60m west of the Site.

1No. HE bomb fell on the south-west end of Bridgwater House, Whitworth Street, approximately 0.2km northwest of the Site.

1st October 1940

IBs (unspecified number) fell between Ardwick Green North and Dolphin Street, within approximately 0.3km southeast of the Site.

11th October 1940

1No. HE bomb fell on 36 Sackville Street, approximately 0.1km northwest of the Site.

1No. HE bomb fell on the junction of Sackville Street and Richmond Street, approximately 0.1km northwest of the Site.

1No. HE bomb fell on 60 Richmond Street, approximately 0.1km northwest of the Site.

22nd-23rd December 1940

Manchester and Salford were heavily bombed between the 22nd and 24th December 1940 (the 'Manchester Blitz'). Over 400No. HE bombs and more than 30,000No. IBs fell across the region.

1No. HE bomb fell on the East India Finishing Works, on the Site.

1No. HE bomb fell on The Albion Inn, Temple Street, on the Site.

1No. HE bomb fell on the junction of Jackson Street and Temple Street, on the Site.

1No. HE bomb fell on 85 Sackville Street, on the Site.

IBs (unspecified number) fell across Sackville Street, on the Site.

HE bombs (unspecified number) fell between Cooke Street, Gray Street and Grosvenor Street, adjacent to the south-western boundary of the Site.

IBs (unspecified number) fell on Whitworth Street, adjacent to the northern boundary of the Site.

IBs (unspecified number) fell on Princess Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on the Manchester South and Altrincham Railway Viaduct, adjacent to the north-eastern boundary of the Site.

IBs (unspecified number) fell on Cooke Street, adjacent to the south-western boundary of the Site.

1No. HE bomb fell on 17 Cooke Street, adjacent to the western boundary of the Site.

1No. HE bomb and 1No. IB fell on 4 Whitworth Street, approximately 40m northwest of the Site.

1No. HE bomb and IBs (unspecified number) fell on 10 Charles Street, approximately 60m west of the Site.

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1No. PM fell on 77 Temple Street, approximately 0.1km south of the Site.

1No. HE bomb fell on 93 Temple Street, approximately 0.1km south of the Site.

1No. HE bomb fell on 17 Sackville Street, approximately 0.1km north of the Site.

1No. PM and 1No. HE bomb fell on 36 Richmond Street, approximately 0.1km north of the Site.

1No. HE bomb fell on Russel Street, approximately 0.1km south of the Site.

1No. HE bomb fell on 27 Richmond Street, approximately 0.1km north of the Site.

1No. PM fell between Penley Street and Buxton Street, approximately 0.1km east of the Site.

1No. HE bomb fell on the Neptune Hotel, Temple Street, approximately 0.1km south of the Site.

IBs (unspecified number) fell on Greek Street, within approximately 0.1km south of the Site.

1No. HE bomb fell on the Charles Street engineering works, approximately 0.2km west of the Site.

IBs (unspecified number) fell on 6 Chorlton Street, approximately 0.2km north of the Site.

1No. HE bomb fell on 13 Sackville Street, approximately 0.2km north of the Site.

1No. HE bomb fell on 22 Sackville Street, approximately 0.2km north of the Site.

1No. PM and 1No. HE bomb fell on Greek Street, approximately 0.2km south of the Site.

1No. PM fell on the Chapelfield India Rubber Works, approximately 0.2km southeast of the Site.

1No. HE bomb fell on Sheffield Street, approximately 0.2km northeast of the Site

2No. HE bombs fell on the junction of Oxford Road and Grosvenor Street, approximately 0.2km south of the Site.

1No. HE bomb fell on 36 Silver Street, approximately 0.3km north of the Site.

Several HE bombs and IBs were recorded falling between 30 and 50 Major Street, within approximately 0.3km north of the Site.

1No. HE bomb fell on Rushmore Road, Mortuary Chapel, approximately 0.3km south of the Site.

1No. HE bomb fell on 44 Downing Street, approximately 0.3km southeast of the Site.

1No. IB fell on Mayfield Station approximately 0.3km east of the Site.

1No. HE bomb fell on 36 Silver Street, approximately 0.3km north of the Site.

1No. PM fell to the north of Mayfield Station, approximately 0.3km east of the Site.

11th March 1941

1No. HE bomb fell on 2 Cooke Street, adjacent to the south-western boundary of the Site.

1st-2nd June 1941

Approximately 110No. bomber aircraft attacked Manchester, dropping 42No. HE bombs and many IBs.

1No. HE bomb fell on 20 Temple Street, on the Site.

2No. HE bombs and 2No. IBs fell on Mount Street, on the Site.

1No. HE bomb fell on the Jackson Street Cotton Mills, on the Site.

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1No. HE bomb and 1No. IB fell on the College of Technology, on the Site.

1No. HE bomb fell at the junction of London Road and Jackson Street, adjacent to the south-eastern boundary of the Site.

1No. HE bomb fell on Princess Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on 63 Sackville Street, adjacent to the north-western boundary of the Site.

1No. HE bomb fell on 25 Granby Row, adjacent to the north-eastern boundary of the Site.

1No. HE bomb fell on the Police Headquarters, approximately 60m northeast of the Site.

1No. HE bomb fell on Grosvenor Street, within approximately 0.1km south of the Site. This was recorded as UXB.

1No. HE bomb fell on Russel Street, approximately 0.1km south of the Site.

1No. HE bomb fell on the Bulls head hotel, Whitworth Street, approximately 0.1km west of the Site.

1No. IB fell on 3 Greek Street, approximately 0.2km south of the Site.

1No. HE bomb fell on a Church and Sunday School, Rusholme Road, approximately 0.3km south of the Site.

1No. HE bomb fell on Rusholme Road Cemetery, approximately 0.3km south of the Site.

1No. HE bomb fell on 61 Rusholme Road, approximately 0.3km south of the Site.

27th July 1942

HE bombs (unspecified number) fell on Russel Street, approximately 0.1km south of the Site.

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Appendix B

Ecological Constraints Assessment

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Memorandum

ARUP

To	Paul Roberts Oliver Cottam	Date	12 September 2019
Copies	Rory Canavan Victoria Newlove Lee Jordan Jordan Weddepohl Bill Wilkins	Reference number	265190-00
From	Joseph Shepherdson	File reference	4-05-14
Subject	ID Manchester (previously called The University of Manchester North Campus), Ecological Constraints Assessment		

ID Manchester Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

1 Introduction

Ove Arup and Partners (Arup) was commissioned by CBRE on behalf of The University of Manchester (UoM) to undertake an ecological constraints assessment of an 11.8ha parcel of The UoM estate (the site).

The site is located in an urban setting in central Manchester. It is bounded by London Road (A6) to the east, Mancunian Way (A57(M)) to the south, Princess Street (A34) to the west and Whitworth Street (B6469) to the north.

2 Methodology

The ecological constraints study assessed 23 locations, which have been identified for ground investigations (see Table 2 and Drawing UMNC-ARUP-ZZ-XX-DR-CG-0006). A Preliminary Ecological Appraisal and a desk study were not undertaken at this stage.

During the ecological constraints assessment, signs of protected/notable species were recorded if observed. In addition, the habitats adjacent to proposed ground investigation were assessed as to their potential to support protected species. The protected species groups sought/assessed included:

- Mammals.
- Birds.
- Herpetofauna (amphibians and reptiles).
- Invertebrates.

An external bat roost suitability assessment of all buildings and trees adjacent to ground investigation locations was undertaken to determine their suitability to support roosting bats. The survey was conducted externally from the ground using binoculars. The survey followed standard

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methodology detailed within the Bat Conservation Trust Good Practice Guidelines[1]. Each tree adjacent to proposed ground investigations were inspected for signs of bat presence including:

- bat droppings;
- scratch and grease marks;
- live or dead bats; and
- noises of bats calling from within the roost.

In addition, features searched for on buildings adjacent to the proposed ground investigations included:

- cracked, missing or lifted roof tiles;
- missing mortar in walls;
- gaps in soffits, fascia or barge boards;
- presence of a cavity wall, and
- any cracks or gaps at least 10mm in size.

The assessment categories used are explained in Table 1.

Table 1: Bat roost suitability categories.

Bat Roost Suitability[1]	Roosting Habitats Description
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only).
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity of hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.
Negligible	Buildings or trees with no potential to support bats.

[1] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

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2.1 Invasive Species

The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA) is extensive and these plants are found in a range of different environments, including aquatic habitats. The survey checked, in particular, for the presence of Japanese knotweed *Reynoutria japonica*, giant knotweed *Reynoutria sachalinensis*, *Reynoutria japonica* x *Reynoutria sachalinensis,* (a hybrid knotweed), giant hogweed *Heracleum mantegazzianum,* and Himalayan balsam *Impatiens glandulifera*.

3 Results

The site predominantly comprises buildings and hardstanding, with areas of amenity grassland and scattered broadleaved trees and scrub.

No waterbodies are present on the site and no waterbodies were identified within 250m of the site.

The results of the ecological constraints assessment at each proposed ground investigation location is detailed in Table 2.

Table 2: Ecological constraints associated with proposed ground investigation.

Proposed Borehole/Trial Pit	Ground Investigation	Approx. Location	Value to Ecology	Ecological Constraint Present (Y/N)
BH001	Percussive borehole with rotary coring	SJ84559764	None.	N
BH002	Percussive borehole	SJ84669762	Located adjacent to silver birch *Betula pendula* tree.	Y
BH003	Percussive borehole	SJ84639760	Located adjacent to ornamental scrub.	Y
BH004	Percussive borehole with rotary coring	SJ84559755	None.	N
BH005	Percussive borehole with rotary coring	SJ84659755	Three beech *Fagus sylvatica* and one Japanese maple *Acer japonicum* present in proximity to the borehole.	Y
BH006	Percussive borehole	SJ84739761	Located adjacent to two sycamore *Acer pseudoplatanus* trees and ornamental scrub.	Y
BH007	Percussive borehole with rotary coring	SJ84769759	None.	N
BH008	Percussive borehole	SJ84769756	None.	N
BH009	Percussive borehole	SJ84759755	None.	N

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BH010	Percussive borehole with rotary coring	SJ84589746	None.	N
BH011	Percussive borehole with rotary coring	SJ84719750	Ten sycamore and one rowan *Sorbus aucuparia* tree present in close proximity to the borehole. In addition, two bird boxes were observed on the sycamore trees.	Y
BH012	Percussive borehole	SJ84619764	None.	N
BH013	Percussive borehole with rotary coring	SJ84389754	Four sycamore trees present.	Y
BH014	Percussive borehole	SJ84499756	None.	N
HC001	Horizontal core	SJ84569762	There is a large cavity present in the wall at approximately SJ84569762. Cavity is approximately 30cm x 30cm square hole and looks to extend behind the clad wall.	Y
HC002	Horizontal core	SJ84599763	None.	N
HC003	Horizontal core	SJ84629765	None.	N
HC004	Horizontal core	SJ84629749	None.	N
TP001	Trial pit	SJ84619754	Three London plane *Platanus x hispanica* trees present.	Y
TP002	Trial pit	SJ84629761	None.	N
TP003	Trial pit	SJ84789751	Located adjacent to approximately five sycamore trees.	Y
DS001	Dynamic sample with rotary core	SJ84779752	None.	N
DS002	Dynamic sample with rotary core	SJ84759749	None.	N

4 Recommendations

Ecological constraints were recorded in proximity to nine locations proposed for ground investigation. It is recommended that all boreholes/trial pits are repositioned to avoid the features detailed in Table 2. An ecologist should be consulted to agree a suitable alternative location for these boreholes. Where this is not feasible, alternative recommendations are outlined in Table 3.

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Memorandum

Table 3: Ecological recommendations for proposed ground investigation.

Point ID	Recommendation
BH002	BH002is located adjacent to a semi-mature silver birch tree. The tree is spindly and was recorded to provide negligible suitability for roosting bats. However, the tree is suitable for breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way (CRoW) Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, this should take place outside of the breeding bird season and the tree should be replaced at a ratio of 2:1.
BH003	BH003 is located adjacent to scrub, which provides suitable opportunities for breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement.
BH005	BH005 is located in close proximity to three beech and one Japanese maple trees. The trees did not provide potential roost features (PRFs) for bats and consequently were deemed to have negligible suitability for roosting bats. However, the trees provided suitable opportunities for breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, and the tree should be replaced at a ratio of 2:1.
BH006	BH006 is located adjacent to two sycamore trees and ornamental scrub. The trees were of negligible suitability for roosting bats. However, the trees and scrub are suitable for breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, the tree should be replaced at a ratio of 2:1.
BH011	BH011 is located adjacent to approximately ten sycamore trees and one rowan tree. The trees were deemed to be suitable for breeding birds. In addition, two bird boxes were observed on the sycamore trees. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation should be replaced at a ratio of 2:1. It is recommended that bird nest boxes are removed prior to works commencing, and re-located on site, following consultation with an ecologist.
BH013	BH013 is located adjacent to four sycamore trees. Although all have negligible suitability to roosting bats, they are of value to breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is

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Memorandum

	scheduled these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, and the tree should be replaced at a ratio of 2:1.
HC001	A large cavity approximately 30cm x 30cm is present in the wall at approximately SJ84569762. This was identified as having moderate suitability for roosting bats. British bat species are fully protected through their inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species Regulations 2010 (as amended). Under the legislation, it is an offence to intentionally kill, injure or take a bat as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a bat or disturb an animal while it is occupying a structure or place which it uses for that purpose. It is recommended that ground investigation within 30m of the cavity are avoided to prevent disturbance to this potential roost. If a 30m buffer cannot be applied, an ecologist should be consulted as further surveys for bats will be required (May-September).
TP001	TP001 is located adjacent to three London plane trees. Although all have negligible suitability to roosting bats, they are of value to breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, and the tree should be replaced at a ratio of 2:1.
TP003	TP003 is located adjacent to approximately five sycamore trees. All five were deemed to have negligible bat roost suitability. However, they are of value to breeding birds. All wild birds, their nests, and their eggs are afforded legal protection through the provisions in the Wildlife and Countryside Act 1981 (as amended) and the CRoW Act 2000. Consequently, works which are likely to disturb breeding birds must be carried out outside of the breeding bird season (March – August inclusive). If work is scheduled within these months, an ecologist should be consulted prior to commencement. If a tree must be felled to allow for ground investigation, and the tree should be replaced at a ratio of 2:1.

This memo is the result of survey work undertaken in September 2019. This report refers, within the limitations stated, to the condition of the proposed scheme site at the time of the inspections. Changes in legislation, guidance, best practice, etc. may necessitate a re-assessment/survey. It is also advised that if there is a delay of over a year in undertaking the works, a re-survey may be required. No warranty is given as to the possibility of future changes in the condition of the site.

This report is produced solely for the benefit of CBRE and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

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A3

384400 384600 384800

397600

BH001 HC003 BH012 HC002 HC001 BH002 TP002 BH006 BH003 BH007 BH014 BH004 BH005 BH008 BH009 BH013 TP001 DS001 TP003 BH011 HC004 DS002 BH010

Bruntwood - 6/30/2020 2:14:30 PM
Bruntwood
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Key

- Percussive borehole
- Percussive borehole with rotary coring
- Dynamic sample with rotary coring
- Horizontal core
- Trial pit
- Site Boundary

Issue	Date	By	Chkd	Appd
P2	22/08/2019	MG	CL	MW

Metres

0 20 40 80

ARUP

6th Floor, 3 Piccadilly Place
Manchester M1 3BN
Tel+44(0161) 228 2331 Fax+44(0161)228 6879
www.arup.com

Client
University of Manchester

Project Title
North Campus

Drawing Title
Preliminary Ground Investigation: Aerial Imagery of Site

Scale at A3
1:1,400

Arup Job No	Suitability	Rev
265190-00	**Preliminary**	**P2**

Name
UMNC-ARUP-ZZ-XX-DR-CG-0006

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\\Globaleurope\Manchester\Jobs\265000\265190-00 - University Of Manchester North Campus\4 Internal Project Data\4-03 Drawings\3_GIS\Workspaces\CG_Constraints_DR_0001_0004.mxd

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Appendix C

Human Health Screening Assessment

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Commercial (1% SOM)

Soil concentration exceeds GAC 100

Hole Ref	ARP-BH001	ARP-BH001	ARP-BH002	ARP-BH002	ARP-BH003	ARP-BH003	ARP-BH004	ARP-BH004	ARP-BH005	ARP-BH006	ARP-BH006A
Easting	384566.052	384566.052	384655.294	384655.294	384633.942	384633.942	384554.516	384554.516	384655.497	384734.367	384728.887
Northing	397646.557	397646.557	397617.594	397617.594	397602.655	397602.655	397582.476	397582.476	397554.645	397611.677	397614.035
Elevation (mOD)	37.81	37.81	33.265	33.265	33.095	33.095	34.223	34.223	33.424	33.967	33.996
Sample Top (m)	1.00	3.00	1.00	2.50	1.00	3.50	2.30	5.30	1.00	1.20	1.00
Sample Elevation (mOD)	36.81	34.81	32.27	30.77	32.10	29.60	31.92	28.92	32.42	32.77	33.00
Sample Date	43764	43765	43771	43771	43771	43771	43771	43771	43785	43771	43786
Investigation	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019
Geology	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max											
Asbestos (Presence of)	Presence	---	0 of 51	0	0.0		NAD	NAD	NAD	NAD	Amosite	NAD	NAD	NAD	NAD	Amosite	NAD
Asbestos Analysts Comments	None	---	0 of 51	2	0.0		na	na	na	na	Small bundle	na	na	na	na	Small bundle	na
Asbestos quantification	None	%	3 of 8	0	0.2						<0.001					<0.001	
pH	None	pH Units	47 of 47	0	11.7		8.1	8.4	10.8	8.1	11.5	9.5	10.8	10.7	8.4	8.5	9.0
Cyanide	16200	mg/kg	25 of 47	0	11.0		< 0.1	0.1	< 0.1	1.0	0.2	0.3	0.4	9.0	0.1	1.0	11.0
Antimony	7350	mg/kg	26 of 30	0	260.0		1.5	1.4	1.9	5.8	1.4	1.1	2.4	2.0	3.0	3.2	9.1
Arsenic	635	mg/kg	48 of 49	0	87.0		9.1	10.0	7.7	21.0	10.0	8.2	9.4	13.0	35.0	20.0	25.0
Barium	22100	mg/kg	19 of 19	0	578.0												
Beryllium	11.7	mg/kg	47 of 49	0	2.1		0.9	0.7	0.6	1.1	0.3	0.3	0.5	0.5	1.1	1.3	0.8
Cadmium	190	mg/kg	39 of 49	0	1.2		0.3	0.2	< 0.1	0.4	0.2	< 0.1	1.2	0.5	0.2	0.7	0.8
Chromium	8570	mg/kg	49 of 49	0	210.0		23.0	17.0	14.0	210.0	10.0	11.0	12.0	20.0	25.0	21.0	17.0
Chromium - Hexavalent	49	mg/kg	1 of 47	0	0.3		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	68300	mg/kg	48 of 49	0	440.0		38.0	35.0	24.0	77.0	180.0	110.0	120.0	46.0	130.0	100.0	76.0
Lead	2300	mg/kg	48 of 49	1	2400.0		39.0	200.0	110.0	150.0	88.0	59.0	400.0	98.0	110.0	270.0	180.0
Mercury	289	mg/kg	37 of 49	0	1.6		< 0.05	0.2	0.1	0.2	1.6	0.1	0.4	< 0.05	0.1	0.5	0.4
Nickel	983	mg/kg	49 of 49	0	34.0		30.0	18.0	15.0	30.0	9.5	8.7	9.8	13.0	31.0	28.0	19.0
Selenium	12261	mg/kg	13 of 49	0	2.0		< 0.5	< 0.5	< 0.5	1.3	0.9	< 0.5	1.1	0.7	< 0.5	1.5	< 0.5
Vanadium	6360	mg/kg	49 of 49	0	48.0		29.0	25.0	21.0	32.0	16.0	18.0	23.0	18.0	35.0	39.0	27.0
Zinc	730000	mg/kg	49 of 49	0	620.0		60.0	43.0	43.0	100.0	74.0	31.0	310.0	91.0	96.0	180.0	130.0
Phenol	26000	mg/kg	0 of 47	0	0.0		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 0.1	<5.0	< 0.1
Total Organic Carbon	None	%	48 of 51	0	7.8		0.7	0.7	0.4	2.1	1.0	0.4	0.8	0.5	1.7	3.5	1.4
Benzene	26.5978811	mg/kg	0 of 39	0	0.0		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	5706.00	mg/kg	0 of 39	0	0.0		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m,p xylenes	5923	mg/kg	1 of 9	0	0.009												
O-Xylene	6603	mg/kg	0 of 9	0	0.0												
Toluene	56294	mg/kg	0 of 39	0	0.0		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	5923	mg/kg	0 of 30	0	0.0		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH,Total	None	mg/kg	38 of 49	0	120.0		< 0.10	< 0.10	5.9	0.2	9.6	55.0	49.0	1.4	0.5	3.6	6.9
Acenaphthene	83700	mg/kg	26 of 53	0	4.6		< 0.03	< 0.03	0.1	< 0.03	0.1	2.4	1.2	< 0.03	< 0.03	< 0.03	0.2
Acenaphthylene	83200	mg/kg	20 of 53	0	1.1		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.1	0.1	< 0.03	< 0.03	< 0.03	0.1
Dibenz-a-h-anthracene	3.53	mg/kg	19 of 53	0	1.0		< 0.03	< 0.03	< 0.03	< 0.03	0.1	0.2	0.3	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	523000	mg/kg	31 of 53	0	6.3		< 0.03	< 0.03	0.2	< 0.03	0.2	3.2	1.4	< 0.03	< 0.03	0.1	0.3
Benzo (g,h,i) perylene	3930	mg/kg	34 of 53	0	7.3		< 0.03	< 0.03	0.1	< 0.03	0.6	0.8	1.2	0.0	< 0.03	0.1	0.1
Benzo(a)anthracene	167	mg/kg	39 of 53	0	11.0		< 0.03	< 0.03	0.4	< 0.03	0.6	2.7	3.5	0.1	0.1	0.2	0.4
Benzo(a)pyrene	35.2	mg/kg	36 of 53	0	12.0		< 0.03	< 0.03	0.2	< 0.03	1.1	1.8	2.4	0.1	< 0.03	0.2	0.3
Benzo(b)fluoranthene	44.3	mg/kg	39 of 53	0	12.0		< 0.03	< 0.03	0.4	< 0.03	1.1	2.4	3.6	0.2	0.0	0.5	0.4
benzo(b,k)fluoranthene	44.3	mg/kg	15 of 21	0	6.2												
Benzo(k)fluoranthene	1170	mg/kg	35 of 53	0	6.9		< 0.03	< 0.03	0.1	< 0.03	0.4	0.8	1.4	0.1	< 0.03	0.3	0.2
Chrysene	346	mg/kg	40 of 53	0	9.3		< 0.03	< 0.03	0.5	< 0.03	0.7	2.9	3.7	0.1	0.1	0.3	0.5
Dibenzofuran	35.2	mg/kg	4 of 7	0	0.2										< 0.1		0.2
Fluoranthene	22600	mg/kg	45 of 53	0	21.0		0.0	< 0.03	1.5	0.1	1.9	9.5	9.8	0.3	0.1	0.7	1.5
Fluorene	63000	mg/kg	25 of 53	0	3.7		< 0.03	< 0.03	0.1	< 0.03	0.1	2.5	1.0	< 0.03	< 0.03	< 0.03	0.1
Indeno(1,2,3-cd)pyrene	501	mg/kg	34 of 53	0	5.0		< 0.03	< 0.03	0.1	< 0.03	0.5	0.7	1.0	0.0	< 0.03	0.1	0.1
Napthalene	193	mg/kg	22 of 53	0	5.7		< 0.03	< 0.03	0.1	< 0.03	< 0.03	3.7	0.6	< 0.03	< 0.03	< 0.03	0.1
Phenanthrene	21900	mg/kg	44 of 53	0	24.0		0.1	0.0	0.8	0.1	0.7	12.0	8.5	0.2	0.1	0.3	1.0
Pyrene	54200	mg/kg	44 of 53	0	21.0		< 0.03	< 0.03	1.3	0.1	1.5	8.8	9.8	0.3	0.1	0.7	1.6
PCB-101 2,2',4,5,5' - Pentachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
PCB-118 2,3',4,4',5 - Pentachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
PCB-138 2,2',3,4,4',5' - Hexachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
PCB-153 2,2',4,4',5,5' - Hexachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
PCB-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
PCB-52 2,2',5,5' - Tetrachlorobiphenyl	None	mg/kg	0 of 5	0	0.0												
Aliphatics & Aromatics >C5-35	None	mg/kg	2 of 5	0	545.0												
Aliphatics >C5-6	3190	mg/kg	0 of 5	0	0.0												
Aliphatics >C6-8	7780	mg/kg	1 of 5	0	0.1												
Aliphatics >C8-10	2000	mg/kg	0 of 5	0	0.0												
Aliphatics >C10-12	9690	mg/kg	0 of 5	0	0.0												
Aliphatics >C12-16	58800	mg/kg	0 of 5	0	0.0												
Aliphatics >C16-21	648000	mg/kg	0 of 5	0	0.0												
Aliphatics >C21-35	648000	mg/kg	1 of 5	0	151.0												
Aliphatics >C5-35	None	mg/kg	1 of 5	0	151.0												
Aromatics >C5-7	27	mg/kg	0 of 5	0	0.0												
Aromatics >C7-8	56294	mg/kg	0 of 5	0	0.0												
Aromatics >C8-10	3460	mg/kg	0 of 5	0	0.0												
Aromatics >C10-12	16200	mg/kg	0 of 5	0	0.0												
Aromatics >C12-16	36200	mg/kg	0 of 5	0	0.0												
Aromatics >C16-21	26600	mg/kg	2 of 5	0	27.0												
Aromatics >C21-35	28400	mg/kg	2 of 5	0	367.0												
Aromatics >C5-35	None	mg/kg	2 of 5	0	394.0												

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Commercial (1% SOM)

Soil concentration exceeds GAC 100

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max	ARP-BH006B 384713.826 397607.847 33.497 0.60 32.90 43786 AEG 2019 MG	ARP-BH007 384765.207 397596.049 34.684 1.00 33.68 43777 AEG 2019 MG	ARP-BH007 384765.207 397596.049 34.684 3.30 31.38 43778 AEG 2019 MG	ARP-BH008 384766.896 397570.397 34.051 5.20 28.85 43779 AEG 2019 MG	ARP-BH008 384766.896 397570.397 34.051 2.20 31.85 43779 AEG 2019 MG	ARP-BH009 384759.087 397550.391 34.203 2.60 31.60 AEG 2019 MG	ARP-BH011 384726.701 397513.893 34.051 3.60 30.45 43778 AEG 2019 MG	ARP-BH011 384726.701 397513.893 34.051 1.00 33.05 43778 AEG 2019 MG	ARP-BH012A 384647.478 397660.412 38.269 7.50 30.77 43765 AEG 2019 MG	ARP-BH012A 384647.478 397660.412 38.269 2.60 35.67 43764 AEG 2019 MG	ARP-BH013 384368.382 397549.44 33.078 1.00 32.08 43766 AEG 2019 MG	ARP-BH013 384368.382 397549.44 33.078 3.50 29.58 43766 AEG 2019 MG	ARP-BH014 384495.592 397565.295 35.705 0.70 35.01 43766 AEG 2019 MG
Asbestos (Presence of)	Presence	---	0 of 51	0	0.0	NAD	NAD	Chrysotile	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Analysts Comments	None	---	0 of 51	2	0.0	na	na	Chrysotile	na	na	na	na	na	na	na	na	na	na	na
Asbestos quantification	None	%	3 of 8	0	0.2			0.192											
pH	None	pH Units	47 of 47	0	11.7	11.1	7.9	11.6	9.2	9.6	8.6	7.7	11.7	7.9	8.5	8.1	10.8	8.4	
Cyanide	16200	mg/kg	25 of 47	0	11.0	0.5	0.4	0.3	0.4	0.3	0.5	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	3.5	
Antimony	7350	mg/kg	26 of 30	0	260.0	< 1.0	< 1.0	2.2	3.9	2.9	1.7	< 1.0	1.5	1.2	< 1.0	1.7	1.5	7.4	
Arsenic	635	mg/kg	48 of 49	0	87.0	7.8	7.7	18.0	28.0	22.0	18.0	16.0	12.0	7.2	6.4	19.0	7.4	32.0	
Barium	22100	mg/kg	19 of 19	0	578.0														
Beryllium	11.7	mg/kg	47 of 49	0	2.1	0.2	0.3	0.6	0.9	0.9	1.0	1.2	0.4	0.7	0.5	0.9	0.6	0.6	
Cadmium	190	mg/kg	39 of 49	0	1.2	0.8	0.4	0.4	0.5	0.4	0.7	0.4	0.9	0.2	0.1	0.3	0.5	0.9	
Chromium	8570	mg/kg	49 of 49	0	210.0	8.2	11.0	20.0	29.0	33.0	15.0	11.0	18.0	18.0	12.0	18.0	11.0	24.0	
Chromium - Hexavalent	49	mg/kg	1 of 47	0	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Copper	68300	mg/kg	48 of 49	0	440.0	22.0	24.0	56.0	87.0	65.0	30.0	440.0	32.0	25.0	23.0	36.0	46.0	430.0	
Lead	2300	mg/kg	48 of 49	1	2400.0	30.0	100.0	140.0	250.0	160.0	120.0	290.0	150.0	42.0	34.0	51.0	73.0	230.0	
Mercury	289	mg/kg	37 of 49	0	1.6	0.1	0.1	0.2	0.4	0.3	0.1	< 0.05	0.2	0.1	0.1	0.1	0.2	0.2	
Nickel	983	mg/kg	49 of 49	0	34.0	6.1	7.9	16.0	20.0	22.0	11.0	17.0	9.2	18.0	13.0	22.0	13.0	34.0	
Selenium	12261	mg/kg	13 of 49	0	2.0	0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5	1.1	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Vanadium	6360	mg/kg	49 of 49	0	48.0	11.0	14.0	17.0	25.0	29.0	16.0	23.0	15.0	25.0	17.0	29.0	21.0	24.0	
Zinc	730000	mg/kg	49 of 49	0	620.0	35.0	36.0	86.0	130.0	100.0	170.0	150.0	60.0	48.0	37.0	75.0	84.0	560.0	
Phenol	26000	mg/kg	0 of 47	0	0.0	< 0.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Organic Carbon	None	%	48 of 51	0	7.8	0.4	1.6	0.9	2.1	2.4	0.5	0.2	0.3	1.2	0.7	0.8	0.9	1.2	
Benzene	26.5978811	mg/kg	0 of 39	0	0.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	5706.00	mg/kg	0 of 39	0	0.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
m,p xylenes	5923	mg/kg	1 of 9	0	0.009														
O-Xylene	6603	mg/kg	0 of 9	0	0.0														
Toluene	56294	mg/kg	0 of 39	0	0.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	5923	mg/kg	0 of 30	0	0.0	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
PAH,Total	None	mg/kg	38 of 49	0	120.0	3.7	110.0	7.6	120.0	120.0	0.5	0.1	9.4	< 0.10	< 0.10	15.0	12.0	54.0	
Acenaphthene	83700	mg/kg	26 of 53	0	4.6	0.1	0.5	0.2	4.6	4.2	< 0.03	< 0.03	0.1	< 0.03	< 0.03	0.5	0.3	2.3	
Acenaphthylene	83200	mg/kg	20 of 53	0	1.1	< 0.03	1.1	< 0.03	0.2	0.4	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.1	0.1	
Dibenz-a-h-anthracene	3.53	mg/kg	19 of 53	0	1.0	< 0.03	1.0	< 0.03	0.4	0.5	< 0.03	< 0.03	0.1	< 0.03	< 0.03	0.1	< 0.03	0.2	
Anthracene	523000	mg/kg	31 of 53	0	6.3	0.1	1.4	0.4	6.3	5.7	< 0.03	< 0.03	0.3	< 0.03	< 0.03	0.9	0.5	2.5	
Benzo (g,h,i) perylene	3930	mg/kg	34 of 53	0	7.3	0.1	7.3	0.1	2.7	2.3	< 0.03	< 0.03	0.2	< 0.03	< 0.03	0.2	0.2	0.9	
Benzo(a)anthracene	167	mg/kg	39 of 53	0	11.0	0.3	11.0	0.6	8.6	9.6	0.1	0.0	0.8	< 0.03	< 0.03	0.9	0.8	3.2	
Benzo(a)pyrene	35.2	mg/kg	36 of 53	0	12.0	0.2	12.0	0.4	6.3	6.7	< 0.03	< 0.03	0.6	< 0.03	< 0.03	0.5	0.5	2.1	
Benzo(b)fluoranthene	44.3	mg/kg	39 of 53	0	12.0	0.2	12.0	0.5	6.7	6.4	0.0	0.0	0.7	< 0.03	< 0.03	0.7	0.7	2.8	
benzo(b,k)fluoranthene	44.3	mg/kg	15 of 21	0	6.2														
Benzo(k)fluoranthene	1170	mg/kg	35 of 53	0	6.9	0.1	6.9	0.2	2.8	3.0	< 0.03	< 0.03	0.3	< 0.03	< 0.03	0.3	0.3	1.0	
Chrysene	346	mg/kg	40 of 53	0	9.3	0.3	9.3	0.4	6.9	7.3	0.1	< 0.03	0.7	< 0.03	< 0.03	0.8	0.8	3.0	
Dibenzofuran	35.2	mg/kg	4 of 7	0	0.2	< 0.1													
Fluoranthene	22600	mg/kg	45 of 53	0	21.0	0.8	20.0	1.5	21.0	21.0	0.1	0.0	1.9	< 0.03	< 0.03	3.4	2.9	11.0	
Fluorene	63000	mg/kg	25 of 53	0	3.7	0.0	0.4	0.1	3.6	3.7	< 0.03	< 0.03	0.1	< 0.03	< 0.03	0.5	0.2	1.4	
Indeno(1,2,3-cd)pyrene	501	mg/kg	34 of 53	0	5.0	0.1	5.0	0.1	2.0	1.7	< 0.03	< 0.03	0.2	< 0.03	< 0.03	0.2	0.2	0.7	
Napthalene	193	mg/kg	22 of 53	0	5.7	< 0.03	0.5	0.3	4.2	5.7	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.2	0.1	0.4	
Phenanthrene	21900	mg/kg	44 of 53	0	24.0	0.5	5.6	1.4	24.0	24.0	0.1	0.0	1.6	< 0.03	< 0.03	2.9	1.6	13.0	
Pyrene	54200	mg/kg	44 of 53	0	21.0	0.8	21.0	1.4	20.0	21.0	0.1	0.0	1.8	< 0.03	< 0.03	2.8	2.6	9.9	
PCB-101 2,2',4,5,5' - Pentachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
PCB-118 2,3',4,4',5 - Pentachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
PCB-138 2,2',3,4,4',5' - Hexachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
PCB-153 2,2',4,4',5,5' - Hexachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
PCB-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
PCB-52 2,2',5,5' - Tetrachlorobiphenyl	None	mg/kg	0 of 5	0	0.0														
Aliphatics & Aromatics >C5-35	None	mg/kg	2 of 5	0	545.0														
Aliphatics >C5-6	3190	mg/kg	0 of 5	0	0.0														
Aliphatics >C6-8	7780	mg/kg	1 of 5	0	0.1														
Aliphatics >C8-10	2000	mg/kg	0 of 5	0	0.0														
Aliphatics >C10-12	9690	mg/kg	0 of 5	0	0.0														
Aliphatics >C12-16	58800	mg/kg	0 of 5	0	0.0														
Aliphatics >C16-21	648000	mg/kg	0 of 5	0	0.0														
Aliphatics >C21-35	648000	mg/kg	1 of 5	0	151.0														
Aliphatics >C5-35	None	mg/kg	1 of 5	0	151.0														
Aromatics >C5-7	27	mg/kg	0 of 5	0	0.0														
Aromatics >C7-8	56294	mg/kg	0 of 5	0	0.0														
Aromatics >C8-10	3460	mg/kg	0 of 5	0	0.0														
Aromatics >C10-12	16200	mg/kg	0 of 5	0	0.0														
Aromatics >C12-16	36200	mg/kg	0 of 5	0	0.0														
Aromatics >C16-21	26600	mg/kg	2 of 5	0	27.0														
Aromatics >C21-35	28400	mg/kg	2 of 5	0	367.0														
Aromatics >C5-35	None	mg/kg	2 of 5	0	394.0														

ID Matches Tester - Chrissie Cook Date/Time Matches Collection 17/01/2020 12:14:30 PM - Unique Number: 1246.72

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Commercial (1% SOM)

Soil concentration exceeds GAC 100

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max	ARP-BH014	ARP-DS001	ARP-DS002	ARP-TP001	ARP-TP002	ARP-TP002	CE-2015-CC/WS2	CE-2015-CC/WS3	GEO-2015-CRH01	GEO-2015-CRH01	GEO-2015-CRH01
						384495.592	384774.985	384753.487	384615.418	384628.47	384628.47	384607	384606	384591.66	384591.66	384591.66
						397565.295	397520.083	397492.025	397543.899	397622.871	397622.871	397436	397461	397462.97	397462.97	397462.97
						35.705	34.217	34.087	33.208	32.851	32.851	27.87	30.13	34.29	34.29	34.29
						4.00	0.60	0.80	0.80	1.00	2.50	0.68	0.56	0.20	0.50	2.00
						31.71	33.62	33.29	32.41	31.85	30.35	27.19	29.57	34.09	33.79	32.29
						43771	43799	43800	43766	43767	43767	42080	42080	42193	42193	42193
						AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	nstructive Evaluati	nstructive Evaluati	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015
						MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Asbestos (Presence of)	**Presence**	**---**	**0 of 51**	**0**	**0.0**	NAD	Amosite	NAD	NAD	NAD	NAD	Not Detected	Not Detected	Chrysotile	None	
Asbestos Analysts Comments	**None**	**---**	**0 of 51**	**2**	**0.0**	na	Bundle of	na	na	na	na	na	na	Fibre Bundles	na	
Asbestos quantification	**None**	**%**	**3 of 8**	**0**	**0.2**		0.001							0.0		
pH	**None**	**pH Units**	**47 of 47**	**0**	**11.7**	8.6	10.7	8.2	8.4	7.7	9.0	7.6	7.8	8.2	8.8	
Cyanide	**16200**	**mg/kg**	**25 of 47**	**0**	**11.0**	0.3	0.6	1.6	2.9	1.8	0.3	< 2	< 2	<0.5	<0.5	
Antimony	**7350**	**mg/kg**	**26 of 30**	**0**	**260.0**	2.3	3.5	260.0	4.8	6.1	3.3					
Arsenic	**635**	**mg/kg**	**48 of 49**	**0**	**87.0**	13.0	32.0	56.0	87.0	44.0	20.0	< 2	2.0	14.9	10.1	
Barium	**22100**	**mg/kg**	**19 of 19**	**0**	**578.0**							25.0	274.0	212.0	578.0	
Beryllium	**11.7**	**mg/kg**	**47 of 49**	**0**	**2.1**	0.5	0.8	1.3	0.7	1.3	0.6	< 0.5	0.6	1.0	1.3	
Cadmium	**190**	**mg/kg**	**39 of 49**	**0**	**1.2**	0.3	1.2	1.2	0.3	0.3	0.8	< 0.2	0.3	0.9	0.9	
Chromium	**8570**	**mg/kg**	**49 of 49**	**0**	**210.0**	25.0	27.0	33.0	20.0	22.0	15.0	6.0	23.0	17.2	33.3	
Chromium - Hexavalent	**49**	**mg/kg**	**1 of 47**	**0**	**0.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2	< 2	<0.3	<0.3	
Copper	**68300**	**mg/kg**	**48 of 49**	**0**	**440.0**	79.0	80.0	160.0	110.0	230.0	100.0	< 4	18.0	73.0	47.0	
Lead	**2300**	**mg/kg**	**48 of 49**	**1**	**2400.0**	82.0	330.0	2400.0	300.0	530.0	250.0	< 3	10.0	170.0	191.0	
Mercury	**289**	**mg/kg**	**37 of 49**	**0**	**1.6**	0.1	0.4	1.1	0.5	1.6	0.7	< 1	< 1	0.4	0.3	
Nickel	**983**	**mg/kg**	**49 of 49**	**0**	**34.0**	20.0	17.0	26.0	17.0	32.0	16.0	4.0	25.0	18.2	20.7	
Selenium	**12261**	**mg/kg**	**13 of 49**	**0**	**2.0**	< 0.5	< 0.5	< 0.5	< 0.5	1.3	< 0.5	< 3	< 3	<1	1.0	
Vanadium	**6360**	**mg/kg**	**49 of 49**	**0**	**48.0**	27.0	28.0	36.0	31.0	37.0	18.0	11.0	26.0	26.0	31.0	
Zinc	**730000**	**mg/kg**	**49 of 49**	**0**	**620.0**	110.0	210.0	470.0	140.0	620.0	220.0	16.0	47.0	177.0	93.0	
Phenol	**26000**	**mg/kg**	**0 of 47**	**0**	**0.0**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 2	< 2	<0.01	<0.01	
Total Organic Carbon	**None**	**%**	**48 of 51**	**0**	**7.8**	0.3	1.1	1.8	1.1	3.6	1.5	0.1	0.4	NDP	1.1	0.8
Benzene	**26.5978811**	**mg/kg**	**0 of 39**	**0**	**0.0**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.002			<0.005
Ethylbenzene	**5706.00**	**mg/kg**	**0 of 39**	**0**	**0.0**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.002			<0.005
m,p xylenes	**5923**	**mg/kg**	**1 of 9**	**0**	**0.009**								<0.002			<0.005
O-Xylene	**6603**	**mg/kg**	**0 of 9**	**0**	**0.0**								<0.002			<0.005
Toluene	**56294**	**mg/kg**	**0 of 39**	**0**	**0.0**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		<0.005			<0.005
Xylene	**5923**	**mg/kg**	**0 of 30**	**0**	**0.0**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01					
PAH,Total	**None**	**mg/kg**	**38 of 49**	**0**	**120.0**	0.7	1.8	16.0	< 0.10	1.0	2.6	< 1.6	< 1.6	11.2	3.6	
Acenaphthene	**83700**	**mg/kg**	**26 of 53**	**0**	**4.6**	< 0.03	0.0	0.3	< 0.03	< 0.03	0.1	< 0.1	< 0.1	0.1	<0.05	<0.05
Acenaphthylene	**83200**	**mg/kg**	**20 of 53**	**0**	**1.1**	< 0.03	< 0.03	0.1	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	0.1	0.1	<0.03
Dibenz-a-h-anthracene	**3.53**	**mg/kg**	**19 of 53**	**0**	**1.0**	< 0.03	< 0.03	0.1	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	<0.04	<0.04	<0.04
Anthracene	**523000**	**mg/kg**	**31 of 53**	**0**	**6.3**	< 0.03	0.0	0.6	< 0.03	< 0.03	0.1	< 0.1	< 0.1	0.3	0.1	<0.04
Benzo (g,h,i) perylene	**3930**	**mg/kg**	**34 of 53**	**0**	**7.3**	< 0.03	0.1	0.4	< 0.03	0.0	0.1	< 0.1	< 0.1	0.6	0.2	<0.04
Benzo(a)anthracene	**167**	**mg/kg**	**39 of 53**	**0**	**11.0**	0.1	0.1	1.0	< 0.03	0.1	0.2	< 0.1	< 0.1	0.9	0.4	<0.06
Benzo(a)pyrene	**35.2**	**mg/kg**	**36 of 53**	**0**	**12.0**	0.0	0.1	0.9	< 0.03	0.1	0.2	< 0.1	< 0.1	1.0	0.3	<0.04
Benzo(b)fluoranthene	**44.3**	**mg/kg**	**39 of 53**	**0**	**12.0**	0.1	0.1	1.1	< 0.03	0.1	0.2	< 0.1	< 0.1	1.2	0.4	<0.05
benzo(b,k)fluoranthene	**44.3**	**mg/kg**	**15 of 21**	**0**	**6.2**									1.6	0.5	<0.07
Benzo(k)fluoranthene	**1170**	**mg/kg**	**35 of 53**	**0**	**6.9**	< 0.03	0.1	0.4	< 0.03	0.0	0.1	< 0.1	< 0.1	0.5	0.1	<0.02
Chrysene	**346**	**mg/kg**	**40 of 53**	**0**	**9.3**	0.1	0.2	1.2	< 0.03	0.1	0.2	< 0.1	< 0.1	1.0	0.3	0.0
Dibenzofuran	**35.2**	**mg/kg**	**4 of 7**	**0**	**0.2**											
Fluoranthene	**22600**	**mg/kg**	**45 of 53**	**0**	**21.0**	0.1	0.4	3.4	0.0	0.2	0.6	< 0.1	< 0.1	2.2	0.6	0.0
Fluorene	**63000**	**mg/kg**	**25 of 53**	**0**	**3.7**	< 0.03	< 0.03	0.3	< 0.03	< 0.03	0.0	< 0.1	< 0.1	0.1	<0.04	<0.04
Indeno(1,2,3-cd)pyrene	**501**	**mg/kg**	**34 of 53**	**0**	**5.0**	< 0.03	0.1	0.3	< 0.03	0.0	0.1	< 0.1	< 0.1	0.5	0.2	<0.04
Napthalene	**193**	**mg/kg**	**22 of 53**	**0**	**5.7**	0.0	< 0.03	0.2	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	<0.04	<0.04	<0.04
Phenanthrene	**21900**	**mg/kg**	**44 of 53**	**0**	**24.0**	0.1	0.2	2.7	< 0.03	0.1	0.4	< 0.1	< 0.1	1.1	0.4	<0.03
Pyrene	**54200**	**mg/kg**	**44 of 53**	**0**	**21.0**	0.1	0.4	3.2	0.0	0.2	0.6	< 0.1	< 0.1	1.9	0.6	0.0
PCB-101 2,2',4,5,5' - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
PCB-118 2,3',4,4',5 - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
PCB-138 2,2',3,4,4',5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
PCB-153 2,2',4,4',5,5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
PCB-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
PCB-52 2,2',5,5' - Tetrachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**											<0.005
Aliphatics & Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**545.0**								< 42			
Aliphatics >C5-6	**3190**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 0.01			
Aliphatics >C6-8	**7780**	**mg/kg**	**1 of 5**	**0**	**0.1**								0.1			
Aliphatics >C8-10	**2000**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 2			
Aliphatics >C10-12	**9690**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 2			
Aliphatics >C12-16	**58800**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 3			
Aliphatics >C16-21	**648000**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 3			
Aliphatics >C21-35	**648000**	**mg/kg**	**1 of 5**	**0**	**151.0**								< 10			
Aliphatics >C5-35	**None**	**mg/kg**	**1 of 5**	**0**	**151.0**								< 21			
Aromatics >C5-7	**27**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 0.01			
Aromatics >C7-8	**56294**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 0.05			
Aromatics >C8-10	**3460**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 2			
Aromatics >C10-12	**16200**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 2			
Aromatics >C12-16	**36200**	**mg/kg**	**0 of 5**	**0**	**0.0**								< 2			
Aromatics >C16-21	**26600**	**mg/kg**	**2 of 5**	**0**	**27.0**								< 3			
Aromatics >C21-35	**28400**	**mg/kg**	**2 of 5**	**0**	**367.0**								< 10			
Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**394.0**								< 21			

ID Manchester - Christine Bolton (cbolton@tetratech.com) 01302 021214 3:30 PM 9.1.19 246.72

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Commercial (1% SOM)

Soil concentration exceeds GAC 100

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max	GEO-2015-CRH01	GEO-2015-CRH01	GEO-2015-CRH01	GEO-2015-CRH02	GEO-2015-CRH03	GEO-2015-TP01	GEO-2015-TP02	GEO-2015-TP03	GEO-2015-TP04	GEO-2015-TP05
						384591.66	384592.36	384592.36	348630.83	384600.92	384599.67	384586.51	384608.06	384585.8	384612.57
						397462.97	397423.86	397423.86	397417.52	397382.43	397413.11	397390.56	397404.11	397381.42	397393.36
						34.29	35	35	34.62	38.16	34.76	35.86	34.57	35.97	36.83
						1.00	1.00	2.00	1.00	3.00	0.30	0.50	0.70	0.20	2.00
						33.29	34.00	33.00	33.62	35.16	34.46	35.36	33.87	35.77	34.83
						42193	42193	42193	42193	42193	42193	42193	42193	42193	42193
						Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015
						MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Asbestos (Presence of)	**Presence**	**---**	**0 of 51**	**0**	**0.0**		None		None	None	Amosite	Chrysotile	None	None	None
Asbestos Analysts Comments	**None**	**---**	**0 of 51**	**2**	**0.0**		na		na	na	Fibre Bundles	Fibre Bundles	na	na	na
Asbestos quantification	**None**	**%**	**3 of 8**	**0**	**0.2**						<0.001	<0.001			
pH	**None**	**pH Units**	**47 of 47**	**0**	**11.7**		8.0			8.6		8.5	8.9	7.5	8.9
Cyanide	**16200**	**mg/kg**	**25 of 47**	**0**	**11.0**		<0.5			<0.5		<0.5	<0.5	<0.5	<0.5
Antimony	**7350**	**mg/kg**	**26 of 30**	**0**	**260.0**										
Arsenic	**635**	**mg/kg**	**48 of 49**	**0**	**87.0**		13.3			5.9	16.5	10.4	2.9	40.4	2.5
Barium	**22100**	**mg/kg**	**19 of 19**	**0**	**578.0**		100.0			351.0	105.0	120.0	38.0	148.0	59.0
Beryllium	**11.7**	**mg/kg**	**47 of 49**	**0**	**2.1**		1.0			1.0	0.8	0.9	0.7	1.1	0.7
Cadmium	**190**	**mg/kg**	**39 of 49**	**0**	**1.2**		<0.1			<0.1	0.4	0.8	<0.1	0.4	<0.1
Chromium	**8570**	**mg/kg**	**49 of 49**	**0**	**210.0**		43.6			49.2	34.2	15.5	10.4	18.0	47.5
Chromium - Hexavalent	**49**	**mg/kg**	**1 of 47**	**0**	**0.3**		<0.3			<0.3		<0.3	<0.3	<0.3	<0.3
Copper	**68300**	**mg/kg**	**48 of 49**	**0**	**440.0**		37.0			24.0	49.0	44.0	11.0	52.0	14.0
Lead	**2300**	**mg/kg**	**48 of 49**	**1**	**2400.0**		78.0			17.0	139.0	83.0	16.0	110.0	24.0
Mercury	**289**	**mg/kg**	**37 of 49**	**0**	**1.6**		0.6			<0.1	0.5	0.2	<0.1	0.2	<0.1
Nickel	**983**	**mg/kg**	**49 of 49**	**0**	**34.0**		21.3			16.0	24.1	17.3	7.5	22.3	8.3
Selenium	**12261**	**mg/kg**	**13 of 49**	**0**	**2.0**		<1			<1	<1	<1	<1	2.0	<1
Vanadium	**6360**	**mg/kg**	**49 of 49**	**0**	**48.0**		25.0			29.0	23.0	22.0	16.0	27.0	21.0
Zinc	**730000**	**mg/kg**	**49 of 49**	**0**	**620.0**		57.0			28.0	98.0	79.0	25.0	100.0	30.0
Phenol	**26000**	**mg/kg**	**0 of 47**	**0**	**0.0**		<0.01			<0.01		<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	**None**	**%**	**48 of 51**	**0**	**7.8**	1.5	2.7	4.4		5.0		NDP	0.3	7.8	0.6
Benzene	**26.5978811**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.005	<0.005	<0.005							
Ethylbenzene	**5706.00**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.005	<0.005	<0.005							
m,p xylenes	**5923**	**mg/kg**	**1 of 9**	**0**	**0.009**	<0.005	<0.005	0.009							
O-Xylene	**6603**	**mg/kg**	**0 of 9**	**0**	**0.0**	<0.005	<0.005	<0.005							
Toluene	**56294**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.005	<0.005	<0.005							
Xylene	**5923**	**mg/kg**	**0 of 30**	**0**	**0.0**										
PAH,Total	**None**	**mg/kg**	**38 of 49**	**0**	**120.0**		<0.6			17.7	7.0	42.3	2.0	21.0	5.0
Acenaphthene	**83700**	**mg/kg**	**26 of 53**	**0**	**4.6**	<0.05	<0.05	<0.05		0.2	<0.05	0.4	<0.05	0.2	<0.05
Acenaphthylene	**83200**	**mg/kg**	**20 of 53**	**0**	**1.1**	<0.03	<0.03	<0.03		0.2	0.0	0.2	<0.03	0.1	0.1
Dibenz-a-h-anthracene	**3.53**	**mg/kg**	**19 of 53**	**0**	**1.0**	<0.04	<0.04	<0.04		0.1	0.1	0.3	<0.04	0.2	<0.04
Anthracene	**523000**	**mg/kg**	**31 of 53**	**0**	**6.3**	<0.04	<0.04	<0.04		0.6	0.1	0.9	0.1	0.6	0.2
Benzo (g,h,i) perylene	**3930**	**mg/kg**	**34 of 53**	**0**	**7.3**	0.1	<0.04	<0.04		0.7	0.4	2.2	0.1	1.1	0.2
Benzo(a)anthracene	**167**	**mg/kg**	**39 of 53**	**0**	**11.0**	0.2	<0.06	<0.06		1.6	0.8	4.3	0.2	1.7	0.5
Benzo(a)pyrene	**35.2**	**mg/kg**	**36 of 53**	**0**	**12.0**	0.2	<0.04	<0.04		1.3	0.7	3.6	0.2	1.9	0.4
Benzo(b)fluoranthene	**44.3**	**mg/kg**	**39 of 53**	**0**	**12.0**	0.2	<0.05	<0.05		1.5	0.8	4.5	0.2	2.1	0.4
benzo(b,k)fluoranthene	**44.3**	**mg/kg**	**15 of 21**	**0**	**6.2**	0.3	<0.07	<0.07		2.0	1.1	6.2	0.2	2.9	0.6
Benzo(k)fluoranthene	**1170**	**mg/kg**	**35 of 53**	**0**	**6.9**	0.1	<0.02	<0.02		0.6	0.3	1.7	0.1	0.8	0.2
Chrysene	**346**	**mg/kg**	**40 of 53**	**0**	**9.3**	0.2	<0.02	<0.02		1.5	0.7	4.2	0.2	1.8	0.5
Dibenzofuran	**35.2**	**mg/kg**	**4 of 7**	**0**	**0.2**										
Fluoranthene	**22600**	**mg/kg**	**45 of 53**	**0**	**21.0**	0.3	<0.03	<0.03		2.9	1.1	7.1	0.4	3.9	0.9
Fluorene	**63000**	**mg/kg**	**25 of 53**	**0**	**3.7**	<0.04	<0.04	<0.04		0.3	<0.04	0.3	<0.04	0.1	<0.04
Indeno(1,2,3-cd)pyrene	**501**	**mg/kg**	**34 of 53**	**0**	**5.0**	0.1	<0.04	<0.04		0.7	0.4	2.1	0.1	1.1	0.2
Napthalene	**193**	**mg/kg**	**22 of 53**	**0**	**5.7**	<0.04	<0.04	<0.04		0.4	0.1	0.2	<0.04	0.1	<0.04
Phenanthrene	**21900**	**mg/kg**	**44 of 53**	**0**	**24.0**	0.2	<0.03	<0.03		2.4	0.6	3.6	0.3	2.0	0.6
Pyrene	**54200**	**mg/kg**	**44 of 53**	**0**	**21.0**	0.3	<0.03	<0.03		2.8	1.1	6.8	0.4	3.5	0.9
PCB-101 2,2',4,5,5' - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
PCB-118 2,3',4,4',5 - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
PCB-138 2,2',3,4,4',5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
PCB-153 2,2',4,4',5,5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
PCB-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
PCB-52 2,2',5,5' - Tetrachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.005		<0.005							
Aliphatics & Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**545.0**		<38								
Aliphatics >C5-6	**3190**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.1								
Aliphatics >C6-8	**7780**	**mg/kg**	**1 of 5**	**0**	**0.1**		<0.1								
Aliphatics >C8-10	**2000**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.1								
Aliphatics >C10-12	**9690**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.2								
Aliphatics >C12-16	**58800**	**mg/kg**	**0 of 5**	**0**	**0.0**		<4								
Aliphatics >C16-21	**648000**	**mg/kg**	**0 of 5**	**0**	**0.0**		<7								
Aliphatics >C21-35	**648000**	**mg/kg**	**1 of 5**	**0**	**151.0**		<7								
Aliphatics >C5-35	**None**	**mg/kg**	**1 of 5**	**0**	**151.0**		<19								
Aromatics >C5-7	**27**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.1								
Aromatics >C7-8	**56294**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.1								
Aromatics >C8-10	**3460**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.1								
Aromatics >C10-12	**16200**	**mg/kg**	**0 of 5**	**0**	**0.0**		<0.2								
Aromatics >C12-16	**36200**	**mg/kg**	**0 of 5**	**0**	**0.0**		<4								
Aromatics >C16-21	**26600**	**mg/kg**	**2 of 5**	**0**	**27.0**		<7								
Aromatics >C21-35	**28400**	**mg/kg**	**2 of 5**	**0**	**367.0**		<7								
Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**394.0**		<19								

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Commercial (1% SOM)

Soil concentration exceeds GAC 100

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max	GEO-2015-TP05	GEO-2015-TP06	GEO-2015-TP07	GEO-2015-TP08	GEO-2015-TP08	GEO-2015-WLS01	GEO-2015-WLS02	GEO-2015-WLS02	GEO-2015-WLS03	GEO-2015-WLS03
						384612.57	384630.44	384622.03	384582.1	384582.1	384649.9	384604.43	384604.43	384588.26	384588.26
						397393.36	397409.03	397403.88	397369.81	397369.81	397470.74	397437.32	397437.32	397411.22	397411.22
						36.83	35.44	35.27	35.61	35.61	33.7	34.36	34.36	37.76	37.76
						1.40	0.30	1.80	0.80	0.30	1.00	2.00	1.00	3.50	2.50
						35.43	35.14	33.47	34.81	35.31	32.70	32.36	33.36	34.26	35.26
						42193	42193	42193	42193	42193	42193	42193	42193	42193	42193
						Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015
						MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
Asbestos (Presence of)	**Presence**	**---**	**0 of 51**	**0**	**0.0**	None	Chrysotile	None	None	None	None	None		None	None
Asbestos Analysts Comments	**None**	**---**	**0 of 51**	**2**	**0.0**	na	Fibre Bundles	na	na	na	na	na		na	na
Asbestos quantification	**None**	**%**	**3 of 8**	**0**	**0.2**		<0.001								
pH	**None**	**pH Units**	**47 of 47**	**0**	**11.7**	8.6	8.1	8.8			10.2	8.8		8.5	8.8
Cyanide	**16200**	**mg/kg**	**25 of 47**	**0**	**11.0**	<0.5	1.9	<0.5			<0.5	<0.5		<0.5	0.6
Antimony	**7350**	**mg/kg**	**26 of 30**	**0**	**260.0**										
Arsenic	**635**	**mg/kg**	**48 of 49**	**0**	**87.0**	53.3	19.5	2.9	5.4		4.7	10.5		8.1	2.2
Barium	**22100**	**mg/kg**	**19 of 19**	**0**	**578.0**	271.0	184.0	43.0	189.0		50.0	136.0		84.0	70.0
Beryllium	**11.7**	**mg/kg**	**47 of 49**	**0**	**2.1**	2.1	1.3	0.7	1.2		0.6	1.3		0.9	<0.5
Cadmium	**190**	**mg/kg**	**39 of 49**	**0**	**1.2**	0.4	0.7	<0.1	<0.1		<0.1	0.2		0.1	0.2
Chromium	**8570**	**mg/kg**	**49 of 49**	**0**	**210.0**	45.8	31.2	11.8	47.8		52.8	11.1		19.0	57.3
Chromium - Hexavalent	**49**	**mg/kg**	**1 of 47**	**0**	**0.3**	<0.3	<0.3	0.3			<0.3	<0.3		<0.3	<0.3
Copper	**68300**	**mg/kg**	**48 of 49**	**0**	**440.0**	57.0	80.0	11.0	28.0		14.0	82.0		37.0	21.0
Lead	**2300**	**mg/kg**	**48 of 49**	**1**	**2400.0**	32.0	289.0	15.0	12.0		11.0	190.0		56.0	55.0
Mercury	**289**	**mg/kg**	**37 of 49**	**0**	**1.6**	<0.1	0.8	<0.1	<0.1		<0.1	0.2		0.2	1.0
Nickel	**983**	**mg/kg**	**49 of 49**	**0**	**34.0**	32.3	22.9	9.6	33.4		19.6	15.5		22.9	6.6
Selenium	**12261**	**mg/kg**	**13 of 49**	**0**	**2.0**	1.0	<1	<1	<1		<1	<1		<1	<1
Vanadium	**6360**	**mg/kg**	**49 of 49**	**0**	**48.0**	48.0	28.0	17.0	31.0		19.0	18.0		21.0	11.0
Zinc	**730000**	**mg/kg**	**49 of 49**	**0**	**620.0**	55.0	186.0	28.0	76.0		37.0	56.0		62.0	42.0
Phenol	**26000**	**mg/kg**	**0 of 47**	**0**	**0.0**	<0.01	<0.01	<0.01			<0.01	<0.01		<0.01	<0.01
Total Organic Carbon	**None**	**%**	**48 of 51**	**0**	**7.8**	7.4	NDP	0.3			0.8	3.2	0.1	1.1	0.3
Benzene	**26.5978811**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.005							<0.005	<0.005	<0.005
Ethylbenzene	**5706.00**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.003							<0.005	<0.005	<0.003
m,p xylenes	**5923**	**mg/kg**	**1 of 9**	**0**	**0.009**	<0.004							<0.005	<0.005	<0.004
O-Xylene	**6603**	**mg/kg**	**0 of 9**	**0**	**0.0**	<0.004							<0.005	<0.005	<0.004
Toluene	**56294**	**mg/kg**	**0 of 39**	**0**	**0.0**	<0.003							<0.005	<0.005	<0.003
Xylene	**5923**	**mg/kg**	**0 of 30**	**0**	**0.0**										
PAH,Total	**None**	**mg/kg**	**38 of 49**	**0**	**120.0**	59.4	18.9	25.9	<0.6		<0.6	40.3		<0.6	49.9
Acenaphthene	**83700**	**mg/kg**	**26 of 53**	**0**	**4.6**	2.5	0.2	0.3	<0.05		<0.05	0.3	<0.05	<0.05	1.6
Acenaphthylene	**83200**	**mg/kg**	**20 of 53**	**0**	**1.1**	0.8	0.1	0.4	<0.03		<0.03	0.2	<0.03	<0.03	<0.03
Dibenz-a-h-anthracene	**3.53**	**mg/kg**	**19 of 53**	**0**	**1.0**	0.2	0.2	0.2	<0.04		<0.04	0.3	<0.04	<0.04	0.4
Anthracene	**523000**	**mg/kg**	**31 of 53**	**0**	**6.3**	2.6	0.4	1.0	<0.04		<0.04	1.1	<0.04	<0.04	1.9
Benzo (g,h,i) perylene	**3930**	**mg/kg**	**34 of 53**	**0**	**7.3**	1.1	1.0	0.9	<0.04		<0.04	1.8	<0.04	<0.04	1.7
Benzo(a)anthracene	**167**	**mg/kg**	**39 of 53**	**0**	**11.0**	4.1	1.5	2.3	<0.06		<0.06	4.2	<0.06	0.1	4.1
Benzo(a)pyrene	**35.2**	**mg/kg**	**36 of 53**	**0**	**12.0**	2.3	1.7	1.7	<0.04		<0.04	3.1	<0.04	0.1	3.0
Benzo(b)fluoranthene	**44.3**	**mg/kg**	**39 of 53**	**0**	**12.0**	2.4	1.9	1.8	<0.05		<0.05	3.9	<0.05	0.1	4.1
benzo(b,k)fluoranthene	**44.3**	**mg/kg**	**15 of 21**	**0**	**6.2**	3.4	2.7	2.5	<0.07		<0.07	5.4	<0.07	0.1	5.7
Benzo(k)fluoranthene	**1170**	**mg/kg**	**35 of 53**	**0**	**6.9**	1.0	0.8	0.7	<0.02		<0.02	1.5	<0.02	0.0	1.6
Chrysene	**346**	**mg/kg**	**40 of 53**	**0**	**9.3**	3.0	1.7	1.9	0.0		<0.02	3.6	<0.02	0.1	3.7
Dibenzofuran	**35.2**	**mg/kg**	**4 of 7**	**0**	**0.2**	0.0					<0.01	0.1			0.0
Fluoranthene	**22600**	**mg/kg**	**45 of 53**	**0**	**21.0**	9.7	3.2	4.1	0.0		<0.03	7.2	0.0	0.1	9.9
Fluorene	**63000**	**mg/kg**	**25 of 53**	**0**	**3.7**	2.2	0.1	0.6	<0.04		<0.04	0.3	<0.04	<0.04	0.8
Indeno(1,2,3-cd)pyrene	**501**	**mg/kg**	**34 of 53**	**0**	**5.0**	1.1	1.0	0.8	<0.04		<0.04	1.9	<0.04	<0.04	2.0
Napthalene	**193**	**mg/kg**	**22 of 53**	**0**	**5.7**	1.5	0.2	0.4	<0.04		<0.04	0.2	<0.04	<0.04	0.1
Phenanthrene	**21900**	**mg/kg**	**44 of 53**	**0**	**24.0**	16.0	1.9	4.6	0.0		<0.03	4.1	0.0	0.1	7.8
Pyrene	**54200**	**mg/kg**	**44 of 53**	**0**	**21.0**	8.8	2.9	4.2	0.0		<0.03	6.7	0.0	0.1	7.2
PCB-101 2,2',4,5,5' - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
PCB-118 2,3',4,4',5 - Pentachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
PCB-138 2,2',3,4,4',5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
PCB-153 2,2',4,4',5,5' - Hexachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
PCB-180 2,2',3,4,4',5,5' - Heptachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
PCB-52 2,2',5,5' - Tetrachlorobiphenyl	**None**	**mg/kg**	**0 of 5**	**0**	**0.0**						<0.005		<0.005		
Aliphatics & Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**545.0**	545.0								<38	76.0
Aliphatics >C5-6	**3190**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.1								<0.1	<0.1
Aliphatics >C6-8	**7780**	**mg/kg**	**1 of 5**	**0**	**0.1**	<0.1								<0.1	<0.1
Aliphatics >C8-10	**2000**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.1								<0.1	<0.1
Aliphatics >C10-12	**9690**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.2								<0.2	<0.2
Aliphatics >C12-16	**58800**	**mg/kg**	**0 of 5**	**0**	**0.0**	<4								<4	<4
Aliphatics >C16-21	**648000**	**mg/kg**	**0 of 5**	**0**	**0.0**	<7								<7	<7
Aliphatics >C21-35	**648000**	**mg/kg**	**1 of 5**	**0**	**151.0**	151.0								<7	<7
Aliphatics >C5-35	**None**	**mg/kg**	**1 of 5**	**0**	**151.0**	151.0								<19	<19
Aromatics >C5-7	**27**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.1								<0.1	<0.1
Aromatics >C7-8	**56294**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.1								<0.1	<0.1
Aromatics >C8-10	**3460**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.1								<0.1	<0.1
Aromatics >C10-12	**16200**	**mg/kg**	**0 of 5**	**0**	**0.0**	<0.2								<0.2	<0.2
Aromatics >C12-16	**36200**	**mg/kg**	**0 of 5**	**0**	**0.0**	<4								<4	<4
Aromatics >C16-21	**26600**	**mg/kg**	**2 of 5**	**0**	**27.0**	27.0								<7	20.0
Aromatics >C21-35	**28400**	**mg/kg**	**2 of 5**	**0**	**367.0**	367.0								<7	56.0
Aromatics >C5-35	**None**	**mg/kg**	**2 of 5**	**0**	**394.0**	394.0								<19	76.0

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Commercial (1% SOM)

Soil concentration exceeds GAC 100
Soil concentration exceeds theoretical NAPL saturation limit 20

Hole Ref	CE-2015-CC/WS3	CE-2015-CC/WS2	GEO-2015-CRH01	GEO-2015-TP03	GEO-2015-WLS03	GEO-2015-WLS03	GEO-2015-WLS02	GEO-2015-WLS01	GEO-2015-TP02	GEO-2015-CRH01	GEO-2015-CRH01B	GEO-2015-TP07
Easting	384606	384607	384591.66	384608.06	384588.26	384588.26	384604.43	384649.9	384586.51	384591.66	384592.36	384622.03
Northing	397461	397436	397462.97	397404.11	397411.22	397411.22	397437.32	397470.74	397390.56	397462.97	397423.86	397403.88
Elevation (mOD)	30.13	27.87	34.29	34.57	37.76	37.76	34.36	33.7	35.86	34.29	35	35.27
Sample Top (m)	0.56	0.68	0.20	0.70	3.50	2.50	2.00	1.00	0.50	0.50	1.00	1.80
Sample Elevation (mOD)	29.57	27.19	34.09	33.87	34.26	35.26	32.36	32.70	35.36	33.79	34.00	33.47
Sample Date	42080	42080	42193	42193	42193	42193	42193	42193	42193	42193	42193	42193
Investigation	Constructive Evaluation	Constructive Evaluation	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015
Geology	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max													
1,1,1,2-Tetrachloroethane	108	mg/kg	0 of 2	0	0.0						<0.005							
1,1,1-Trichloroethane	660	mg/kg	0 of 2	0	0.0						<0.005							
1,1,2,2-Tetrachloroethane	274	mg/kg	0 of 2	0	0.0						<0.003							
1,1,2-Trichloroethane	89.1	mg/kg	0 of 2	0	0.0						<0.004							
1,1-Dichloroethane	263	mg/kg	0 of 2	0	0.0						<0.006							
1,1-Dichloroethene	24.3	mg/kg	0 of 2	0	0.0						<0.006							
1,1-Dichloropropene	27	mg/kg	0 of 2	0	0.0						<0.003							
1,2,3 Trichlorobenzene	102	mg/kg	0 of 2	0	0.0						<0.007							
1,2,3-Trichloropropane	26.5978811	mg/kg	0 of 2	0	0.0						<0.004							
1,2,4-Trichlorobenzene	215	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
1,2,4-Trimethylbenzene	39.4	mg/kg	0 of 2	0	0.0						<0.006							
1,2-Dibromo-3-Chloropropane	None	mg/kg	0 of 2	0	0.0						<0.004							
1,2-Dibromoethane	1.96	mg/kg	0 of 2	0	0.0						<0.003							
1,2-Dichlorobenzene	2020	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
1,2-Dichloroethane	0.671	mg/kg	0 of 2	0	0.0						<0.005							
1,2-Dichloropropane	3.13	mg/kg	0 of 2	0	0.0						<0.004							
1,3,5-Trimethylbenzene	39.4	mg/kg	0 of 2	0	0.0						<0.003							
1,3-Dichlorobenzene	29.9	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
1,3-Dichloropropane	None	mg/kg	0 of 2	0	0.0						<0.004							
1,4-Dichlorobenzene	4220	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,2-Dichloropropane	None	mg/kg	0 of 2	0	0.0						<0.004							
2,4,5-Trichlorophenol	3850	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,4,6-Trichlorophenol	3850	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,4-Dichlorophenol	3420	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,4-Dimethylphenol	15700	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,4-Dinitrotoluene	3720	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2,6-Dinitrotoluene	1850	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2-Chloronaphthalene	370	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2-Chlorophenol	3500	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2-Chlorotoluene	55.6	mg/kg	0 of 2	0	0.0						<0.003							
2-Methylnaphthalene	193	mg/kg	3 of 4	0	0.1						0.05	0.06	<0.01					
2-Methylphenol	160000	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2-Nitroaniline	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
2-Nitrophenol	3500	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
3-Nitroaniline	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Bromophenyl Phenyl Ether	26.5978811	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Chloro-3-Methylphenol	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Chlorophenyl Phenyl Ether	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Chlorotoluene	55.6	mg/kg	0 of 2	0	0.0						<0.003							
4-Isopropyltoluene	16200	mg/kg	0 of 2	0	0.0						<0.004							
4-Methylphenol	162000	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Nitroaniline	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
4-Nitrophenol	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Azobenzene	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Bis(2-chloroethoxy)methane	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Bis(2-chloroethyl)ether	0.671	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Bis(2-chloroisopropyl)ether	None	mg/kg	0 of 0	0	0.0													
Bis(2-ethylhexyl)phthalate	85163	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Bromobenzene	91.5	mg/kg	0 of 2	0	0.0						<0.002							
Bromochloromethane	None	mg/kg	0 of 2	0	0.0						<0.004							
Bromodichloromethane	1.96	mg/kg	0 of 2	0	0.0						<0.004							
Bromomethane	714	mg/kg	0 of 2	0	0.0						<0.001							
Butylbenzylphthalate	940280	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Carbazole	None	mg/kg	3 of 4	0	0.1						0.06	0.12	<0.01					
Chlorobenzene	55.6	mg/kg	0 of 2	0	0.0						<0.004							
Chloroethane	904	mg/kg	0 of 2	0	0.0						<0.006							
Chloroethene	0.0594	mg/kg	0 of 2	0	0.0						<0.002							
Chloroform	99.1	mg/kg	0 of 2	0	0.0						<0.005							
Chloromethane	0.956	mg/kg	0 of 2	0	0.0						<0.003							
cis-1,2-Dichloroethene	13.6	mg/kg	0 of 2	0	0.0						<0.007							
cis1,3-Dichloropropene	None	mg/kg	0 of 2	0	0.0						<0.004							
Dibromochloromethane	None	mg/kg	0 of 2	0	0.0						<0.005							
Dibromomethane	1.96	mg/kg	0 of 2	0	0.0						<0.004							
Dichlorodifluoromethane	None	mg/kg	0 of 2	0	0.0						<0.002							
Dichloromethane	257	mg/kg	0 of 2	0	0.0						<0.007							
Diethylphthalate	144000	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Dimethylphthalate	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Di-N-Butyl Phthalate	15400	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Di-N-Octyl Phthalate	89100	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Hexachlorobenzene (HCB)	104	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Hexachlorobutadiene (HCBD)	30.7	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Hexachlorocyclopentadiene	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Hexachloroethane	20.9	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Isophorone	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Isopropylbenzene	1300	mg/kg	0 of 2	0	0.0						<0.003							
Methyl tert-butyl ether (MTBE)	7480	mg/kg	0 of 9	0	0.0		<0.005			<0.005	<0.006						<0.005	
n-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0						<0.004							
Nitrobenzene	26.5978811	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
N-Nitroso-Di-N-Propylamine	None	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
n-propylbenzene	3860	mg/kg	0 of 2	0	0.0						<0.004							
Pentachlorophenol (PCP)	399	mg/kg	0 of 4	0	0.0						<0.01	<0.01	<0.01					
Phenol	26000	mg/kg	0 of 17	0	0.0		< 2	< 2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sec-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0						<0.004							
Styrene	3170	mg/kg	0 of 2	0	0.0						<0.003							
Tert-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0						<0.005							
Tetrachloroethene	18.6	mg/kg	0 of 2	0	0.0						<0.003							
Tetrachloromethane (Carbon Tetra Chloride)	2.87	mg/kg	0 of 2	0	0.0						<0.004							
trans-1,2-Dichloroethene	20.7	mg/kg	0 of 2	0	0.0						<0.003							
trans-1,3-Dichloropropene	None	mg/kg	0 of 2	0	0.0						<0.003							
Tribromomethane	None	mg/kg	0 of 2	0	0.0						<0.004							
Trichloroethene	1.23	mg/kg	0 of 2	0	0.0						<0.005							
Trichlorofluoromethane	1.96	mg/kg	0 of 2	0	0.0						<0.003							

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Commercial (1% SOM)

Soil concentration exceeds GAC 100
Soil concentration exceeds theoretical NAPL saturation limit 20

Contaminant Name	GAC	Test Units	Total > LOD	Total > GAC	Max	GEO-2015-TP06	GEO-2015-TP05	GEO-2015-TP05	GEO-2015-CRH03	GEO-2015-TP04	GEO-2015-CRH01B	GEO-2015-WLS02	GEO-2015-CRH01	GEO-2015-CRH01
						384630.44	384612.57	384612.57	384600.92	384585.8	384592.36	384604.43	384591.66	384591.66
						397409.03	397393.36	397393.36	397382.43	397381.42	397423.86	397437.32	397462.97	397462.97
						35.44	36.83	36.83	38.16	35.97	35	34.36	34.29	34.29
						0.30	2.00	1.40	3.00	0.20	2.00	1.00	2.00	1.00
						35.14	34.83	35.43	35.16	35.77	33.00	33.36	32.29	33.29
						42193	42193	42193	42193	42193	42193	42193	42193	42193
						Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015	Geotechnics 2015
						MG	MG	MG	MG	MG	MG	MG	MG	MG
1,1,1,2-Tetrachloroethane	108	mg/kg	0 of 2	0	0.0			<0.005						
1,1,1-Trichloroethane	660	mg/kg	0 of 2	0	0.0			<0.005						
1,1,2,2-Tetrachloroethane	274	mg/kg	0 of 2	0	0.0			<0.003						
1,1,2-Trichloroethane	89.1	mg/kg	0 of 2	0	0.0			<0.004						
1,1-Dichloroethane	263	mg/kg	0 of 2	0	0.0			<0.006						
1,1-Dichloroethene	24.3	mg/kg	0 of 2	0	0.0			<0.006						
1,1-Dichloropropene	27	mg/kg	0 of 2	0	0.0			<0.003						
1,2,3 Trichlorobenzene	102	mg/kg	0 of 2	0	0.0			<0.007						
1,2,3-Trichloropropane	26.5978811	mg/kg	0 of 2	0	0.0			<0.004						
1,2,4-Trichlorobenzene	215	mg/kg	0 of 4	0	0.0			<0.01						
1,2,4-Trimethylbenzene	39.4	mg/kg	0 of 2	0	0.0			<0.006						
1,2-Dibromo-3-Chloropropane	None	mg/kg	0 of 2	0	0.0			<0.004						
1,2-Dibromoethane	1.96	mg/kg	0 of 2	0	0.0			<0.003						
1,2-Dichlorobenzene	2020	mg/kg	0 of 4	0	0.0			<0.01						
1,2-Dichloroethane	0.671	mg/kg	0 of 2	0	0.0			<0.005						
1,2-Dichloropropane	3.13	mg/kg	0 of 2	0	0.0			<0.004						
1,3,5-Trimethylbenzene	39.4	mg/kg	0 of 2	0	0.0			<0.003						
1,3-Dichlorobenzene	29.9	mg/kg	0 of 4	0	0.0			<0.01						
1,3-Dichloropropane	None	mg/kg	0 of 2	0	0.0			<0.004						
1,4-Dichlorobenzene	4220	mg/kg	0 of 4	0	0.0			<0.01						
2,2-Dichloropropane	None	mg/kg	0 of 2	0	0.0			<0.004						
2,4,5-Trichlorophenol	3850	mg/kg	0 of 4	0	0.0			<0.01						
2,4,6-Trichlorophenol	3850	mg/kg	0 of 4	0	0.0			<0.01						
2,4-Dichlorophenol	3420	mg/kg	0 of 4	0	0.0			<0.01						
2,4-Dimethylphenol	15700	mg/kg	0 of 4	0	0.0			<0.01						
2,4-Dinitrotoluene	3720	mg/kg	0 of 4	0	0.0			<0.01						
2,6-Dinitrotoluene	1850	mg/kg	0 of 4	0	0.0			<0.01						
2-Chloronaphthalene	370	mg/kg	0 of 4	0	0.0			<0.01						
2-Chlorophenol	3500	mg/kg	0 of 4	0	0.0			<0.01						
2-Chlorotoluene	55.6	mg/kg	0 of 2	0	0.0			<0.003						
2-Methylnaphthalene	193	mg/kg	3 of 4	0	0.1			0.05						
2-Methylphenol	160000	mg/kg	0 of 4	0	0.0			<0.01						
2-Nitroaniline	None	mg/kg	0 of 4	0	0.0			<0.01						
2-Nitrophenol	3500	mg/kg	0 of 4	0	0.0			<0.01						
3-Nitroaniline	None	mg/kg	0 of 4	0	0.0			<0.01						
4-Bromophenyl Phenyl Ether	26.5978811	mg/kg	0 of 4	0	0.0			<0.01						
4-Chloro-3-Methylphenol	None	mg/kg	0 of 4	0	0.0			<0.01						
4-Chlorophenyl Phenyl Ether	None	mg/kg	0 of 4	0	0.0			<0.01						
4-Chlorotoluene	55.6	mg/kg	0 of 2	0	0.0			<0.003						
4-Isopropyltoluene	16200	mg/kg	0 of 2	0	0.0			<0.004						
4-Methylphenol	162000	mg/kg	0 of 4	0	0.0			<0.01						
4-Nitroaniline	None	mg/kg	0 of 4	0	0.0			<0.01						
4-Nitrophenol	None	mg/kg	0 of 4	0	0.0			<0.01						
Azobenzene	None	mg/kg	0 of 4	0	0.0			<0.01						
Bis(2-chloroethoxy)methane	None	mg/kg	0 of 4	0	0.0			<0.01						
Bis(2-chloroethyl)ether	0.671	mg/kg	0 of 4	0	0.0			<0.01						
Bis(2-chloroisopropyl)ether	None	mg/kg	0 of 0	0	0.0									
Bis(2-ethylhexyl)phthalate	85163	mg/kg	0 of 4	0	0.0			<0.01						
Bromobenzene	91.5	mg/kg	0 of 2	0	0.0			<0.002						
Bromochloromethane	None	mg/kg	0 of 2	0	0.0			<0.004						
Bromodichloromethane	1.96	mg/kg	0 of 2	0	0.0			<0.004						
Bromomethane	714	mg/kg	0 of 2	0	0.0			<0.001						
Butylbenzylphthalate	940280	mg/kg	0 of 4	0	0.0			<0.01						
Carbazole	None	mg/kg	3 of 4	0	0.1			0.052						
Chlorobenzene	55.6	mg/kg	0 of 2	0	0.0			<0.004						
Chloroethane	904	mg/kg	0 of 2	0	0.0			<0.006						
Chloroethene	0.0594	mg/kg	0 of 2	0	0.0			<0.002						
Chloroform	99.1	mg/kg	0 of 2	0	0.0			<0.005						
Chloromethane	0.956	mg/kg	0 of 2	0	0.0			<0.003						
cis-1,2-Dichloroethene	13.6	mg/kg	0 of 2	0	0.0			<0.007						
cis1,3-Dichloropropene	None	mg/kg	0 of 2	0	0.0			<0.004						
Dibromochloromethane	None	mg/kg	0 of 2	0	0.0			<0.005						
Dibromomethane	1.96	mg/kg	0 of 2	0	0.0			<0.004						
Dichlorodifluoromethane	None	mg/kg	0 of 2	0	0.0			<0.002						
Dichloromethane	257	mg/kg	0 of 2	0	0.0			<0.007						
Diethylphthalate	144000	mg/kg	0 of 4	0	0.0			<0.01						
Dimethylphthalate	None	mg/kg	0 of 4	0	0.0			<0.01						
Di-N-Butyl Phthalate	15400	mg/kg	0 of 4	0	0.0			<0.01						
Di-N-Octyl Phthalate	89100	mg/kg	0 of 4	0	0.0			<0.01						
Hexachlorobenzene (HCB)	104	mg/kg	0 of 4	0	0.0			<0.01						
Hexachlorobutadiene (HCBD)	30.7	mg/kg	0 of 4	0	0.0			<0.01						
Hexachlorocyclopentadiene	None	mg/kg	0 of 4	0	0.0			<0.01						
Hexachloroethane	20.9	mg/kg	0 of 4	0	0.0			<0.01						
Isophorone	None	mg/kg	0 of 4	0	0.0			<0.01						
Isopropylbenzene	1300	mg/kg	0 of 2	0	0.0			<0.003						
Methyl tert-butyl ether (MTBE)	7480	mg/kg	0 of 9	0	0.0			<0.006			<0.005	<0.005	<0.005	<0.005
n-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0			<0.004						
Nitrobenzene	26.5978811	mg/kg	0 of 4	0	0.0			<0.01						
N-Nitroso-Di-N-Propylamine	None	mg/kg	0 of 4	0	0.0			<0.01						
n-propylbenzene	3860	mg/kg	0 of 2	0	0.0			<0.004						
Pentachlorophenol (PCP)	399	mg/kg	0 of 4	0	0.0			<0.01						
Phenol	26000	mg/kg	0 of 17	0	0.0	<0.01	<0.01	<0.01	<0.01	<0.01				
Sec-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0			<0.004						
Styrene	3170	mg/kg	0 of 2	0	0.0			<0.003						
Tert-Butylbenzene	26.5978811	mg/kg	0 of 2	0	0.0			<0.005						
Tetrachloroethene	18.6	mg/kg	0 of 2	0	0.0			<0.003						
Tetrachloromethane (Carbon Tetra Chloride)	2.87	mg/kg	0 of 2	0	0.0			<0.004						
trans-1,2-Dichloroethene	20.7	mg/kg	0 of 2	0	0.0			<0.003						
trans-1,3-Dichloropropene	None	mg/kg	0 of 2	0	0.0			<0.003						
Tribromomethane	None	mg/kg	0 of 2	0	0.0			<0.004						
Trichloroethene	1.23	mg/kg	0 of 2	0	0.0			<0.005						
Trichlorofluoromethane	1.96	mg/kg	0 of 2	0	0.0			<0.003						

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Appendix D

Controlled Waters Risk Assessment

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GACs apply to CSM1 - Principal Aquifer and fresh water receptor

Shallow Groundwater concentration exceeds GAC	100
Limit of Detection Value exceeds GAC	**<0.1**

Contaminant Name	GAC	Source	LOD	Units	Total > LOD	Total > GAC	Min	Max		Hole Ref	BH001	BH004	BH005	BH007	BH011	BH013
										Easting	384566.052	384554.516	384655.497	384765.207	384726.701	384368.382
										Northing	397646.557	397582.476	397554.645	397596.049	397513.893	397549.44
										Sample Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020	16/01/2020
										Investigation	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019
Metals																
Antimony, Dissolved	5	DWS	0.17	ug/l	6 of 6	0	0.18	0.53			0.25	0.18	0.23	0.18	0.28	0.53
Arsenic, Dissolved	10	EQS	0.16	ug/l	6 of 6	1	0.54	15			0.82	4.7	0.54	**15**	0.57	0.78
Beryllium, Dissolved			0.1	ug/l	2 of 6	0	0.2	0.5			< 0.1	< 0.1	0.2	< 0.1	0.5	< 0.1
Cadmium, Dissolved	0.00008	EQS	0.03	ug/l	3 of 6	3	0.04	0.38			**< 0.03**	**< 0.03**	**0.26**	**< 0.03**	**0.38**	**0.04**
Calcium, Dissolved			0.09	mg/l	6 of 6	0	11	140			43	140	11	83	130	140
Chromium, Dissolved	4.7	EQS	0.25	ug/l	4 of 6	1	0.32	9			0.63	< 0.25	< 0.25	0.32	1.1	**9**
Copper, Dissolved	1	EQS	0.4	ug/l	4 of 6	2	0.5	2.4			**2**	< 0.4	1	< 0.4	0.5	**2.4**
Lead, Dissolved	1.2	EQS	0.09	ug/l	6 of 6	1	0.12	3100			0.21	0.12	0.26	0.31	**3100**	0.33
Manganese, Dissolved	50	EQS	0.22	ug/l	6 of 6	6	52	2600			**780**	**1900**	**170**	**2600**	**210**	**52**
Mercury, Dissolved	1	DWS	0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	4	EQS	0.5	ug/l	6 of 6	2	1	8.6			**4.3**	1	**8.6**	2.3	3.7	1.5
Selenium, Dissolved	10	DWS	0.25	ug/l	6 of 6	1	0.81	22			2.6	1.5	0.87	0.81	2.4	**22**
Tin, Dissolved			0.4	ug/l	0 of 5	0					< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	
Vanadium, Dissolved	20	EQS	0.6	ug/l	5 of 6	0	0.6	1.3			1.3	0.6	1	< 0.6	0.9	0.8
Zinc, Dissolved	12.3	EQS	1.3	ug/l	6 of 6	2	3.9	45			7.8	3.9	8.8	**13**	**45**	10
Inorganics																
pH	6 to 9	EQS		pH	6 of 6	0	4.8	7			6.7	6.7	6.9	6.8	**4.8**	7
Cyanide, Total	0.001	EQS	40	ug/l	2 of 6	2	78	1000			**< 40**	**< 40**	**< 40**	**< 40**	**1000**	**78**
Dissolved Organic Carbon			2	mg/l	2 of 6	0	2.3	2.6			< 2.0	2.3	< 2.0	< 2.0	< 2.0	2.6
Hardness			0.1	mg/l	6 of 6	0	39.6	420			170	420	39.6	246	349	405
Ammoniacal Nitrogen as N	0.3	EQS	0.015	mg/l	4 of 6	2	0.025	0.53			< 0.015	**0.53**	0.027	< 0.015	**0.31**	0.025
Chloride	250	EQS	0.1	mg/l	6 of 6	0	24	180			26	32	30	24	180	36
Petroleum Hydrocarbons																
Aliphatic C5-C6	15000	WHO	0.1	ug/l	2 of 6	0	2.1	2.7			< 0.1	2.7	2.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	15000	WHO	0.1	ug/l	0 of 6	0					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	300	WHO	0.1	ug/l	4 of 6	0	3.4	9.7			3.9	< 0.1	< 0.1	7.9	9.7	3.4
Aliphatic C10-C12	300	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	300	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C35-C44			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35			10	ug/l	0 of 6	0					< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	10	WHO	0.1	ug/l	0 of 6	0					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	700	WHO	0.1	ug/l	0 of 6	0					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	300	WHO	0.1	ug/l	0 of 6	0					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	90	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	90	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	90	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	90	WHO	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C35-C44			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35			10	ug/l	0 of 6	0					< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total			10	ug/l	0 of 6	0					< 10	< 10	< 10	< 10	< 10	< 10
Benzene	1	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	74	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	20	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	30	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs																
Naphthalene	2	EQS	0.05	ug/l	3 of 6	1	0.12	4.9			< 0.05	**4.9**	< 0.05	0.42	0.12	< 0.05
Acenaphthylene			0.01	ug/l	2 of 6	0	0.02	0.09			< 0.01	0.09	< 0.01	0.02	< 0.01	< 0.01
Acenaphthene	2000	USEPA	0.01	ug/l	3 of 6	0	0.01	0.37			< 0.01	0.37	< 0.01	0.36	< 0.01	0.01
Fluorene			0.01	ug/l	3 of 6	0	0.01	0.27			0.01	0.27	< 0.01	0.15	< 0.01	< 0.01
Phenanthrene			0.01	ug/l	4 of 6	0	0.01	0.56			0.01	0.56	< 0.01	0.42	0.01	< 0.01
Anthracene	0.1	EQS	0.01	ug/l	2 of 6	0	0.07	0.08			< 0.01	0.08	< 0.01	0.07	< 0.01	< 0.01
Fluoranthene	0.0063	EQS	0.01	ug/l	2 of 6	2	0.09	0.1			**< 0.01**	**0.1**	**< 0.01**	**0.09**	**< 0.01**	**< 0.01**
Pyrene			0.01	ug/l	3 of 6	0	0.01	0.08			< 0.01	0.08	< 0.01	0.07	< 0.01	0.01
Benzo(a)anthracene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	0.00017	EQS	0.01	ug/l	0 of 6	0					**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**	**< 0.01**
Indeno(1,2,3-c,d)pyrene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene			0.01	ug/l	0 of 6	0					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total			0.2	ug/l	2 of 6	0	1.6	6.4			< 0.20	6.4	< 0.20	1.6	< 0.20	< 0.20
Phenols																
Phenols, Total			2	ug/l	0 of 6	0					< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
VOCs																
Dichlorodifluoromethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	0.5	DWS	1	ug/l	0 of 6	0					**< 1**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**
Bromomethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Trans-1,2-dichloroethylene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene			1	ug/l	1 of 6	0	1	1			< 1	< 1	< 1	1	< 1	< 1
2,2-dichloropropane			2	ug/l	0 of 6	0					< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane			4	ug/l	0 of 6	0					< 4	< 4	< 4	< 4	< 4	< 4

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GACs apply to CSM1 - Principal Aquifer and fresh water receptor

Shallow Groundwater concentration exceeds GAC	100
Limit of Detection Value exceeds GAC	<0.1

Contaminant Name	GAC	Source	LOD	Units	Total > LOD	Total > GAC	Min	Max		Hole Ref	BH001	BH004	BH005	BH007	BH011	BH013
										Easting	384566.052	384554.516	384655.497	384765.207	384726.701	384368.382
										Northing	397646.557	397582.476	397554.645	397596.049	397513.893	397549.44
										Sample Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020	16/01/2020
										Investigation	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019
Chloroform			1	ug/l	1 of 6	0	1	1			< 1	< 1	1	< 1	< 1	< 1
1,1,1-trichloroethane	100	EQS	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Benzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	3	EQS	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene			1	ug/l	1 of 6	0	1	1			< 1	< 1	< 1	1	< 1	< 1
1,2-dichloropropane	40	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	60	WHO	4	ug/l	0 of 6	0					< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Toluene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	400	EQS	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	100	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	0.4	WHO	1	ug/l	0 of 6	0					**< 1**	< 1	**< 1**	**< 1**	**< 1**	**< 1**
Chlorobenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene			2	ug/l	0 of 6	0					< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Styrene	50	EQS	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	100	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	400	USEPA	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	3000	USEPA	2	ug/l	0 of 6	0					< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	300	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	1000	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	1	WHO	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	70	USEPA	1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	0.6	WHO	1	ug/l	0 of 6	0					**< 1**	**< 1**	**< 1**	**< 1**	**< 1**	**< 1**
1,2,3-trichlorobenzene			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
MTBE			1	ug/l	0 of 6	0					< 1	< 1	< 1	< 1	< 1	< 1
SVOCs																
Phenol	7.7	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	50	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylphenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	70	USEPA	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	40	EQS	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	50	USEPA	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	100	USEPA	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	1	USEPA	1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	0.4	EQS	1	ug/l	0 of 6	0					**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**	**< 1.0**
Di-n-butylphthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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GACs apply to CSM1 - Principal Aquifer and fresh water receptor

Shallow Groundwater concentration exceeds GAC	100
Limit of Detection Value exceeds GAC	<0.1

Contaminant Name	GAC	Source	LOD	Units	Total > LOD	Total > GAC	Min	Max		Hole Ref	BH001	BH004	BH005	BH007	BH011	BH013
										Easting	384566.052	384554.516	384655.497	384765.207	384726.701	384368.382
										Northing	397646.557	397582.476	397554.645	397596.049	397513.893	397549.44
										Sample Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020	16/01/2020
										Investigation	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019	AEG 2019
Butylbenzylphthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene			1	ug/l	0 of 6	0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Appendix E

Ground Gas Risk Assessment

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Water Depth (mbgl)	1.5	Water depth < top of piezometer (can be discounted)
Carbon Dioxide (%)	5.8	CO2 concentration >5% (extra consideration required)
Methane (%)	1.9	CH4 concentration >1% (extra consideration required)
GSV	0.006	Characteristic situation 1: GSV < 0.07
GSV	0.4	Characteristic situation 2: 0.07 > GSV < 0.7

Hole ID	Easting	Northing	Elevation (mOD)	Response zone top (mbgl)	Response zone base (mbgl)	Date	Geology	Gas Monitoring Round		Water Depth	Flow	Pressure	Carbon Dioxide Peak	Carbon Dioxide Steady	Methane Peak	Methane Steady	Carbon Monoxide	Hydrogen Sulphide	Methane Peak	Methane Steady	Oxygen Low Decline	Oxygen Steady	CO2 GSV	CH4 GSV
									Parameter	Water Depth	Flow	Pressure	Carbon Dioxide Peak	Carbon Dioxide Steady	Methane Peak	Methane Steady	Carbon Monoxide	Hydrogen Sulphide	Methane Peak	Methane Steady	Oxygen Low Decline	Oxygen Steady	CO2 GSV	CH4 GSV
									Units	mbgl	l/hr	mbar	% v/v	% v/v	% v/v	% v/v	ppm	ppm	% LEL	% LEL	%	%		
BH001	384566.1	397646.6	37.81	10	15.5	16/01/20	SS	1		9.50	0.0	997	0.2	0.2	<0.1	<0.1	<1.0	1	<2.0	<2.0	20.4	20.4	0	0
BH001	384566.1	397646.6	37.81	10	15.5	06/02/20	SS	2		9.73	0.0	1031	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH001	384566.1	397646.6	37.81	10	15.5	20/02/20	SS	3		9.75	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.4	20.4	0	0
BH001	384566.1	397646.6	37.81	10	15.5	06/03/20	SS	4		9.80	0.0	1001	0.3	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.8	0	0
BH002	384655.3	397617.6	33.27	0.5	2.5	21/01/20	MG	1		Dry	0.0	1000	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.7	20.7	0	0
BH002	384655.3	397617.6	33.27	0.5	2.5	06/02/20	MG	2		Dry	0.0	1030	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.1	20.1	0	0
BH002	384655.3	397617.6	33.27	0.5	2.5	20/02/20	MG	3		Dry	0.0	1001	0.2	0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.3	20.3	0	0
BH002	384655.3	397617.6	33.27	0.5	2.5	06/03/20	MG	4		Wet at Tip	0.0	1001	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.3	20.4	0	0
BH002	384655.3	397617.6	33.27	3.2	4	21/01/20	MG	1		Dry	0.0	1000	0.5	0.5	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH002	384655.3	397617.6	33.27	3.2	4	06/02/20	MG	2		Dry	0.0	1031	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.0	20.0	0	0
BH002	384655.3	397617.6	33.27	3.2	4	20/02/20	MG	3		Dry	0.0	1001	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.0	20.1	0	0
BH002	384655.3	397617.6	33.27	3.2	4	06/03/20	MG	4		Wet at Tip	0.0	1001	0.2	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.2	0	0
BH004	384554.5	397582.5	34.22	11	14	21/01/20	SS	1		6.06	0.0	1000	0.3	0.3	<0.1	<0.1	<1.0	1	<2.0	<2.0	20.4	20.4	0	0
BH004	384554.5	397582.5	34.22	11	14	06/02/20	SS	2		6.15	0.0	1030	0.2	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.3	20.3	0	0
BH004	384554.5	397582.5	34.22	11	14	20/02/20	SS	3		6.20	0.0	1001	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.6	20.6	0	0
BH004	384554.5	397582.5	34.22	11	14	06/03/20	SS	4		6.20	0.0	1001	0.2	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH004A	384553.6	397583.4	34.19	1	4	21/01/20	MG	1		Dry	0.0	999	1.3	1.3	<0.1	<0.1	<1.0	1	<2.0	<2.0	19.6	19.6	0	0
BH004A	384553.6	397583.4	34.19	1	4	06/02/20	MG	2		Dry	0.0	1029	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.1	20.1	0	0
BH004A	384553.6	397583.4	34.19	1	4	20/02/20	MG	3		Wet at Tip	0.0	1001	0.5	0.2	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.3	20.3	0	0
BH004A	384553.6	397583.4	34.19	1	4	06/03/20	MG	4		Wet at Tip	0.0	1001	0.6	0.4	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.5	0	0
BH005	384655.5	397554.6	33.42	18.5	21.5	21/01/20	SS	1		5.60	0.0	1000	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.4	0	0
BH005	384655.5	397554.6	33.42	18.5	21.5	06/02/20	SS	2		5.27	0.0	1030	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.4	0	0
BH005	384655.5	397554.6	33.42	18.5	21.5	20/02/20	SS	3		5.30	0.0	1001	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.1	20.1	0	0
BH005	384655.5	397554.6	33.42	18.5	21.5	06/03/20	SS	4		5.25	0.0	1001	0.3	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.3	0	0
BH007	384765.2	397596.0	34.68	10.6	13.6	21/01/20	SS	1		6.07	0.0	1000	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.6	20.6	0	0
BH007	384765.2	397596.0	34.68	10.6	13.6	06/02/20	SS	2		6.27	0.0	1030	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.6	20.6	0	0
BH007	384765.2	397596.0	34.68	10.6	13.6	20/02/20	SS	3		6.20	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.3	20.3	0	0
BH007	384765.2	397596.0	34.68	10.6	13.6	06/03/20	SS	4		6.10	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.3	20.4	0	0
BH008	384766.9	397570.4	34.05	0.3	6.5	21/01/20	MG	1		Wet at Tip	0.0	1000	0.5	0.5	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.2	0	0
BH008	384766.9	397570.4	34.05	0.3	6.5	06/02/20	MG	2		5.51	0.0	1030	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.1	20.1	0	0
BH008	384766.9	397570.4	34.05	0.3	6.5	20/02/20	MG	3		5.50	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.4	20.4	0	0
BH008	384766.9	397570.4	34.05	0.3	6.5	06/03/20	MG	4		5.50	0.0	1001	0.1	<0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH009	384759.1	397550.4	34.20	0.5	1.7	21/01/20	MG	1		Dry	0.0	1000	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.6	20.6	0	0
BH009	384759.1	397550.4	34.20	0.5	1.7	06/02/20	MG	2		Dry	0.0	1030	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.7	20.7	0	0
BH009	384759.1	397550.4	34.20	0.5	1.7	20/02/20	MG	3		Dry	0.0	1001	0.1	<0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.7	20.8	0	0
BH009	384759.1	397550.4	34.20	0.5	1.7	06/03/20	MG	4		Wet at Tip	0.0	1001	0.1	<0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.5	0	0
BH011	384726.7	397513.9	34.05	10	13	21/01/20	SS	1		7.40	0.0	1000	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.6	20.6	0	0
BH011	384726.7	397513.9	34.05	10	13	06/02/20	SS	2		5.65	0.0	1029	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.7	20.7	0	0
BH011	384726.7	397513.9	34.05	10	13	20/02/20	SS	3		5.70	0.0	1001	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.6	20.7	0	0
BH011	384726.7	397513.9	34.05	10	13	06/03/20	SS	4		5.60	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH012A	384647.5	397660.4	38.27	2	6	21/01/20	MG	1		Wet at Tip	0.0	1000	0.6	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.6	0	0
BH012A	384647.5	397660.4	38.27	2	6	06/02/20	MG	2		5.98	0.0	1029	0.3	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.5	20.5	0	0
BH012A	384647.5	397660.4	38.27	2	6	20/02/20	MG	3		Wet at Tip	0.0	1001	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.2	20.2	0	0
BH012A	384647.5	397660.4	38.27	2	6	06/03/20	MG	4		Wet at Tip	0.0	1001	0.4	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.3	0	0
BH013	384368.4	397549.4	33.08	11	16.5	15/01/20	SS	1		5.30	0.2	999	0.5	0.5	<0.1	<0.1	<1.0	1	<2.0	<2.0	20.3	20.3	0.001	0.0002
BH013	384368.4	397549.4	33.08	11	16.5	06/02/20	SS	2		5.40	0.1	1029	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.3	20.3	0.0003	0.0001
BH013	384368.4	397549.4	33.08	11	16.5	20/02/20	SS	3		5.40	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.6	20.6	0	0
BH013	384368.4	397549.4	33.08	11	16.5	06/03/20	SS	4		5.30	0.0	1001	0.1	0.1	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.6	20.6	0	0
DS001	384775.0	397520.1	34.22	2	4	21/01/20	MG	1		Wet at Tip	0.0	1000	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.2	0	0

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Water Depth (mbgl)	1.5	Water depth < top of piezometer (can be discounted)
Carbon Dioxide (%)	5.8	CO2 concentration >5% (extra consideration required)
Methane (%)	1.9	CH4 concentration >1% (extra consideration required)
GSV	0.006	Characteristic situation 1: GSV < 0.07
GSV	0.4	Characteristic situation 2: 0.07 > GSV < 0.7

Hole ID	Easting	Northing	Elevation (mOD)	Response zone top (mbgl)	Response zone base (mbgl)	Date	Geology	Gas Monitoring Round	Parameter / Units	Water Depth mbgl	Flow l/hr	Pressure mbar	Carbon Dioxide Peak % v/v	Carbon Dioxide Steady % v/v	Methane Peak % v/v	Methane Steady % v/v	Carbon Monoxide ppm	Hydrogen Sulphide ppm	Methane Peak % LEL	Methane Steady % LEL	Oxygen Low Decline %	Oxygen Steady %	CO2 GSV	CH4 GSV
DS001	384775.0	397520.1	34.22	2	4	06/02/20	MG	2		3.17	0.0	1029	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.4	0	0
DS001	384775.0	397520.1	34.22	2	4	20/02/20	MG	3		3.05	0.0	1001	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.5	20.4	0	0
DS001	384775.0	397520.1	34.22	2	4	06/03/20	MG	4		3.00	0.0	1001	0.2	0.2	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.2	20.2	0	0
DS002	384753.5	397492.0	34.09	8.15	9.9	21/01/20	SS	1		9.70	0.0	1000	0.6	0.6	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.1	20.1	0	0
DS002	384753.5	397492.0	34.09	8.15	9.9	06/02/20	SS	2		5.51	0.0	1029	0.5	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.1	20.1	0	0
DS002	384753.5	397492.0	34.09	8.15	9.9	20/02/20	SS	3		5.45	0.0	1001	0.4	0.4	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	20.2	20.2	0	0
DS002	384753.5	397492.0	34.09	8.15	9.9	06/03/20	SS	4		5.40	0.0	1001	0.3	0.3	<0.1	<0.1	<1.0	<1.0	<2.0	<2.0	20.4	20.4	0	0

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Appendix F

Chemically Aggressive Ground Assessment

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					Borehole ID	BH001	BH001	BH001	BH001	BH002	BH003	BH003	BH004	BH004	BH004	BH005	BH006A	BH007
					East	384566.05	384566.05	384566.05	384566.05	384655.29	384633.94	384633.94	384554.52	384554.52	384554.52	384655.5	384728.89	384765.21
					North	397646.56	397646.56	397646.56	397646.56	397617.59	397602.66	397602.66	397582.48	397582.48	397582.48	397554.65	397614.04	397596.05
					Sample Depth (mbgl)	1.65	5.5	8-9.50	12.5	1.2	1.2	4.7	9.5-11	6	0.8	0.5	0.5	7.5-8.1
					Date	27/11/19	27/11/19	29/10/19	29/10/19	27/11/19	27/11/19	27/11/19	16/11/19	02/11/19	21/11/19	16/11/19	17/11/19	17/11/19
Contaminant	**LOD**	**Units**	**Min**	**Max**	**Geology**	MG	SS	SS	SS	MG	MG	SS	SS	MG	MG	MG	MG	SS
pH	-	pH	7.6	11.4		9.4	8.9	8.9	8.3	10.3	9.3	10.2	8.2	10	8.3	8.4	10.7	8.1
Sulphate as SO4	10	mg/l	14	1100		430	22	18	16	340	210	160	59	1100	80	89	710	14

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					Borehole ID	BH007	BH007	BH007	BH008	BH008	BH009	BH011	BH011	BH011	BH012A	BH012A	BH013	BH013
					East	384765.21	384765.21	384765.21	384766.9	384766.9	384759.09	384726.7	384726.7	384726.7	384647.48	384647.48	384368.38	384368.38
					North	397596.05	397596.05	397596.05	397570.4	397570.4	397550.39	397513.89	397513.89	397513.89	397660.41	397660.41	397549.44	397549.44
					Sample Depth (mbgl)	4.5	1.2	7.2	2.1	5.5	0.8	7.5-8.5	1.2	5.5	1.7	10	1.5	8
					Date	09/11/19	08/11/19	09/11/19	10/11/19	10/11/19	09/11/19	23/11/19	09/11/19	09/11/19	27/11/19	27/10/19	27/11/19	27/11/19
Contaminant	**LOD**	**Units**	**Min**	**Max**	**Geology**	MG	MG	SS	MG	MG	MG	SS	MG	SS	MG	MG	MG	SS
pH	-	pH	7.6	11.4		10.2	10.6	8.3	11.4	7.8	10.7	7.6	11.2	8.4	8.3	8.1	8.4	8.4
Sulphate as SO4	10	mg/l	14	1100		630	120	39	120	200	410	51	120	68	62	61	120	31

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					Borehole ID	BH013	BH014	TP001	TP002
					East	384368.38	384495.59	384615.42	384628.47
					North	397549.44	397565.3	397543.9	397622.87
					Sample Depth (mbgl)	10.5-12	0.7	0.8	1.5
					Date	30/10/19	27/11/19	27/11/19	27/11/19
Contaminant	**LOD**	**Units**	**Min**	**Max**	**Geology**	SS	MG	MG	MG
pH	-	pH	7.6	11.4		8.4	9.5	8	9.3
Sulphate as SO4	10	mg/l	14	1100		21	42	16	40

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Appendix G

HazWasteOnline Waste Assessment

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ARUP

HazWasteOnline™

Waste Classification Report

T4BCC-MR4SU-PW7SE

Job name

ID Manchester

Description/Comments

Asbestos was not included in this assessment.

Project

ID Manchester

Site

University of Manchester

Related Documents

#	Name	Description
None		

Waste Stream Template

ID Manchester

Classified by

Name:
Mark Griffiths
Date:
15 Jan 2020 11:36 GMT
Telephone:
0161 228 2331

Company:
Ove Arup & Partners International
8th Floor, St James's Buildings
Oxford Street
Manchester
M1 6EL

Report

Created by: Mark Griffiths
Created date: 15 Jan 2020 11:36 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	ARP-BH001	1	Non Hazardous		3
2	ARP-BH001[2]	3	Non Hazardous		5
3	ARP-BH002	1	Non Hazardous		7
4	ARP-BH002[2]	2.5	Non Hazardous		9
5	ARP-BH003	1	Non Hazardous		11
6	ARP-BH003[2]	3.5	Non Hazardous		13
7	ARP-BH004	2.3	Non Hazardous		15
8	ARP-BH004[2]	5.3	Non Hazardous		17
9	ARP-BH005	1	Non Hazardous		19
10	ARP-BH006	1.2	Non Hazardous		21
11	ARP-BH006A	1	Non Hazardous		23
12	ARP-BH006B	0.6	Non Hazardous		25

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#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
13	ARP-BH007	1	Non Hazardous		27
14	ARP-BH007[2]	3.3	Non Hazardous		29
15	ARP-BH008	5.2	Non Hazardous		31
16	ARP-BH008[2]	2.2	Non Hazardous		33
17	ARP-BH009	2.6	Non Hazardous		35
18	ARP-BH011	3.6	Non Hazardous		37
19	ARP-BH011[2]	1	Non Hazardous		39
20	ARP-BH012A	7.5	Non Hazardous		41
21	ARP-BH012A[2]	2.6	Non Hazardous		43
22	ARP-BH013	1	Non Hazardous		45
23	ARP-BH013[2]	3.5	Non Hazardous		47
24	ARP-BH014	0.7	Non Hazardous		49
25	ARP-BH014[2]	4	Non Hazardous		51
26	ARP-DS001	0.6	Non Hazardous		53
27	ARP-DS002	0.8	Non Hazardous		55
28	ARP-TP001	0.8	Non Hazardous		57
29	ARP-TP002	1	Non Hazardous		59
30	ARP-TP002[2]	2.5	Non Hazardous		61
31	CE-2015-CC/WS2	0.68	Non Hazardous		63
32	CE-2015-CC/WS3	0.56	Non Hazardous		65
33	GEO-2015-CRH01	0.2	Non Hazardous		67
34	GEO-2015-CRH01[2]	0.5	Non Hazardous		69
35	GEO-2015-CRH01[3]	2	Non Hazardous		71
36	GEO-2015-CRH01[4]	1	Non Hazardous		73
37	GEO-2015-CRH01B	1	Non Hazardous		75
38	GEO-2015-CRH01B[2]	2	Non Hazardous		77
39	GEO-2015-CRH03	3	Non Hazardous		79
40	GEO-2015-TP01	0.3	Non Hazardous		81
41	GEO-2015-TP02	0.5	Non Hazardous		83
42	GEO-2015-TP03	0.7	Non Hazardous		85
43	GEO-2015-TP04	0.2	Non Hazardous		87
44	GEO-2015-TP05	2	Non Hazardous		89
45	GEO-2015-TP05[2]	1.4	Non Hazardous		91
46	GEO-2015-TP06	0.3	Non Hazardous		93
47	GEO-2015-TP07	1.8	Non Hazardous		95
48	GEO-2015-TP08	0.8	Non Hazardous		97
49	GEO-2015-WLS01	1	Non Hazardous		99
50	GEO-2015-WLS02	2	Non Hazardous		101
51	GEO-2015-WLS02[2]	1	Non Hazardous		103
52	GEO-2015-WLS03	3.5	Non Hazardous		105
53	GEO-2015-WLS03[2]	2.5	Non Hazardous		107

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	109
Appendix B: Rationale for selection of metal species	111
Appendix C: Version	111

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Classification of sample: ARP-BH001

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH001
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3		anthracene 204-371-1 / 120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	1.5 mg/kg		1.5 mg/kg	0.00015 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	9.1 mg/kg		9.1 mg/kg	0.00091 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.9 mg/kg	2.775	2.498 mg/kg	0.00025 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.3 mg/kg		0.3 mg/kg	0.00003 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				23	mg/kg	1.462	33.616	mg/kg	0.00336 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				38	mg/kg	1.252	47.568	mg/kg	0.00476 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	39	mg/kg		39	mg/kg	0.0039 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				30	mg/kg	1.545	46.356	mg/kg	0.00464 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
			201-581-5	85-01-8									
26		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				29	mg/kg	1.785	51.77	mg/kg	0.00518 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				60	mg/kg	1.245	74.683	mg/kg	0.00747 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0308 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH001[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
ARP-BH001[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
3 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.4 mg/kg		1.4 mg/kg	0.00014 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	10 mg/kg		10 mg/kg	0.001 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7 mg/kg	2.775	1.943 mg/kg	0.000194 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.2 mg/kg		0.2 mg/kg	0.00002 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				35	mg/kg	1.252	43.812	mg/kg	0.00438 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.1	mg/kg	1.884	0.188	mg/kg	0.0000188 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	200	mg/kg		200	mg/kg	0.02 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.16	mg/kg	1.16	0.186	mg/kg	0.0000186 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				18	mg/kg	1.545	27.813	mg/kg	0.00278 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-581-5	85-01-8									
26		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	44.63	mg/kg	0.00446 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				43	mg/kg	1.245	53.523	mg/kg	0.00535 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.041 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH002

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH002
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		0.12 mg/kg		0.12 mg/kg	0.000012 %		
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		0.17 mg/kg		0.17 mg/kg	0.000017 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	1.9 mg/kg		1.9 mg/kg	0.00019 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	7.7 mg/kg		7.7 mg/kg	0.00077 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		0.14 mg/kg		0.14 mg/kg	0.000014 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.35 mg/kg		0.35 mg/kg	0.000035 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.21 mg/kg		0.21 mg/kg	0.000021 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.41 mg/kg		0.41 mg/kg	0.000041 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.14 mg/kg		0.14 mg/kg	0.000014 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
			215-160-9	1308-38-9									
14		chrysene				0.51	mg/kg		0.51	mg/kg	0.000051 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				24	mg/kg	1.252	30.043	mg/kg	0.003 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				1.5	mg/kg		1.5	mg/kg	0.00015 %		
			205-912-4	206-44-0									
19		fluorene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	110	mg/kg		110	mg/kg	0.011 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.05	mg/kg	1.16	0.058	mg/kg	0.0000058 %		
			215-696-3	1344-48-5									
23		naphthalene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				15	mg/kg	1.545	23.178	mg/kg	0.00232 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.84	mg/kg		0.84	mg/kg	0.000084 %		
			201-581-5	85-01-8									
26		pyrene				1.3	mg/kg		1.3	mg/kg	0.00013 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				21	mg/kg	1.785	37.489	mg/kg	0.00375 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				43	mg/kg	1.245	53.523	mg/kg	0.00535 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0293 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH002[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH002[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
2.5 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	5.8	mg/kg		5.8	mg/kg	0.00058 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	21	mg/kg		21	mg/kg	0.0021 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.1	mg/kg	2.775	3.053	mg/kg	0.000305 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4	mg/kg		0.4	mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				210	mg/kg	1.462	306.927	mg/kg	0.0307 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				77	mg/kg	1.252	96.387	mg/kg	0.00964 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1	mg/kg	1.884	1.884	mg/kg	0.000188 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	150	mg/kg		150	mg/kg	0.015 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.23	mg/kg	1.16	0.267	mg/kg	0.0000267 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				30	mg/kg	1.545	46.356	mg/kg	0.00464 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
			201-581-5	85-01-8									
26		pyrene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
			204-927-3	129-00-0									
27		selenium { selenium }				1.3	mg/kg		1.3	mg/kg	0.00013 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				32	mg/kg	1.785	57.126	mg/kg	0.00571 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				100	mg/kg	1.245	124.471	mg/kg	0.0124 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0816 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH003

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH003
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		0.08 mg/kg		0.08 mg/kg	0.000008 %		
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		0.17 mg/kg		0.17 mg/kg	0.000017 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	1.4 mg/kg		1.4 mg/kg	0.00014 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	10 mg/kg		10 mg/kg	0.001 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		0.6 mg/kg		0.6 mg/kg	0.00006 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.57 mg/kg		0.57 mg/kg	0.000057 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		1.1 mg/kg		1.1 mg/kg	0.00011 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		1.1 mg/kg		1.1 mg/kg	0.00011 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.4 mg/kg		0.4 mg/kg	0.00004 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.3 mg/kg	2.775	0.833 mg/kg	0.0000833 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.2 mg/kg		0.2 mg/kg	0.00002 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				10	mg/kg	1.462	14.616	mg/kg	0.00146 %		
			215-160-9	1308-38-9									
14		chrysene				0.74	mg/kg		0.74	mg/kg	0.000074 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				180	mg/kg	1.252	225.32	mg/kg	0.0225 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.2	mg/kg	1.884	0.377	mg/kg	0.0000377 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				1.9	mg/kg		1.9	mg/kg	0.00019 %		
			205-912-4	206-44-0									
19		fluorene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.53	mg/kg		0.53	mg/kg	0.000053 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	88	mg/kg		88	mg/kg	0.0088 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				1.6	mg/kg	1.16	1.856	mg/kg	0.000186 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				9.5	mg/kg	1.545	14.679	mg/kg	0.00147 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.67	mg/kg		0.67	mg/kg	0.000067 %		
			201-581-5	85-01-8									
26		pyrene				1.5	mg/kg		1.5	mg/kg	0.00015 %		
			204-927-3	129-00-0									
27		selenium { selenium }				0.9	mg/kg		0.9	mg/kg	0.00009 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				16	mg/kg	1.785	28.563	mg/kg	0.00286 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				74	mg/kg	1.245	92.109	mg/kg	0.00921 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0488 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH003[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH003[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
3.5 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		2.4 mg/kg		2.4 mg/kg	0.00024 %		
2	acenaphthylene		205-917-1	208-96-8		0.09 mg/kg		0.09 mg/kg	0.000009 %		
3	anthracene		204-371-1	120-12-7		3.2 mg/kg		3.2 mg/kg	0.00032 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.1 mg/kg		1.1 mg/kg	0.00011 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	8.2 mg/kg		8.2 mg/kg	0.00082 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.81 mg/kg		0.81 mg/kg	0.000081 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.7 mg/kg		2.7 mg/kg	0.00027 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.8 mg/kg		1.8 mg/kg	0.00018 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.4 mg/kg		2.4 mg/kg	0.00024 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.77 mg/kg		0.77 mg/kg	0.000077 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.3 mg/kg	2.775	0.833 mg/kg	0.0000833 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
			215-160-9	1308-38-9									
14		chrysene				2.9	mg/kg		2.9	mg/kg	0.00029 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				110	mg/kg	1.252	137.695	mg/kg	0.0138 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.3	mg/kg	1.884	0.565	mg/kg	0.0000565 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.17	mg/kg		0.17	mg/kg	0.000017 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				9.5	mg/kg		9.5	mg/kg	0.00095 %		
			205-912-4	206-44-0									
19		fluorene				2.5	mg/kg		2.5	mg/kg	0.00025 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.71	mg/kg		0.71	mg/kg	0.000071 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	59	mg/kg		59	mg/kg	0.0059 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.06	mg/kg	1.16	0.0696	mg/kg	0.00000696 %		
			215-696-3	1344-48-5									
23		naphthalene				3.7	mg/kg		3.7	mg/kg	0.00037 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				8.7	mg/kg	1.545	13.443	mg/kg	0.00134 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				12	mg/kg		12	mg/kg	0.0012 %		
			201-581-5	85-01-8									
26		pyrene				8.8	mg/kg		8.8	mg/kg	0.00088 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				18	mg/kg	1.785	32.133	mg/kg	0.00321 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				31	mg/kg	1.245	38.586	mg/kg	0.00386 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0363 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH004

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH004
Sample Depth:
2.3 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		1.2 mg/kg		1.2 mg/kg	0.00012 %		
2		acenaphthylene 205-917-1 / 208-96-8		0.1 mg/kg		0.1 mg/kg	0.00001 %		
3		anthracene 204-371-1 / 120-12-7		1.4 mg/kg		1.4 mg/kg	0.00014 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	2.4 mg/kg		2.4 mg/kg	0.00024 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	9.4 mg/kg		9.4 mg/kg	0.00094 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		1.2 mg/kg		1.2 mg/kg	0.00012 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		3.5 mg/kg		3.5 mg/kg	0.00035 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		2.4 mg/kg		2.4 mg/kg	0.00024 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		3.6 mg/kg		3.6 mg/kg	0.00036 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		1.4 mg/kg		1.4 mg/kg	0.00014 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.5 mg/kg	2.775	1.388 mg/kg	0.000139 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	1.2 mg/kg		1.2 mg/kg	0.00012 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				12	mg/kg	1.462	17.539	mg/kg	0.00175 %		
			215-160-9	1308-38-9									
14		chrysene				3.7	mg/kg		3.7	mg/kg	0.00037 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				120	mg/kg	1.252	150.213	mg/kg	0.015 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.4	mg/kg	1.884	0.754	mg/kg	0.0000754 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.25	mg/kg		0.25	mg/kg	0.000025 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				9.8	mg/kg		9.8	mg/kg	0.00098 %		
			205-912-4	206-44-0									
19		fluorene				1	mg/kg		1	mg/kg	0.0001 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				1	mg/kg		1	mg/kg	0.0001 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	400	mg/kg		400	mg/kg	0.04 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.43	mg/kg	1.16	0.499	mg/kg	0.0000499 %		
			215-696-3	1344-48-5									
23		naphthalene				0.61	mg/kg		0.61	mg/kg	0.000061 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				9.8	mg/kg	1.545	15.143	mg/kg	0.00151 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				8.5	mg/kg		8.5	mg/kg	0.00085 %		
			201-581-5	85-01-8									
26		pyrene				9.8	mg/kg		9.8	mg/kg	0.00098 %		
			204-927-3	129-00-0									
27		selenium { selenium }				1.1	mg/kg		1.1	mg/kg	0.00011 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				23	mg/kg	1.785	41.059	mg/kg	0.00411 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				310	mg/kg	1.245	385.861	mg/kg	0.0386 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.108 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH004[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH004[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
5.3 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	2 mg/kg		2 mg/kg	0.0002 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	13 mg/kg		13 mg/kg	0.0013 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.04 mg/kg		0.04 mg/kg	0.000004 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.09 mg/kg		0.09 mg/kg	0.000009 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.05 mg/kg		0.05 mg/kg	0.000005 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2 mg/kg		0.2 mg/kg	0.00002 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.11 mg/kg		0.11 mg/kg	0.000011 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.5 mg/kg	2.775	1.388 mg/kg	0.000139 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.5 mg/kg		0.5 mg/kg	0.00005 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium { chromium(III) oxide }		215-160-9	1308-38-9		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
14		chrysene	601-048-00-0	205-923-4	218-01-9		0.13	mg/kg		0.13	mg/kg	0.000013 %		
15		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		46	mg/kg	1.252	57.582	mg/kg	0.00576 %		
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				9	mg/kg	1.884	16.956	mg/kg	0.0017 %		
17		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
18		fluoranthene		205-912-4	206-44-0		0.3	mg/kg		0.3	mg/kg	0.00003 %		
19		fluorene		201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
20		indeno[123-cd]pyrene		205-893-2	193-39-5		0.04	mg/kg		0.04	mg/kg	0.000004 %		
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	98	mg/kg		98	mg/kg	0.0098 %		
22		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
24		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		13	mg/kg	1.545	20.087	mg/kg	0.00201 %		
25		phenanthrene		201-581-5	85-01-8		0.21	mg/kg		0.21	mg/kg	0.000021 %		
26		pyrene		204-927-3	129-00-0		0.25	mg/kg		0.25	mg/kg	0.000025 %		
27		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		0.7	mg/kg		0.7	mg/kg	0.00007 %		
28		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		18	mg/kg	1.785	32.133	mg/kg	0.00321 %		
29		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		91	mg/kg	1.245	113.269	mg/kg	0.0113 %		
											Total:	0.0387 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH005

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH005
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	3 mg/kg		3 mg/kg	0.0003 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	35 mg/kg		35 mg/kg	0.0035 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.05 mg/kg		0.05 mg/kg	0.000005 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.04 mg/kg		0.04 mg/kg	0.000004 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		1.1 mg/kg	2.775	3.053 mg/kg	0.000305 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.2 mg/kg		0.2 mg/kg	0.00002 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				25	mg/kg	1.462	36.539	mg/kg	0.00365 %		
			215-160-9	1308-38-9									
14		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				130	mg/kg	1.252	162.731	mg/kg	0.0163 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.1	mg/kg	1.884	0.188	mg/kg	0.0000188 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		dibenzofuran				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-071-3	132-64-9									
19		fluoranthene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
			205-912-4	206-44-0									
20		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	110	mg/kg		110	mg/kg	0.011 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				0.13	mg/kg	1.16	0.151	mg/kg	0.0000151 %		
			215-696-3	1344-48-5									
24		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				31	mg/kg	1.545	47.901	mg/kg	0.00479 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			201-581-5	85-01-8									
27		pyrene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				35	mg/kg	1.785	62.481	mg/kg	0.00625 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				96	mg/kg	1.245	119.493	mg/kg	0.0119 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0582 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH006

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH006	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1.2 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		0.08 mg/kg		0.08 mg/kg	0.000008 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	3.2 mg/kg		3.2 mg/kg	0.00032 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	20 mg/kg		20 mg/kg	0.002 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		0.13 mg/kg		0.13 mg/kg	0.000013 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.24 mg/kg		0.24 mg/kg	0.000024 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.18 mg/kg		0.18 mg/kg	0.000018 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.5 mg/kg		0.5 mg/kg	0.00005 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.29 mg/kg		0.29 mg/kg	0.000029 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		1.3 mg/kg	2.775	3.608 mg/kg	0.000361 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.7 mg/kg		0.7 mg/kg	0.00007 %		

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#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
13		chromium { chromium(III) oxide }		21 mg/kg	1.462	30.693 mg/kg	0.00307 %		
		215-160-9 / 1308-38-9							
14		chrysene		0.3 mg/kg		0.3 mg/kg	0.00003 %		
		601-048-00-0 / 205-923-4 / 218-01-9							
15		copper { copper(II) oxide }		100 mg/kg	1.252	125.178 mg/kg	0.0125 %		
		029-016-00-6 / 215-269-1 / 1317-38-0							
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }		1 mg/kg	1.884	1.884 mg/kg	0.000188 %		
		006-007-00-5							
17		dibenz[a,h]anthracene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		601-041-00-2 / 200-181-8 / 53-70-3							
18		fluoranthene		0.72 mg/kg		0.72 mg/kg	0.000072 %		
		205-912-4 / 206-44-0							
19		fluorene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5 / 86-73-7							
20		indeno[123-cd]pyrene		0.12 mg/kg		0.12 mg/kg	0.000012 %		
		205-893-2 / 193-39-5							
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	270 mg/kg		270 mg/kg	0.027 %		
		082-001-00-6							
22		mercury { mercury(II) sulphide }		0.48 mg/kg	1.16	0.557 mg/kg	0.0000557 %		
		215-696-3 / 1344-48-5							
23		naphthalene		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		601-052-00-2 / 202-049-5 / 91-20-3							
24		nickel { nickel(IV) oxide (nickel dioxide) }		28 mg/kg	1.545	43.265 mg/kg	0.00433 %		
		028-004-00-8 / 234-823-3 / 12035-36-8							
25		phenanthrene		0.29 mg/kg		0.29 mg/kg	0.000029 %		
		201-581-5 / 85-01-8							
26		pyrene		0.74 mg/kg		0.74 mg/kg	0.000074 %		
		204-927-3 / 129-00-0							
27		selenium { selenium }		1.5 mg/kg		1.5 mg/kg	0.00015 %		
		034-001-00-2 / 231-957-4 / 7782-49-2							
28		vanadium { divanadium pentaoxide; vanadium pentoxide }		39 mg/kg	1.785	69.622 mg/kg	0.00696 %		
		023-001-00-8 / 215-239-8 / 1314-62-1							
29		zinc { zinc oxide }		180 mg/kg	1.245	224.049 mg/kg	0.0224 %		
		030-013-00-7 / 215-222-5 / 1314-13-2							
						Total:	0.0798 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH006A

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH006A	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.21	mg/kg		0.21	mg/kg	0.000021 %		
2		acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		
3		anthracene		204-371-1	120-12-7		0.33	mg/kg		0.33	mg/kg	0.000033 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	9.1	mg/kg		9.1	mg/kg	0.00091 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	25	mg/kg		25	mg/kg	0.0025 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.14	mg/kg		0.14	mg/kg	0.000014 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.38	mg/kg		0.38	mg/kg	0.000038 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.32	mg/kg		0.32	mg/kg	0.000032 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.42	mg/kg		0.42	mg/kg	0.000042 %		
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.16	mg/kg		0.16	mg/kg	0.000016 %		
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.8	mg/kg	2.775	2.22	mg/kg	0.000222 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.8	mg/kg		0.8	mg/kg	0.00008 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %		
			215-160-9	1308-38-9									
14		chrysene				0.48	mg/kg		0.48	mg/kg	0.000048 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				76	mg/kg	1.252	95.135	mg/kg	0.00951 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				11	mg/kg	1.884	20.724	mg/kg	0.00207 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		dibenzofuran				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			205-071-3	132-64-9									
19		fluoranthene				1.5	mg/kg		1.5	mg/kg	0.00015 %		
			205-912-4	206-44-0									
20		fluorene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	180	mg/kg		180	mg/kg	0.018 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				0.39	mg/kg	1.16	0.452	mg/kg	0.0000452 %		
			215-696-3	1344-48-5									
24		naphthalene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				19	mg/kg	1.545	29.359	mg/kg	0.00294 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				1	mg/kg		1	mg/kg	0.0001 %		
			201-581-5	85-01-8									
27		pyrene				1.6	mg/kg		1.6	mg/kg	0.00016 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				27	mg/kg	1.785	48.2	mg/kg	0.00482 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				130	mg/kg	1.245	161.813	mg/kg	0.0162 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0605 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH006B

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH006B	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
0.6 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.05	mg/kg		0.05	mg/kg	0.000005 %		
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		0.1	mg/kg		0.1	mg/kg	0.00001 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<1	mg/kg		<1	mg/kg	<0.0001 %		<**LOD**
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	7.8	mg/kg		7.8	mg/kg	0.00078 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.11	mg/kg		0.11	mg/kg	0.000011 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.27	mg/kg		0.27	mg/kg	0.000027 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.21	mg/kg		0.21	mg/kg	0.000021 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.24	mg/kg		0.24	mg/kg	0.000024 %		
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.1	mg/kg		0.1	mg/kg	0.00001 %		
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.2	mg/kg	2.775	0.555	mg/kg	0.0000555 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.8	mg/kg		0.8	mg/kg	0.00008 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				8.2	mg/kg	1.462	11.985	mg/kg	0.0012 %		
			215-160-9	1308-38-9									
14		chrysene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				22	mg/kg	1.252	27.539	mg/kg	0.00275 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.5	mg/kg	1.884	0.942	mg/kg	0.0000942 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		dibenzofuran				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-071-3	132-64-9									
19		fluoranthene				0.81	mg/kg		0.81	mg/kg	0.000081 %		
			205-912-4	206-44-0									
20		fluorene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	30	mg/kg		30	mg/kg	0.003 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				0.05	mg/kg	1.16	0.058	mg/kg	0.0000058 %		
			215-696-3	1344-48-5									
24		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				6.1	mg/kg	1.545	9.426	mg/kg	0.000943 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				0.54	mg/kg		0.54	mg/kg	0.000054 %		
			201-581-5	85-01-8									
27		pyrene				0.82	mg/kg		0.82	mg/kg	0.000082 %		
			204-927-3	129-00-0									
28		selenium { selenium }				0.5	mg/kg		0.5	mg/kg	0.00005 %		
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				11	mg/kg	1.785	19.637	mg/kg	0.00196 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				35	mg/kg	1.245	43.565	mg/kg	0.00436 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0158 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH007

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH007
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.53 mg/kg		0.53 mg/kg	0.000053 %		
2	acenaphthylene		205-917-1	208-96-8		1.1 mg/kg		1.1 mg/kg	0.00011 %		
3	anthracene		204-371-1	120-12-7		1.4 mg/kg		1.4 mg/kg	0.00014 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	7.7 mg/kg		7.7 mg/kg	0.00077 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		7.3 mg/kg		7.3 mg/kg	0.00073 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		11 mg/kg		11 mg/kg	0.0011 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		12 mg/kg		12 mg/kg	0.0012 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		12 mg/kg		12 mg/kg	0.0012 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		6.9 mg/kg		6.9 mg/kg	0.00069 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.3 mg/kg	2.775	0.833 mg/kg	0.0000833 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4 mg/kg		0.4 mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
			215-160-9	1308-38-9									
14		chrysene				9.3	mg/kg		9.3	mg/kg	0.00093 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				24	mg/kg	1.252	30.043	mg/kg	0.003 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.4	mg/kg	1.884	0.754	mg/kg	0.0000754 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				1	mg/kg		1	mg/kg	0.0001 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				20	mg/kg		20	mg/kg	0.002 %		
			205-912-4	206-44-0									
19		fluorene				0.38	mg/kg		0.38	mg/kg	0.000038 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				5	mg/kg		5	mg/kg	0.0005 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	100	mg/kg		100	mg/kg	0.01 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.07	mg/kg	1.16	0.0812	mg/kg	0.00000812 %		
			215-696-3	1344-48-5									
23		naphthalene				0.53	mg/kg		0.53	mg/kg	0.000053 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				7.9	mg/kg	1.545	12.207	mg/kg	0.00122 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				5.6	mg/kg		5.6	mg/kg	0.00056 %		
			201-581-5	85-01-8									
26		pyrene				21	mg/kg		21	mg/kg	0.0021 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				14	mg/kg	1.785	24.993	mg/kg	0.0025 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				36	mg/kg	1.245	44.81	mg/kg	0.00448 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0354 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH007[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH007[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
3.3 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.23 mg/kg		0.23 mg/kg	0.000023 %		
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		0.37 mg/kg		0.37 mg/kg	0.000037 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	2.2 mg/kg		2.2 mg/kg	0.00022 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	18 mg/kg		18 mg/kg	0.0018 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.14 mg/kg		0.14 mg/kg	0.000014 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.56 mg/kg		0.56 mg/kg	0.000056 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.43 mg/kg		0.43 mg/kg	0.000043 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.46 mg/kg		0.46 mg/kg	0.000046 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2 mg/kg		0.2 mg/kg	0.00002 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4 mg/kg		0.4 mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
			215-160-9	1308-38-9									
14		chrysene				0.43	mg/kg		0.43	mg/kg	0.000043 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				56	mg/kg	1.252	70.099	mg/kg	0.00701 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.3	mg/kg	1.884	0.565	mg/kg	0.0000565 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				1.5	mg/kg		1.5	mg/kg	0.00015 %		
			205-912-4	206-44-0									
19		fluorene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	140	mg/kg		140	mg/kg	0.014 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.2	mg/kg	1.16	0.232	mg/kg	0.0000232 %		
			215-696-3	1344-48-5									
23		naphthalene				0.25	mg/kg		0.25	mg/kg	0.000025 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				16	mg/kg	1.545	24.723	mg/kg	0.00247 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				1.4	mg/kg		1.4	mg/kg	0.00014 %		
			201-581-5	85-01-8									
26		pyrene				1.4	mg/kg		1.4	mg/kg	0.00014 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				17	mg/kg	1.785	30.348	mg/kg	0.00303 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				86	mg/kg	1.245	107.045	mg/kg	0.0107 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0433 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH008

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
ARP-BH008	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
5.2 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		4.6	mg/kg		4.6	mg/kg	0.00046 %		
2		acenaphthylene		205-917-1	208-96-8		0.16	mg/kg		0.16	mg/kg	0.000016 %		
3		anthracene		204-371-1	120-12-7		6.3	mg/kg		6.3	mg/kg	0.00063 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	3.9	mg/kg		3.9	mg/kg	0.00039 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	28	mg/kg		28	mg/kg	0.0028 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		2.7	mg/kg		2.7	mg/kg	0.00027 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		8.6	mg/kg		8.6	mg/kg	0.00086 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		6.3	mg/kg		6.3	mg/kg	0.00063 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		6.7	mg/kg		6.7	mg/kg	0.00067 %		
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		2.8	mg/kg		2.8	mg/kg	0.00028 %		
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9	mg/kg	2.775	2.498	mg/kg	0.00025 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.5	mg/kg		0.5	mg/kg	0.00005 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				29	mg/kg	1.462	42.385	mg/kg	0.00424 %		
			215-160-9	1308-38-9									
14		chrysene				6.9	mg/kg		6.9	mg/kg	0.00069 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				87	mg/kg	1.252	108.905	mg/kg	0.0109 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.4	mg/kg	1.884	0.754	mg/kg	0.0000754 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.36	mg/kg		0.36	mg/kg	0.000036 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				21	mg/kg		21	mg/kg	0.0021 %		
			205-912-4	206-44-0									
19		fluorene				3.6	mg/kg		3.6	mg/kg	0.00036 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				2	mg/kg		2	mg/kg	0.0002 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	250	mg/kg		250	mg/kg	0.025 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.41	mg/kg	1.16	0.476	mg/kg	0.0000476 %		
			215-696-3	1344-48-5									
23		naphthalene				4.2	mg/kg		4.2	mg/kg	0.00042 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				20	mg/kg	1.545	30.904	mg/kg	0.00309 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				24	mg/kg		24	mg/kg	0.0024 %		
			201-581-5	85-01-8									
26		pyrene				20	mg/kg		20	mg/kg	0.002 %		
			204-927-3	129-00-0									
27		selenium { selenium }				0.5	mg/kg		0.5	mg/kg	0.00005 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	44.63	mg/kg	0.00446 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				130	mg/kg	1.245	161.813	mg/kg	0.0162 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0795 %		

Key

	User supplied data
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH008[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
ARP-BH008[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
2.2 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		4.2 mg/kg		4.2 mg/kg	0.00042 %		
2	acenaphthylene		205-917-1	208-96-8		0.37 mg/kg		0.37 mg/kg	0.000037 %		
3	anthracene		204-371-1	120-12-7		5.7 mg/kg		5.7 mg/kg	0.00057 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	2.9 mg/kg		2.9 mg/kg	0.00029 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	22 mg/kg		22 mg/kg	0.0022 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		2.3 mg/kg		2.3 mg/kg	0.00023 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		9.6 mg/kg		9.6 mg/kg	0.00096 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		6.7 mg/kg		6.7 mg/kg	0.00067 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		6.4 mg/kg		6.4 mg/kg	0.00064 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		3 mg/kg		3 mg/kg	0.0003 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9 mg/kg	2.775	2.498 mg/kg	0.00025 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4 mg/kg		0.4 mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				33	mg/kg	1.462	48.231	mg/kg	0.00482 %		
			215-160-9	1308-38-9									
14		chrysene				7.3	mg/kg		7.3	mg/kg	0.00073 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				65	mg/kg	1.252	81.365	mg/kg	0.00814 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.3	mg/kg	1.884	0.565	mg/kg	0.0000565 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.45	mg/kg		0.45	mg/kg	0.000045 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				21	mg/kg		21	mg/kg	0.0021 %		
			205-912-4	206-44-0									
19		fluorene				3.7	mg/kg		3.7	mg/kg	0.00037 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				1.7	mg/kg		1.7	mg/kg	0.00017 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	160	mg/kg		160	mg/kg	0.016 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.3	mg/kg	1.16	0.348	mg/kg	0.0000348 %		
			215-696-3	1344-48-5									
23		naphthalene				5.7	mg/kg		5.7	mg/kg	0.00057 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				22	mg/kg	1.545	33.994	mg/kg	0.0034 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				24	mg/kg		24	mg/kg	0.0024 %		
			201-581-5	85-01-8									
26		pyrene				21	mg/kg		21	mg/kg	0.0021 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				29	mg/kg	1.785	51.77	mg/kg	0.00518 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				100	mg/kg	1.245	124.471	mg/kg	0.0124 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0652 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH009

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH009
Sample Depth:
2.6 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.7 mg/kg		1.7 mg/kg	0.00017 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	18 mg/kg		18 mg/kg	0.0018 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.07 mg/kg		0.07 mg/kg	0.000007 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.04 mg/kg		0.04 mg/kg	0.000004 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1 mg/kg	2.775	2.775 mg/kg	0.000278 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.7 mg/kg		0.7 mg/kg	0.00007 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				15	mg/kg	1.462	21.923	mg/kg	0.00219 %		
			215-160-9	1308-38-9									
14		chrysene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				30	mg/kg	1.252	37.553	mg/kg	0.00376 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.5	mg/kg	1.884	0.942	mg/kg	0.0000942 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	120	mg/kg		120	mg/kg	0.012 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.1	mg/kg	1.16	0.116	mg/kg	0.0000116 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				11	mg/kg	1.545	16.997	mg/kg	0.0017 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			201-581-5	85-01-8									
26		pyrene				0.09	mg/kg		0.09	mg/kg	0.000009 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				16	mg/kg	1.785	28.563	mg/kg	0.00286 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				170	mg/kg	1.245	211.601	mg/kg	0.0212 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0462 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH011

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH011	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
3.6 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<1 mg/kg		<1 mg/kg	<0.0001 %		<**LOD**
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	16 mg/kg		16 mg/kg	0.0016 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.04 mg/kg		0.04 mg/kg	0.000004 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.03 mg/kg		0.03 mg/kg	0.000003 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.2 mg/kg	2.775	3.33 mg/kg	0.000333 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4 mg/kg		0.4 mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				440	mg/kg	1.252	550.782	mg/kg	0.0551 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	290	mg/kg		290	mg/kg	0.029 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				17	mg/kg	1.545	26.268	mg/kg	0.00263 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			201-581-5	85-01-8									
26		pyrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			204-927-3	129-00-0									
27		selenium { selenium }				1.1	mg/kg		1.1	mg/kg	0.00011 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				23	mg/kg	1.785	41.059	mg/kg	0.00411 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				150	mg/kg	1.245	186.707	mg/kg	0.0187 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.113 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH011[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH011[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
1 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		0.1 mg/kg		0.1 mg/kg	0.00001 %		
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		0.34 mg/kg		0.34 mg/kg	0.000034 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	1.5 mg/kg		1.5 mg/kg	0.00015 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	12 mg/kg		12 mg/kg	0.0012 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		0.22 mg/kg		0.22 mg/kg	0.000022 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.78 mg/kg		0.78 mg/kg	0.000078 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.59 mg/kg		0.59 mg/kg	0.000059 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.69 mg/kg		0.69 mg/kg	0.000069 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.29 mg/kg		0.29 mg/kg	0.000029 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.4 mg/kg	2.775	1.11 mg/kg	0.000111 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.9 mg/kg		0.9 mg/kg	0.00009 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium { chromium(III) oxide }		215-160-9	1308-38-9		18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
14		chrysene	601-048-00-0	205-923-4	218-01-9		0.73	mg/kg		0.73	mg/kg	0.000073 %		
15		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		32	mg/kg	1.252	40.057	mg/kg	0.00401 %		
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
17		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.06	mg/kg		0.06	mg/kg	0.000006 %		
18		fluoranthene		205-912-4	206-44-0		1.9	mg/kg		1.9	mg/kg	0.00019 %		
19		fluorene		201-695-5	86-73-7		0.09	mg/kg		0.09	mg/kg	0.000009 %		
20		indeno[123-cd]pyrene		205-893-2	193-39-5		0.21	mg/kg		0.21	mg/kg	0.000021 %		
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	150	mg/kg		150	mg/kg	0.015 %		
22		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.22	mg/kg	1.16	0.255	mg/kg	0.0000255 %		
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
24		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		9.2	mg/kg	1.545	14.216	mg/kg	0.00142 %		
25		phenanthrene		201-581-5	85-01-8		1.6	mg/kg		1.6	mg/kg	0.00016 %		
26		pyrene		204-927-3	129-00-0		1.8	mg/kg		1.8	mg/kg	0.00018 %		
27		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		0.9	mg/kg		0.9	mg/kg	0.00009 %		
28		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		15	mg/kg	1.785	26.778	mg/kg	0.00268 %		
29		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		60	mg/kg	1.245	74.683	mg/kg	0.00747 %		
											Total:	0.0358 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH012A

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH012A	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
7.5 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.2	mg/kg		1.2	mg/kg	0.00012 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	7.2	mg/kg		7.2	mg/kg	0.00072 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7	mg/kg	2.775	1.943	mg/kg	0.000194 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.2	mg/kg		0.2	mg/kg	0.00002 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				25	mg/kg	1.252	31.294	mg/kg	0.00313 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.1	mg/kg	1.884	0.188	mg/kg	0.0000188 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	42	mg/kg		42	mg/kg	0.0042 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.09	mg/kg	1.16	0.104	mg/kg	0.0000104 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				18	mg/kg	1.545	27.813	mg/kg	0.00278 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
26		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	44.63	mg/kg	0.00446 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				48	mg/kg	1.245	59.746	mg/kg	0.00597 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0244 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH012A[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
ARP-BH012A[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
2.6 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3		anthracene 204-371-1 / 120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	6.4 mg/kg		6.4 mg/kg	0.00064 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		0.5 mg/kg	2.775	1.388 mg/kg	0.000139 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.1 mg/kg		0.1 mg/kg	0.00001 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				12	mg/kg	1.462	17.539	mg/kg	0.00175 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				23	mg/kg	1.252	28.791	mg/kg	0.00288 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	34	mg/kg		34	mg/kg	0.0034 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.06	mg/kg	1.16	0.0696	mg/kg	0.00000696 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				13	mg/kg	1.545	20.087	mg/kg	0.00201 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
26		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				17	mg/kg	1.785	30.348	mg/kg	0.00303 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				37	mg/kg	1.245	46.054	mg/kg	0.00461 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0187 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH013

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-BH013
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.48 mg/kg		0.48 mg/kg	0.000048 %		
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		0.91 mg/kg		0.91 mg/kg	0.000091 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.7 mg/kg		1.7 mg/kg	0.00017 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	19 mg/kg		19 mg/kg	0.0019 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.24 mg/kg		0.24 mg/kg	0.000024 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.86 mg/kg		0.86 mg/kg	0.000086 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.54 mg/kg		0.54 mg/kg	0.000054 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.74 mg/kg		0.74 mg/kg	0.000074 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.27 mg/kg		0.27 mg/kg	0.000027 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9 mg/kg	2.775	2.498 mg/kg	0.00025 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.3 mg/kg		0.3 mg/kg	0.00003 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
			215-160-9	1308-38-9									
14		chrysene				0.78	mg/kg		0.78	mg/kg	0.000078 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				36	mg/kg	1.252	45.064	mg/kg	0.00451 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				3.4	mg/kg		3.4	mg/kg	0.00034 %		
			205-912-4	206-44-0									
19		fluorene				0.46	mg/kg		0.46	mg/kg	0.000046 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	51	mg/kg		51	mg/kg	0.0051 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.11	mg/kg	1.16	0.128	mg/kg	0.0000128 %		
			215-696-3	1344-48-5									
23		naphthalene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				22	mg/kg	1.545	33.994	mg/kg	0.0034 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				2.9	mg/kg		2.9	mg/kg	0.00029 %		
			201-581-5	85-01-8									
26		pyrene				2.8	mg/kg		2.8	mg/kg	0.00028 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				29	mg/kg	1.785	51.77	mg/kg	0.00518 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				75	mg/kg	1.245	93.354	mg/kg	0.00934 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0341 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH013[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH013[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
3.5 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.26 mg/kg		0.26 mg/kg	0.000026 %		
2	acenaphthylene		205-917-1	208-96-8		0.06 mg/kg		0.06 mg/kg	0.000006 %		
3	anthracene		204-371-1	120-12-7		0.46 mg/kg		0.46 mg/kg	0.000046 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	1.5 mg/kg		1.5 mg/kg	0.00015 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	7.4 mg/kg		7.4 mg/kg	0.00074 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.22 mg/kg		0.22 mg/kg	0.000022 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.84 mg/kg		0.84 mg/kg	0.000084 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.54 mg/kg		0.54 mg/kg	0.000054 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.71 mg/kg		0.71 mg/kg	0.000071 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.25 mg/kg		0.25 mg/kg	0.000025 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6 mg/kg	2.775	1.665 mg/kg	0.000167 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.5 mg/kg		0.5 mg/kg	0.00005 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
			215-160-9	1308-38-9									
14		chrysene				0.81	mg/kg		0.81	mg/kg	0.000081 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				46	mg/kg	1.252	57.582	mg/kg	0.00576 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				2.9	mg/kg		2.9	mg/kg	0.00029 %		
			205-912-4	206-44-0									
19		fluorene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	73	mg/kg		73	mg/kg	0.0073 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.24	mg/kg	1.16	0.278	mg/kg	0.0000278 %		
			215-696-3	1344-48-5									
23		naphthalene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				13	mg/kg	1.545	20.087	mg/kg	0.00201 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				1.6	mg/kg		1.6	mg/kg	0.00016 %		
			201-581-5	85-01-8									
26		pyrene				2.6	mg/kg		2.6	mg/kg	0.00026 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				21	mg/kg	1.785	37.489	mg/kg	0.00375 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				84	mg/kg	1.245	104.556	mg/kg	0.0105 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0333 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH014

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH014	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
0.7 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		2.3	mg/kg		2.3	mg/kg	0.00023 %		
2		acenaphthylene		205-917-1	208-96-8		0.08	mg/kg		0.08	mg/kg	0.000008 %		
3		anthracene		204-371-1	120-12-7		2.5	mg/kg		2.5	mg/kg	0.00025 %		
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	7.4	mg/kg		7.4	mg/kg	0.00074 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	32	mg/kg		32	mg/kg	0.0032 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.86	mg/kg		0.86	mg/kg	0.000086 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		3.2	mg/kg		3.2	mg/kg	0.00032 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.1	mg/kg		2.1	mg/kg	0.00021 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.8	mg/kg		2.8	mg/kg	0.00028 %		
10		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.95	mg/kg		0.95	mg/kg	0.000095 %		
11		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6	mg/kg	2.775	1.665	mg/kg	0.000167 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.9	mg/kg		0.9	mg/kg	0.00009 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				24	mg/kg	1.462	35.077	mg/kg	0.00351 %		
			215-160-9	1308-38-9									
14		chrysene				3	mg/kg		3	mg/kg	0.0003 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				430	mg/kg	1.252	538.264	mg/kg	0.0538 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				3.5	mg/kg	1.884	6.594	mg/kg	0.000659 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				11	mg/kg		11	mg/kg	0.0011 %		
			205-912-4	206-44-0									
19		fluorene				1.4	mg/kg		1.4	mg/kg	0.00014 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.7	mg/kg		0.7	mg/kg	0.00007 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	230	mg/kg		230	mg/kg	0.023 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.17	mg/kg	1.16	0.197	mg/kg	0.0000197 %		
			215-696-3	1344-48-5									
23		naphthalene				0.42	mg/kg		0.42	mg/kg	0.000042 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				34	mg/kg	1.545	52.536	mg/kg	0.00525 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				13	mg/kg		13	mg/kg	0.0013 %		
			201-581-5	85-01-8									
26		pyrene				9.9	mg/kg		9.9	mg/kg	0.00099 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				24	mg/kg	1.785	42.844	mg/kg	0.00428 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				560	mg/kg	1.245	697.04	mg/kg	0.0697 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.17 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-BH014[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-BH014[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
4 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	2.3	mg/kg		2.3	mg/kg	0.00023 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	13	mg/kg		13	mg/kg	0.0013 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.06	mg/kg		0.06	mg/kg	0.000006 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.04	mg/kg		0.04	mg/kg	0.000004 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.05	mg/kg		0.05	mg/kg	0.000005 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.5	mg/kg	2.775	1.388	mg/kg	0.000139 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.3	mg/kg		0.3	mg/kg	0.00003 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				25	mg/kg	1.462	36.539	mg/kg	0.00365 %		
			215-160-9	1308-38-9									
14		chrysene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				79	mg/kg	1.252	98.89	mg/kg	0.00989 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.3	mg/kg	1.884	0.565	mg/kg	0.0000565 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	82	mg/kg		82	mg/kg	0.0082 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.12	mg/kg	1.16	0.139	mg/kg	0.0000139 %		
			215-696-3	1344-48-5									
23		naphthalene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				20	mg/kg	1.545	30.904	mg/kg	0.00309 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			201-581-5	85-01-8									
26		pyrene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				27	mg/kg	1.785	48.2	mg/kg	0.00482 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				110	mg/kg	1.245	136.919	mg/kg	0.0137 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0453 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-DS001

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-DS001
Sample Depth:
0.6 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.03	mg/kg		0.03	mg/kg	0.000003 %		
2	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		0.04	mg/kg		0.04	mg/kg	0.000004 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	3.5	mg/kg		3.5	mg/kg	0.00035 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	32	mg/kg		32	mg/kg	0.0032 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.06	mg/kg		0.06	mg/kg	0.000006 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.13	mg/kg		0.13	mg/kg	0.000013 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.11	mg/kg		0.11	mg/kg	0.000011 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.14	mg/kg		0.14	mg/kg	0.000014 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.06	mg/kg		0.06	mg/kg	0.000006 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.8	mg/kg	2.775	2.22	mg/kg	0.000222 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	1.2	mg/kg		1.2	mg/kg	0.00012 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				27	mg/kg	1.462	39.462	mg/kg	0.00395 %		
			215-160-9	1308-38-9									
14		chrysene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				80	mg/kg	1.252	100.142	mg/kg	0.01 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.6	mg/kg	1.884	1.13	mg/kg	0.000113 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.39	mg/kg		0.39	mg/kg	0.000039 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	330	mg/kg		330	mg/kg	0.033 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.37	mg/kg	1.16	0.429	mg/kg	0.0000429 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				17	mg/kg	1.545	26.268	mg/kg	0.00263 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.22	mg/kg		0.22	mg/kg	0.000022 %		
			201-581-5	85-01-8									
26		pyrene				0.37	mg/kg		0.37	mg/kg	0.000037 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				28	mg/kg	1.785	49.985	mg/kg	0.005 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				210	mg/kg	1.245	261.39	mg/kg	0.0261 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.085 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-DS002

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-DS002
Sample Depth:
0.8 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.25 mg/kg		0.25 mg/kg	0.000025 %		
2	acenaphthylene		205-917-1	208-96-8		0.1 mg/kg		0.1 mg/kg	0.00001 %		
3	anthracene		204-371-1	120-12-7		0.56 mg/kg		0.56 mg/kg	0.000056 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	260 mg/kg		260 mg/kg	0.026 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	56 mg/kg		56 mg/kg	0.0056 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.41 mg/kg		0.41 mg/kg	0.000041 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1 mg/kg		1 mg/kg	0.0001 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.88 mg/kg		0.88 mg/kg	0.000088 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.1 mg/kg		1.1 mg/kg	0.00011 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.44 mg/kg		0.44 mg/kg	0.000044 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3 mg/kg	2.775	3.608 mg/kg	0.000361 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	1.2 mg/kg		1.2 mg/kg	0.00012 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				33	mg/kg	1.462	48.231	mg/kg	0.00482 %		
			215-160-9	1308-38-9									
14		chrysene				1.2	mg/kg		1.2	mg/kg	0.00012 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				160	mg/kg	1.252	200.284	mg/kg	0.02 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1.6	mg/kg	1.884	3.014	mg/kg	0.000301 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				3.4	mg/kg		3.4	mg/kg	0.00034 %		
			205-912-4	206-44-0									
19		fluorene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	2400	mg/kg		2400	mg/kg	0.24 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				1.1	mg/kg	1.16	1.276	mg/kg	0.000128 %		
			215-696-3	1344-48-5									
23		naphthalene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				26	mg/kg	1.545	40.175	mg/kg	0.00402 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				2.7	mg/kg		2.7	mg/kg	0.00027 %		
			201-581-5	85-01-8									
26		pyrene				3.2	mg/kg		3.2	mg/kg	0.00032 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				36	mg/kg	1.785	64.267	mg/kg	0.00643 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				470	mg/kg	1.245	585.016	mg/kg	0.0585 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.368 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-TP001

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-TP001	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
0.8 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	4.8 mg/kg		4.8 mg/kg	0.00048 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	87 mg/kg		87 mg/kg	0.0087 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7 mg/kg	2.775	1.943 mg/kg	0.000194 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.3 mg/kg		0.3 mg/kg	0.00003 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
			215-160-9	1308-38-9									
14		chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				110	mg/kg	1.252	137.695	mg/kg	0.0138 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2.9	mg/kg	1.884	5.464	mg/kg	0.000546 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	300	mg/kg		300	mg/kg	0.03 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.45	mg/kg	1.16	0.522	mg/kg	0.0000522 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				17	mg/kg	1.545	26.268	mg/kg	0.00263 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
26		pyrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				31	mg/kg	1.785	55.341	mg/kg	0.00553 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				140	mg/kg	1.245	174.26	mg/kg	0.0174 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0824 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-TP002

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
ARP-TP002
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
2		acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3		anthracene 204-371-1 / 120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
4		antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	6.1 mg/kg		6.1 mg/kg	0.00061 %		
5		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	44 mg/kg		44 mg/kg	0.0044 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		0.04 mg/kg		0.04 mg/kg	0.000004 %		
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.09 mg/kg		0.09 mg/kg	0.000009 %		
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.08 mg/kg		0.08 mg/kg	0.000008 %		
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.13 mg/kg		0.13 mg/kg	0.000013 %		
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.03 mg/kg		0.03 mg/kg	0.000003 %		
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		1.3 mg/kg	2.775	3.608 mg/kg	0.000361 %		
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	0.3 mg/kg		0.3 mg/kg	0.00003 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
13		chromium { chromium(III) oxide }				22	mg/kg	1.462	32.154	mg/kg	0.00322 %		
			215-160-9	1308-38-9									
14		chrysene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				230	mg/kg	1.252	287.909	mg/kg	0.0288 %		
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1.8	mg/kg	1.884	3.391	mg/kg	0.000339 %		
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.19	mg/kg		0.19	mg/kg	0.000019 %		
			205-912-4	206-44-0									
19		fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	530	mg/kg		530	mg/kg	0.053 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				1.6	mg/kg	1.16	1.856	mg/kg	0.000186 %		
			215-696-3	1344-48-5									
23		naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				32	mg/kg	1.545	49.446	mg/kg	0.00494 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			201-581-5	85-01-8									
26		pyrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			204-927-3	129-00-0									
27		selenium { selenium }				1.3	mg/kg		1.3	mg/kg	0.00013 %		
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				37	mg/kg	1.785	66.052	mg/kg	0.00661 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				620	mg/kg	1.245	771.723	mg/kg	0.0772 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.18 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: ARP-TP002[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
ARP-TP002[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
2.5 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.05	mg/kg		0.05	mg/kg	0.000005 %		
2	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3	anthracene		204-371-1	120-12-7		0.07	mg/kg		0.07	mg/kg	0.000007 %		
4	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	3.3	mg/kg		3.3	mg/kg	0.00033 %		
5	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	20	mg/kg		20	mg/kg	0.002 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.09	mg/kg		0.09	mg/kg	0.000009 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.2	mg/kg		0.2	mg/kg	0.00002 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.16	mg/kg		0.16	mg/kg	0.000016 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.2	mg/kg	0.00002 %		
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.07	mg/kg		0.07	mg/kg	0.000007 %		
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6	mg/kg	2.775	1.665	mg/kg	0.000167 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.8	mg/kg		0.8	mg/kg	0.00008 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
13		chromium { chromium(III) oxide }		215-160-9	1308-38-9		15	mg/kg	1.462	21.923	mg/kg	0.00219 %		
14		chrysene	601-048-00-0	205-923-4	218-01-9		0.21	mg/kg		0.21	mg/kg	0.000021 %		
15		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		100	mg/kg	1.252	125.178	mg/kg	0.0125 %		
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				0.3	mg/kg	1.884	0.565	mg/kg	0.0000565 %		
17		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
18		fluoranthene		205-912-4	206-44-0		0.55	mg/kg		0.55	mg/kg	0.000055 %		
19		fluorene		201-695-5	86-73-7		0.03	mg/kg		0.03	mg/kg	0.000003 %		
20		indeno[123-cd]pyrene		205-893-2	193-39-5		0.08	mg/kg		0.08	mg/kg	0.000008 %		
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	250	mg/kg		250	mg/kg	0.025 %		
22		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.67	mg/kg	1.16	0.777	mg/kg	0.0000777 %		
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
24		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		16	mg/kg	1.545	24.723	mg/kg	0.00247 %		
25		phenanthrene		201-581-5	85-01-8		0.36	mg/kg		0.36	mg/kg	0.000036 %		
26		pyrene		204-927-3	129-00-0		0.55	mg/kg		0.55	mg/kg	0.000055 %		
27		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		<LOD
28		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		18	mg/kg	1.785	32.133	mg/kg	0.00321 %		
29		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		220	mg/kg	1.245	273.837	mg/kg	0.0274 %		
											Total:	0.0758 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: CE-2015-CC/WS2

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
CE-2015-CC/WS2
Sample Depth:
0.68 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		acenaphthene 201-469-6 / 83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2		acenaphthylene 205-917-1 / 208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
3		anthracene 204-371-1 / 120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex } 033-002-00-5	1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
5		barium { barium sulfate } 231-784-4 / 7727-43-7		25 mg/kg	1.7	42.488 mg/kg	0.00425 %		
6		benzo[ghi]perylene 205-883-8 / 191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
7		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
8		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
9		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
10		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
11		beryllium { beryllium oxide } 004-003-00-8 / 215-133-1 / 1304-56-9		<0.5 mg/kg	2.775	<1.388 mg/kg	<0.000139 %		<LOD
12		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex } 048-001-00-5	1	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
13		chromium { chromium(III) oxide } 215-160-9 / 1308-38-9		6 mg/kg	1.462	8.769 mg/kg	0.000877 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
15		copper { copper(II) oxide }				<4	mg/kg	1.252	<5.007	mg/kg	<0.000501 %		<LOD
		029-016-00-6	215-269-1	1317-38-0									
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
		006-007-00-5											
17		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
19		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	<3	mg/kg		<3	mg/kg	<0.0003 %		<LOD
		082-001-00-6											
22		mercury { mercury(II) sulphide }				<1	mg/kg	1.16	<1.16	mg/kg	<0.000116 %		<LOD
			215-696-3	1344-48-5									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				4	mg/kg	1.545	6.181	mg/kg	0.000618 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
26		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
27		selenium { selenium }				<3	mg/kg		<3	mg/kg	<0.0003 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				11	mg/kg	1.785	19.637	mg/kg	0.00196 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				16	mg/kg	1.245	19.915	mg/kg	0.00199 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0118 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: CE-2015-CC/WS3

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
CE-2015-CC/WS3
Sample Depth:
0.56 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	2	mg/kg		2	mg/kg	0.0002 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		274	mg/kg	1.7	465.668	mg/kg	0.0466 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
10	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
11	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6	mg/kg	2.775	1.665	mg/kg	0.000167 %		
12	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.3	mg/kg		0.3	mg/kg	0.00003 %		
13	chromium { chromium(III) oxide }		215-160-9	1308-38-9		23	mg/kg	1.462	33.616	mg/kg	0.00336 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
15		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		18	mg/kg	1.252	22.532	mg/kg	0.00225 %		
16		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<2	mg/kg	1.884	<3.768	mg/kg	<0.000377 %		<LOD
17		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
18		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
19		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	10	mg/kg		10	mg/kg	0.001 %		
22		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.002	mg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
23		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		<1	mg/kg	1.16	<1.16	mg/kg	<0.000116 %		<LOD
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		25	mg/kg	1.545	38.63	mg/kg	0.00386 %		
26		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<3	mg/kg		<3	mg/kg	<0.0003 %		<LOD
29		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		26	mg/kg	1.785	46.415	mg/kg	0.00464 %		
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		47	mg/kg	1.245	58.502	mg/kg	0.00585 %		
											Total:	0.0689 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-CRH01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH01
Sample Depth:
0.2 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.12 mg/kg		0.12 mg/kg	0.000012 %		
2	acenaphthylene		205-917-1	208-96-8		0.06 mg/kg		0.06 mg/kg	0.000006 %		
3	anthracene		204-371-1	120-12-7		0.26 mg/kg		0.26 mg/kg	0.000026 %		
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	14.9 mg/kg		14.9 mg/kg	0.00149 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		212 mg/kg	1.7	360.298 mg/kg	0.036 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.58 mg/kg		0.58 mg/kg	0.000058 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.91 mg/kg		0.91 mg/kg	0.000091 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.96 mg/kg		0.96 mg/kg	0.000096 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.16 mg/kg		1.16 mg/kg	0.000116 %		
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		1.61 mg/kg		1.61 mg/kg	0.000161 %		
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.45 mg/kg		0.45 mg/kg	0.000045 %		
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1 mg/kg	2.775	2.775 mg/kg	0.000278 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.9 mg/kg		0.9 mg/kg	0.00009 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		17.2	mg/kg	1.462	25.139	mg/kg	0.00251 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.98	mg/kg		0.98	mg/kg	0.000098 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		73	mg/kg	1.252	91.38	mg/kg	0.00914 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		fluoranthene		205-912-4	206-44-0		2.16	mg/kg		2.16	mg/kg	0.000216 %		
20		fluorene		201-695-5	86-73-7		0.09	mg/kg		0.09	mg/kg	0.000009 %		
21		indeno[123-cd]pyrene		205-893-2	193-39-5		0.48	mg/kg		0.48	mg/kg	0.000048 %		
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	170	mg/kg		170	mg/kg	0.017 %		
23		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.4	mg/kg	1.16	0.464	mg/kg	0.0000464 %		
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
25		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		18.2	mg/kg	1.545	28.122	mg/kg	0.00281 %		
26		phenanthrene		201-581-5	85-01-8		1.09	mg/kg		1.09	mg/kg	0.000109 %		
27		pyrene		204-927-3	129-00-0		1.89	mg/kg		1.89	mg/kg	0.000189 %		
28		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
29		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		26	mg/kg	1.785	46.415	mg/kg	0.00464 %		
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		177	mg/kg	1.245	220.314	mg/kg	0.022 %		
											Total:	0.0976 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-CRH01[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH01[2]
Sample Depth:
0.5 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		
3		anthracene		204-371-1	120-12-7		0.1	mg/kg		0.1	mg/kg	0.00001 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	10.1	mg/kg		10.1	mg/kg	0.00101 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		578	mg/kg	1.7	982.321	mg/kg	0.0982 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.19	mg/kg		0.19	mg/kg	0.000019 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.35	mg/kg		0.35	mg/kg	0.000035 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.3	mg/kg		0.3	mg/kg	0.00003 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.36	mg/kg		0.36	mg/kg	0.000036 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		0.5	mg/kg		0.5	mg/kg	0.00005 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.14	mg/kg		0.14	mg/kg	0.000014 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3	mg/kg	2.775	3.608	mg/kg	0.000361 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.9	mg/kg		0.9	mg/kg	0.00009 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		33.3	mg/kg	1.462	48.67	mg/kg	0.00487 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.34	mg/kg		0.34	mg/kg	0.000034 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		47	mg/kg	1.252	58.834	mg/kg	0.00588 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		fluoranthene		205-912-4	206-44-0		0.63	mg/kg		0.63	mg/kg	0.000063 %		
20		fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21		indeno[123-cd]pyrene		205-893-2	193-39-5		0.16	mg/kg		0.16	mg/kg	0.000016 %		
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	191	mg/kg		191	mg/kg	0.0191 %		
23		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.3	mg/kg	1.16	0.348	mg/kg	0.0000348 %		
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
25		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		20.7	mg/kg	1.545	31.985	mg/kg	0.0032 %		
26		phenanthrene		201-581-5	85-01-8		0.39	mg/kg		0.39	mg/kg	0.000039 %		
27		pyrene		204-927-3	129-00-0		0.63	mg/kg		0.63	mg/kg	0.000063 %		
28		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		1	mg/kg		1	mg/kg	0.0001 %		
29		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		31	mg/kg	1.785	55.341	mg/kg	0.00553 %		
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		93	mg/kg	1.245	115.758	mg/kg	0.0116 %		
											Total:	0.151 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-CRH01[3]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH01[3]
Sample Depth:
2 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
4	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	●	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
10		chrysene	601-048-00-0	205-923-4	218-01-9		0.04 mg/kg		0.04 mg/kg	0.000004 %		
11		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	●	fluoranthene		205-912-4	206-44-0		0.04 mg/kg		0.04 mg/kg	0.000004 %		
13	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
14	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
15		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17	•	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
18	•	pyrene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
			204-927-3	129-00-0									
										Total:	0.00007 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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Classification of sample: GEO-2015-CRH01[4]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
GEO-2015-CRH01[4]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
1 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1	●	acenaphthene 201-469-6 / 83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<**LOD**
2	●	acenaphthylene 205-917-1 / 208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<**LOD**
3	●	anthracene 204-371-1 / 120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
4	●	benzo[ghi]perylene 205-883-8 / 191-24-2		0.09 mg/kg		0.09 mg/kg	0.000009 %		
5		benzo[a]anthracene 601-033-00-9 / 200-280-6 / 56-55-3		0.22 mg/kg		0.22 mg/kg	0.000022 %		
6		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3 / 200-028-5 / 50-32-8		0.15 mg/kg		0.15 mg/kg	0.000015 %		
7		benzo[b]fluoranthene 601-034-00-4 / 205-911-9 / 205-99-2		0.19 mg/kg		0.19 mg/kg	0.000019 %		
8	●	benzo[bk]fluoranthene [1] 205-911-9 [2] 205-916-6 / [1] 205-99-2 [2] 207-08-9		0.26 mg/kg		0.26 mg/kg	0.000026 %		
9		benzo[k]fluoranthene 601-036-00-5 / 205-916-6 / 207-08-9		0.07 mg/kg		0.07 mg/kg	0.000007 %		
10		chrysene 601-048-00-0 / 205-923-4 / 218-01-9		0.22 mg/kg		0.22 mg/kg	0.000022 %		
11		dibenz[a,h]anthracene 601-041-00-2 / 200-181-8 / 53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
12	●	fluoranthene 205-912-4 / 206-44-0		0.34 mg/kg		0.34 mg/kg	0.000034 %		
13	●	fluorene 201-695-5 / 86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<**LOD**
14	●	indeno[123-cd]pyrene 205-893-2 / 193-39-5		0.08 mg/kg		0.08 mg/kg	0.000008 %		
15		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4] 601-022-00-9 / 202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4] / 95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<**LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
17	•	phenanthrene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
			201-581-5	85-01-8									
18	•	pyrene				0.32	mg/kg		0.32	mg/kg	0.000032 %		
			204-927-3	129-00-0									
										Total:	0.00023 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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Classification of sample: GEO-2015-CRH01B

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH01B
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	13.3 mg/kg		13.3 mg/kg	0.00133 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		100 mg/kg	1.7	169.952 mg/kg	0.017 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1 mg/kg	2.775	2.775 mg/kg	0.000278 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				43.6	mg/kg	1.462	63.724	mg/kg	0.00637 %		
			215-160-9	1308-38-9									
15		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				37	mg/kg	1.252	46.316	mg/kg	0.00463 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
20		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	78	mg/kg		78	mg/kg	0.0078 %		
		082-001-00-6											
23		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
24		mercury { mercury(II) sulphide }				0.6	mg/kg	1.16	0.696	mg/kg	0.0000696 %		
			215-696-3	1344-48-5									
25		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
26		nickel { nickel(IV) oxide (nickel dioxide) }				21.3	mg/kg	1.545	32.912	mg/kg	0.00329 %		
		028-004-00-8	234-823-3	12035-36-8									
27		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
28		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
29		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
30		vanadium { divanadium pentaoxide; vanadium pentoxide }				25	mg/kg	1.785	44.63	mg/kg	0.00446 %		
		023-001-00-8	215-239-8	1314-62-1									
31		zinc { zinc oxide }				57	mg/kg	1.245	70.949	mg/kg	0.00709 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0526 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-CRH01B[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH01B[2]
Sample Depth:
2 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
4	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	●	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
10		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
11		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	●	fluoranthene		205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
13	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
14	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
15		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		0.009 mg/kg		0.009 mg/kg	0.0000009 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
18	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
										Total:	0.00006 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Unlikely to be flammable due to dilution and low concentration.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]: (conc.: 9.0e-07%)

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Report created by Mark Griffiths on 15 Jan 2020

Classification of sample: GEO-2015-CRH03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-CRH03
Sample Depth:
3 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.22	mg/kg		0.22	mg/kg	0.000022 %		
2		acenaphthylene		205-917-1	208-96-8		0.24	mg/kg		0.24	mg/kg	0.000024 %		
3		anthracene		204-371-1	120-12-7		0.62	mg/kg		0.62	mg/kg	0.000062 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	5.9	mg/kg		5.9	mg/kg	0.00059 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		351	mg/kg	1.7	596.531	mg/kg	0.0597 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.68	mg/kg		0.68	mg/kg	0.000068 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.64	mg/kg		1.64	mg/kg	0.000164 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.29	mg/kg		1.29	mg/kg	0.000129 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.45	mg/kg		1.45	mg/kg	0.000145 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		2.02	mg/kg		2.02	mg/kg	0.000202 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.57	mg/kg		0.57	mg/kg	0.000057 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1	mg/kg	2.775	2.775	mg/kg	0.000278 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				49.2	mg/kg	1.462	71.909	mg/kg	0.00719 %		
			215-160-9	1308-38-9									
15		chrysene				1.46	mg/kg		1.46	mg/kg	0.000146 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				24	mg/kg	1.252	30.043	mg/kg	0.003 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				2.89	mg/kg		2.89	mg/kg	0.000289 %		
			205-912-4	206-44-0									
20		fluorene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				0.7	mg/kg		0.7	mg/kg	0.00007 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	17	mg/kg		17	mg/kg	0.0017 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
			215-696-3	1344-48-5									
24		naphthalene				0.41	mg/kg		0.41	mg/kg	0.000041 %		
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				16	mg/kg	1.545	24.723	mg/kg	0.00247 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				2.36	mg/kg		2.36	mg/kg	0.000236 %		
			201-581-5	85-01-8									
27		pyrene				2.79	mg/kg		2.79	mg/kg	0.000279 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				29	mg/kg	1.785	51.77	mg/kg	0.00518 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				28	mg/kg	1.245	34.852	mg/kg	0.00349 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0857 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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HazWasteOnline™
Report created by Mark Griffiths on 15 Jan 2020

Classification of sample: GEO-2015-TP01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-TP01
Sample Depth:
0.3 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		0.04	mg/kg		0.04	mg/kg	0.000004 %		
3		anthracene		204-371-1	120-12-7		0.13	mg/kg		0.13	mg/kg	0.000013 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	16.5	mg/kg		16.5	mg/kg	0.00165 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		105	mg/kg	1.7	178.449	mg/kg	0.0178 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.43	mg/kg		0.43	mg/kg	0.000043 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.76	mg/kg		0.76	mg/kg	0.000076 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.66	mg/kg		0.66	mg/kg	0.000066 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.78	mg/kg		0.78	mg/kg	0.000078 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		1.09	mg/kg		1.09	mg/kg	0.000109 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.31	mg/kg		0.31	mg/kg	0.000031 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.8	mg/kg	2.775	2.22	mg/kg	0.000222 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4	mg/kg		0.4	mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				34.2	mg/kg	1.462	49.985	mg/kg	0.005 %		
			215-160-9	1308-38-9									
15		chrysene				0.65	mg/kg		0.65	mg/kg	0.000065 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				49	mg/kg	1.252	61.337	mg/kg	0.00613 %		
		029-016-00-6	215-269-1	1317-38-0									
17		dibenz[a,h]anthracene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				1.07	mg/kg		1.07	mg/kg	0.000107 %		
			205-912-4	206-44-0									
19		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				0.41	mg/kg		0.41	mg/kg	0.000041 %		
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	139	mg/kg		139	mg/kg	0.0139 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				0.5	mg/kg	1.16	0.58	mg/kg	0.000058 %		
			215-696-3	1344-48-5									
23		naphthalene				0.05	mg/kg		0.05	mg/kg	0.000005 %		
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				24.1	mg/kg	1.545	37.239	mg/kg	0.00372 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.56	mg/kg		0.56	mg/kg	0.000056 %		
			201-581-5	85-01-8									
26		pyrene				1.06	mg/kg		1.06	mg/kg	0.000106 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				23	mg/kg	1.785	41.059	mg/kg	0.00411 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				98	mg/kg	1.245	121.982	mg/kg	0.0122 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0658 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
GEO-2015-TP02	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.5 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.41 mg/kg		0.41 mg/kg	0.000041 %		
2	acenaphthylene		205-917-1	208-96-8		0.17 mg/kg		0.17 mg/kg	0.000017 %		
3	anthracene		204-371-1	120-12-7		0.9 mg/kg		0.9 mg/kg	0.00009 %		
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	10.4 mg/kg		10.4 mg/kg	0.00104 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		120 mg/kg	1.7	203.942 mg/kg	0.0204 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		2.21 mg/kg		2.21 mg/kg	0.000221 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.32 mg/kg		4.32 mg/kg	0.000432 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		3.58 mg/kg		3.58 mg/kg	0.000358 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		4.47 mg/kg		4.47 mg/kg	0.000447 %		
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		6.21 mg/kg		6.21 mg/kg	0.000621 %		
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.74 mg/kg		1.74 mg/kg	0.000174 %		
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9 mg/kg	2.775	2.498 mg/kg	0.00025 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.8 mg/kg		0.8 mg/kg	0.00008 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		15.5	mg/kg	1.462	22.654	mg/kg	0.00227 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		4.17	mg/kg		4.17	mg/kg	0.000417 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		44	mg/kg	1.252	55.078	mg/kg	0.00551 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.31	mg/kg		0.31	mg/kg	0.000031 %		
19		fluoranthene		205-912-4	206-44-0		7.11	mg/kg		7.11	mg/kg	0.000711 %		
20		fluorene		201-695-5	86-73-7		0.28	mg/kg		0.28	mg/kg	0.000028 %		
21		indeno[123-cd]pyrene		205-893-2	193-39-5		2.07	mg/kg		2.07	mg/kg	0.000207 %		
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	83	mg/kg		83	mg/kg	0.0083 %		
23		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.2	mg/kg	1.16	0.232	mg/kg	0.0000232 %		
24		naphthalene	601-052-00-2	202-049-5	91-20-3		0.22	mg/kg		0.22	mg/kg	0.000022 %		
25		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		17.3	mg/kg	1.545	26.732	mg/kg	0.00267 %		
26		phenanthrene		201-581-5	85-01-8		3.57	mg/kg		3.57	mg/kg	0.000357 %		
27		pyrene		204-927-3	129-00-0		6.76	mg/kg		6.76	mg/kg	0.000676 %		
28		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
29		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		22	mg/kg	1.785	39.274	mg/kg	0.00393 %		
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		79	mg/kg	1.245	98.332	mg/kg	0.00983 %		
											Total:	0.0593 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-TP03
Sample Depth:
0.7 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		0.07	mg/kg		0.07	mg/kg	0.000007 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	2.9	mg/kg		2.9	mg/kg	0.00029 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		38	mg/kg	1.7	64.582	mg/kg	0.00646 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		0.09	mg/kg		0.09	mg/kg	0.000009 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.17	mg/kg		0.17	mg/kg	0.000017 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.16	mg/kg		0.16	mg/kg	0.000016 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.17	mg/kg		0.17	mg/kg	0.000017 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		0.24	mg/kg		0.24	mg/kg	0.000024 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.07	mg/kg		0.07	mg/kg	0.000007 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7	mg/kg	2.775	1.943	mg/kg	0.000194 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		10.4	mg/kg	1.462	15.2	mg/kg	0.00152 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		0.17	mg/kg		0.17	mg/kg	0.000017 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		11	mg/kg	1.252	13.77	mg/kg	0.00138 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
19		fluoranthene		205-912-4	206-44-0		0.38	mg/kg		0.38	mg/kg	0.000038 %		
20		fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21		indeno[123-cd]pyrene		205-893-2	193-39-5		0.09	mg/kg		0.09	mg/kg	0.000009 %		
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	16	mg/kg		16	mg/kg	0.0016 %		
23		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
24		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
25		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		7.5	mg/kg	1.545	11.589	mg/kg	0.00116 %		
26		phenanthrene		201-581-5	85-01-8		0.31	mg/kg		0.31	mg/kg	0.000031 %		
27		pyrene		204-927-3	129-00-0		0.36	mg/kg		0.36	mg/kg	0.000036 %		
28		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
29		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		16	mg/kg	1.785	28.563	mg/kg	0.00286 %		
30		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		25	mg/kg	1.245	31.118	mg/kg	0.00311 %		
											Total:	0.019 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP04

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
GEO-2015-TP04	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.2 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.15	mg/kg		0.15	mg/kg	0.000015 %		
2		acenaphthylene		205-917-1	208-96-8		0.11	mg/kg		0.11	mg/kg	0.000011 %		
3		anthracene		204-371-1	120-12-7		0.56	mg/kg		0.56	mg/kg	0.000056 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	40.4	mg/kg		40.4	mg/kg	0.00404 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		148	mg/kg	1.7	251.529	mg/kg	0.0252 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		1.08	mg/kg		1.08	mg/kg	0.000108 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.66	mg/kg		1.66	mg/kg	0.000166 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.87	mg/kg		1.87	mg/kg	0.000187 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.11	mg/kg		2.11	mg/kg	0.000211 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		2.93	mg/kg		2.93	mg/kg	0.000293 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.82	mg/kg		0.82	mg/kg	0.000082 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.1	mg/kg	2.775	3.053	mg/kg	0.000305 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4	mg/kg		0.4	mg/kg	0.00004 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
			215-160-9	1308-38-9									
15		chrysene				1.78	mg/kg		1.78	mg/kg	0.000178 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				52	mg/kg	1.252	65.092	mg/kg	0.00651 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				3.91	mg/kg		3.91	mg/kg	0.000391 %		
			205-912-4	206-44-0									
20		fluorene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				1.09	mg/kg		1.09	mg/kg	0.000109 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	110	mg/kg		110	mg/kg	0.011 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				0.2	mg/kg	1.16	0.232	mg/kg	0.0000232 %		
			215-696-3	1344-48-5									
24		naphthalene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				22.3	mg/kg	1.545	34.458	mg/kg	0.00345 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				1.98	mg/kg		1.98	mg/kg	0.000198 %		
			201-581-5	85-01-8									
27		pyrene				3.54	mg/kg		3.54	mg/kg	0.000354 %		
			204-927-3	129-00-0									
28		selenium { selenium }				2	mg/kg		2	mg/kg	0.0002 %		
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				27	mg/kg	1.785	48.2	mg/kg	0.00482 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				100	mg/kg	1.245	124.471	mg/kg	0.0124 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0731 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP05

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-TP05
Sample Depth:
2 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2	acenaphthylene		205-917-1	208-96-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		
3	anthracene		204-371-1	120-12-7		0.18	mg/kg		0.18	mg/kg	0.000018 %		
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	2.5	mg/kg		2.5	mg/kg	0.00025 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		59	mg/kg	1.7	100.272	mg/kg	0.01 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.22	mg/kg		0.22	mg/kg	0.000022 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.53	mg/kg		0.53	mg/kg	0.000053 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.39	mg/kg		0.39	mg/kg	0.000039 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.44	mg/kg		0.44	mg/kg	0.000044 %		
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		0.61	mg/kg		0.61	mg/kg	0.000061 %		
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.17	mg/kg		0.17	mg/kg	0.000017 %		
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7	mg/kg	2.775	1.943	mg/kg	0.000194 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				47.5	mg/kg	1.462	69.424	mg/kg	0.00694 %		
			215-160-9	1308-38-9									
15		chrysene				0.46	mg/kg		0.46	mg/kg	0.000046 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				14	mg/kg	1.252	17.525	mg/kg	0.00175 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.89	mg/kg		0.89	mg/kg	0.000089 %		
			205-912-4	206-44-0									
20		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				0.21	mg/kg		0.21	mg/kg	0.000021 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	24	mg/kg		24	mg/kg	0.0024 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
			215-696-3	1344-48-5									
24		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				8.3	mg/kg	1.545	12.825	mg/kg	0.00128 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				0.57	mg/kg		0.57	mg/kg	0.000057 %		
			201-581-5	85-01-8									
27		pyrene				0.89	mg/kg		0.89	mg/kg	0.000089 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				21	mg/kg	1.785	37.489	mg/kg	0.00375 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				30	mg/kg	1.245	37.341	mg/kg	0.00373 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0311 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP05[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-TP05[2]
Sample Depth:
1.4 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		2.48	mg/kg		2.48	mg/kg	0.000248 %		
2		acenaphthylene		205-917-1	208-96-8		0.84	mg/kg		0.84	mg/kg	0.000084 %		
3		anthracene		204-371-1	120-12-7		2.63	mg/kg		2.63	mg/kg	0.000263 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	53.3	mg/kg		53.3	mg/kg	0.00533 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		271	mg/kg	1.7	460.569	mg/kg	0.0461 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		1.13	mg/kg		1.13	mg/kg	0.000113 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.09	mg/kg		4.09	mg/kg	0.000409 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.3	mg/kg		2.3	mg/kg	0.00023 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.44	mg/kg		2.44	mg/kg	0.000244 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		3.39	mg/kg		3.39	mg/kg	0.000339 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.95	mg/kg		0.95	mg/kg	0.000095 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		2.1	mg/kg	2.775	5.828	mg/kg	0.000583 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.4	mg/kg		0.4	mg/kg	0.00004 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		45.8	mg/kg	1.462	66.939	mg/kg	0.00669 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		2.99	mg/kg		2.99	mg/kg	0.000299 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		57	mg/kg	1.252	71.351	mg/kg	0.00714 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		**<LOD**
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.19	mg/kg		0.19	mg/kg	0.000019 %		
19		dibenzofuran		205-071-3	132-64-9		0.044	mg/kg		0.044	mg/kg	0.0000044 %		
20		fluoranthene		205-912-4	206-44-0		9.7	mg/kg		9.7	mg/kg	0.00097 %		
21		fluorene		201-695-5	86-73-7		2.21	mg/kg		2.21	mg/kg	0.000221 %		
22		indeno[123-cd]pyrene		205-893-2	193-39-5		1.13	mg/kg		1.13	mg/kg	0.000113 %		
23		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	32	mg/kg		32	mg/kg	0.0032 %		
24		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
25		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		**<LOD**
26		naphthalene	601-052-00-2	202-049-5	91-20-3		1.53	mg/kg		1.53	mg/kg	0.000153 %		
27		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		32.3	mg/kg	1.545	49.909	mg/kg	0.00499 %		
28		phenanthrene		201-581-5	85-01-8		16.04	mg/kg		16.04	mg/kg	0.0016 %		
29		pyrene		204-927-3	129-00-0		8.79	mg/kg		8.79	mg/kg	0.000879 %		
30		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		1	mg/kg		1	mg/kg	0.0001 %		
31		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		48	mg/kg	1.785	85.689	mg/kg	0.00857 %		
32		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		55	mg/kg	1.245	68.459	mg/kg	0.00685 %		
											Total:	0.0959 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP06

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
GEO-2015-TP06	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.3 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.23	mg/kg		0.23	mg/kg	0.000023 %		
2		acenaphthylene		205-917-1	208-96-8		0.14	mg/kg		0.14	mg/kg	0.000014 %		
3		anthracene		204-371-1	120-12-7		0.39	mg/kg		0.39	mg/kg	0.000039 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	19.5	mg/kg		19.5	mg/kg	0.00195 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		184	mg/kg	1.7	312.711	mg/kg	0.0313 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		1.02	mg/kg		1.02	mg/kg	0.000102 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.5	mg/kg		1.5	mg/kg	0.00015 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.67	mg/kg		1.67	mg/kg	0.000167 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.94	mg/kg		1.94	mg/kg	0.000194 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		2.7	mg/kg		2.7	mg/kg	0.00027 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.76	mg/kg		0.76	mg/kg	0.000076 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3	mg/kg	2.775	3.608	mg/kg	0.000361 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.7	mg/kg		0.7	mg/kg	0.00007 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				31.2	mg/kg	1.462	45.601	mg/kg	0.00456 %		
			215-160-9	1308-38-9									
15		chrysene				1.67	mg/kg		1.67	mg/kg	0.000167 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				80	mg/kg	1.252	100.142	mg/kg	0.01 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1.9	mg/kg	1.884	3.58	mg/kg	0.000358 %		
		006-007-00-5											
18		dibenz[a,h]anthracene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				3.15	mg/kg		3.15	mg/kg	0.000315 %		
			205-912-4	206-44-0									
20		fluorene				0.14	mg/kg		0.14	mg/kg	0.000014 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				1.02	mg/kg		1.02	mg/kg	0.000102 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	289	mg/kg		289	mg/kg	0.0289 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				0.8	mg/kg	1.16	0.928	mg/kg	0.0000928 %		
			215-696-3	1344-48-5									
24		naphthalene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				22.9	mg/kg	1.545	35.385	mg/kg	0.00354 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				1.9	mg/kg		1.9	mg/kg	0.00019 %		
			201-581-5	85-01-8									
27		pyrene				2.93	mg/kg		2.93	mg/kg	0.000293 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				28	mg/kg	1.785	49.985	mg/kg	0.005 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				186	mg/kg	1.245	231.517	mg/kg	0.0232 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.112 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP07

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
GEO-2015-TP07	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
1.8 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		0.34 mg/kg		0.34 mg/kg	0.000034 %		
2	acenaphthylene		205-917-1	208-96-8		0.42 mg/kg		0.42 mg/kg	0.000042 %		
3	anthracene		204-371-1	120-12-7		1.04 mg/kg		1.04 mg/kg	0.000104 %		
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	2.9 mg/kg		2.9 mg/kg	0.00029 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		43 mg/kg	1.7	73.079 mg/kg	0.00731 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		0.88 mg/kg		0.88 mg/kg	0.000088 %		
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.25 mg/kg		2.25 mg/kg	0.000225 %		
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.65 mg/kg		1.65 mg/kg	0.000165 %		
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.79 mg/kg		1.79 mg/kg	0.000179 %		
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		2.48 mg/kg		2.48 mg/kg	0.000248 %		
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.69 mg/kg		0.69 mg/kg	0.000069 %		
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.7 mg/kg	2.775	1.943 mg/kg	0.000194 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				11.8	mg/kg	1.462	17.246	mg/kg	0.00172 %		
			215-160-9	1308-38-9									
15		chrysene				1.85	mg/kg		1.85	mg/kg	0.000185 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				11	mg/kg	1.252	13.77	mg/kg	0.00138 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				4.11	mg/kg		4.11	mg/kg	0.000411 %		
			205-912-4	206-44-0									
20		fluorene				0.63	mg/kg		0.63	mg/kg	0.000063 %		
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				0.84	mg/kg		0.84	mg/kg	0.000084 %		
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	15	mg/kg		15	mg/kg	0.0015 %		
		082-001-00-6											
23		mercury { mercury(II) sulphide }				<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
			215-696-3	1344-48-5									
24		naphthalene				0.43	mg/kg		0.43	mg/kg	0.000043 %		
		601-052-00-2	202-049-5	91-20-3									
25		nickel { nickel(IV) oxide (nickel dioxide) }				9.6	mg/kg	1.545	14.834	mg/kg	0.00148 %		
		028-004-00-8	234-823-3	12035-36-8									
26		phenanthrene				4.62	mg/kg		4.62	mg/kg	0.000462 %		
			201-581-5	85-01-8									
27		pyrene				4.24	mg/kg		4.24	mg/kg	0.000424 %		
			204-927-3	129-00-0									
28		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
29		vanadium { divanadium pentaoxide; vanadium pentoxide }				17	mg/kg	1.785	30.348	mg/kg	0.00303 %		
		023-001-00-8	215-239-8	1314-62-1									
30		zinc { zinc oxide }				28	mg/kg	1.245	34.852	mg/kg	0.00349 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0235 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-TP08

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
GEO-2015-TP08	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		
0.8 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
3	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
4	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	5.4	mg/kg		5.4	mg/kg	0.00054 %		
5	barium { barium sulfate }		231-784-4	7727-43-7		189	mg/kg	1.7	321.209	mg/kg	0.0321 %		
6	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
7	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
8	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
9	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
11	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
12	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.2	mg/kg	2.775	3.33	mg/kg	0.000333 %		
13	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				47.8	mg/kg	1.462	69.862	mg/kg	0.00699 %		
			215-160-9	1308-38-9									
15		chrysene				0.02	mg/kg		0.02	mg/kg	0.000002 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				28	mg/kg	1.252	35.05	mg/kg	0.0035 %		
		029-016-00-6	215-269-1	1317-38-0									
17		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
18		fluoranthene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			205-912-4	206-44-0									
19		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
20		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
21		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	12	mg/kg		12	mg/kg	0.0012 %		
		082-001-00-6											
22		mercury { mercury(II) sulphide }				<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
			215-696-3	1344-48-5									
23		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		nickel { nickel(IV) oxide (nickel dioxide) }				33.4	mg/kg	1.545	51.609	mg/kg	0.00516 %		
		028-004-00-8	234-823-3	12035-36-8									
25		phenanthrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			201-581-5	85-01-8									
26		pyrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			204-927-3	129-00-0									
27		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
28		vanadium { divanadium pentaoxide; vanadium pentoxide }				31	mg/kg	1.785	55.341	mg/kg	0.00553 %		
		023-001-00-8	215-239-8	1314-62-1									
29		zinc { zinc oxide }				76	mg/kg	1.245	94.598	mg/kg	0.00946 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.065 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-WLS01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-WLS01
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
3		anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	4.7	mg/kg		4.7	mg/kg	0.00047 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		50	mg/kg	1.7	84.976	mg/kg	0.0085 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07	mg/kg		<0.07	mg/kg	<0.000007 %		<LOD
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.6	mg/kg	2.775	1.665	mg/kg	0.000167 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				52.8	mg/kg	1.462	77.17	mg/kg	0.00772 %		
			215-160-9	1308-38-9									
15		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				14	mg/kg	1.252	17.525	mg/kg	0.00175 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
19		dibenzofuran				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-071-3	132-64-9									
20		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
21		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
22		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
23		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	11	mg/kg		11	mg/kg	0.0011 %		
		082-001-00-6											
24		mercury { mercury(II) sulphide }				<0.1	mg/kg	1.16	<0.116	mg/kg	<0.0000116 %		<LOD
			215-696-3	1344-48-5									
25		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
26		nickel { nickel(IV) oxide (nickel dioxide) }				19.6	mg/kg	1.545	30.286	mg/kg	0.00303 %		
		028-004-00-8	234-823-3	12035-36-8									
27		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
28		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
29		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
30		vanadium { divanadium pentaoxide; vanadium pentoxide }				19	mg/kg	1.785	33.919	mg/kg	0.00339 %		
		023-001-00-8	215-239-8	1314-62-1									
31		zinc { zinc oxide }				37	mg/kg	1.245	46.054	mg/kg	0.00461 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.031 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-WLS02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-WLS02
Sample Depth:
2 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		0.28	mg/kg		0.28	mg/kg	0.000028 %		
2		acenaphthylene		205-917-1	208-96-8		0.22	mg/kg		0.22	mg/kg	0.000022 %		
3		anthracene		204-371-1	120-12-7		1.11	mg/kg		1.11	mg/kg	0.000111 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	10.5	mg/kg		10.5	mg/kg	0.00105 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		136	mg/kg	1.7	231.134	mg/kg	0.0231 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		1.79	mg/kg		1.79	mg/kg	0.000179 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.15	mg/kg		4.15	mg/kg	0.000415 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		3.09	mg/kg		3.09	mg/kg	0.000309 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		3.85	mg/kg		3.85	mg/kg	0.000385 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		5.35	mg/kg		5.35	mg/kg	0.000535 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.5	mg/kg		1.5	mg/kg	0.00015 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		1.3	mg/kg	2.775	3.608	mg/kg	0.000361 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.2	mg/kg		0.2	mg/kg	0.00002 %		

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#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium { chromium(III) oxide }		215-160-9	1308-38-9		11.1	mg/kg	1.462	16.223	mg/kg	0.00162 %		
15		chrysene	601-048-00-0	205-923-4	218-01-9		3.59	mg/kg		3.59	mg/kg	0.000359 %		
16		copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0		82	mg/kg	1.252	102.646	mg/kg	0.0103 %		
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
18		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.32	mg/kg		0.32	mg/kg	0.000032 %		
19		dibenzofuran		205-071-3	132-64-9		0.071	mg/kg		0.071	mg/kg	0.0000071 %		
20		fluoranthene		205-912-4	206-44-0		7.18	mg/kg		7.18	mg/kg	0.000718 %		
21		fluorene		201-695-5	86-73-7		0.27	mg/kg		0.27	mg/kg	0.000027 %		
22		indeno[123-cd]pyrene		205-893-2	193-39-5		1.92	mg/kg		1.92	mg/kg	0.000192 %		
23		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	190	mg/kg		190	mg/kg	0.019 %		
24		mercury { mercury(II) sulphide }		215-696-3	1344-48-5		0.2	mg/kg	1.16	0.232	mg/kg	0.0000232 %		
25		naphthalene	601-052-00-2	202-049-5	91-20-3		0.15	mg/kg		0.15	mg/kg	0.000015 %		
26		nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8		15.5	mg/kg	1.545	23.95	mg/kg	0.0024 %		
27		phenanthrene		201-581-5	85-01-8		4.11	mg/kg		4.11	mg/kg	0.000411 %		
28		pyrene		204-927-3	129-00-0		6.72	mg/kg		6.72	mg/kg	0.000672 %		
29		selenium { selenium }	034-001-00-2	231-957-4	7782-49-2		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
30		vanadium { divanadium pentaoxide; vanadium pentoxide }	023-001-00-8	215-239-8	1314-62-1		18	mg/kg	1.785	32.133	mg/kg	0.00321 %		
31		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		56	mg/kg	1.245	69.704	mg/kg	0.00697 %		
											Total:	0.0728 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Classification of sample: GEO-2015-WLS02[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-WLS02[2]
Sample Depth:
1 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
2	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
3	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
4	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
5		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
8	●	benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
10		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
11		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
12	●	fluoranthene		205-912-4	206-44-0		0.03 mg/kg		0.03 mg/kg	0.000003 %		
13	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
14	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
15		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
17	•	phenanthrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			201-581-5	85-01-8									
18	•	pyrene				0.03	mg/kg		0.03	mg/kg	0.000003 %		
			204-927-3	129-00-0									
										Total:	0.00006 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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Classification of sample: GEO-2015-WLS03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-WLS03
Sample Depth:
3.5 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	8.1	mg/kg		8.1	mg/kg	0.00081 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		84	mg/kg	1.7	142.759	mg/kg	0.0143 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<**LOD**
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.07	mg/kg		0.07	mg/kg	0.000007 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.05	mg/kg		0.05	mg/kg	0.000005 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.06	mg/kg		0.06	mg/kg	0.000006 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		0.08	mg/kg		0.08	mg/kg	0.000008 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.02	mg/kg		0.02	mg/kg	0.000002 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		0.9	mg/kg	2.775	2.498	mg/kg	0.00025 %		
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.1	mg/kg		0.1	mg/kg	0.00001 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				19	mg/kg	1.462	27.77	mg/kg	0.00278 %		
			215-160-9	1308-38-9									
15		chrysene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				37	mg/kg	1.252	46.316	mg/kg	0.00463 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
		006-007-00-5											
18		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
19		fluoranthene				0.07	mg/kg		0.07	mg/kg	0.000007 %		
			205-912-4	206-44-0									
20		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
21		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
22		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	56	mg/kg		56	mg/kg	0.0056 %		
		082-001-00-6											
23		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
24		mercury { mercury(II) sulphide }				0.2	mg/kg	1.16	0.232	mg/kg	0.0000232 %		
			215-696-3	1344-48-5									
25		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
26		nickel { nickel(IV) oxide (nickel dioxide) }				22.9	mg/kg	1.545	35.385	mg/kg	0.00354 %		
		028-004-00-8	234-823-3	12035-36-8									
27		phenanthrene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
			201-581-5	85-01-8									
28		pyrene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
			204-927-3	129-00-0									
29		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
30		vanadium { divanadium pentaoxide; vanadium pentoxide }				21	mg/kg	1.785	37.489	mg/kg	0.00375 %		
		023-001-00-8	215-239-8	1314-62-1									
31		zinc { zinc oxide }				62	mg/kg	1.245	77.172	mg/kg	0.00772 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0437 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Report created by Mark Griffiths on 15 Jan 2020

Classification of sample: GEO-2015-WLS03[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
GEO-2015-WLS03[2]
Sample Depth:
2.5 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		acenaphthene		201-469-6	83-32-9		1.61	mg/kg		1.61	mg/kg	0.000161 %		
2		acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<**LOD**
3		anthracene		204-371-1	120-12-7		1.94	mg/kg		1.94	mg/kg	0.000194 %		
4		arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	2.2	mg/kg		2.2	mg/kg	0.00022 %		
5		barium { barium sulfate }		231-784-4	7727-43-7		70	mg/kg	1.7	118.966	mg/kg	0.0119 %		
6		benzo[ghi]perylene		205-883-8	191-24-2		1.71	mg/kg		1.71	mg/kg	0.000171 %		
7		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.09	mg/kg		4.09	mg/kg	0.000409 %		
8		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		3.04	mg/kg		3.04	mg/kg	0.000304 %		
9		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		4.08	mg/kg		4.08	mg/kg	0.000408 %		
10		benzo[bk]fluoranthene		[1] 205-911-9 [2] 205-916-6	[1] 205-99-2 [2] 207-08-9		5.67	mg/kg		5.67	mg/kg	0.000567 %		
11		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.59	mg/kg		1.59	mg/kg	0.000159 %		
12		beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9		<0.5	mg/kg	2.775	<1.388	mg/kg	<0.000139 %		<**LOD**
13		cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.2	mg/kg		0.2	mg/kg	0.00002 %		

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#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium { chromium(III) oxide }				57.3	mg/kg	1.462	83.747	mg/kg	0.00837 %		
			215-160-9	1308-38-9									
15		chrysene				3.69	mg/kg		3.69	mg/kg	0.000369 %		
		601-048-00-0	205-923-4	218-01-9									
16		copper { copper(II) oxide }				21	mg/kg	1.252	26.287	mg/kg	0.00263 %		
		029-016-00-6	215-269-1	1317-38-0									
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.6	mg/kg	1.884	1.13	mg/kg	0.000113 %		
		006-007-00-5											
18		dibenz[a,h]anthracene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
		601-041-00-2	200-181-8	53-70-3									
19		dibenzofuran				0.042	mg/kg		0.042	mg/kg	0.0000042 %		
			205-071-3	132-64-9									
20		fluoranthene				9.89	mg/kg		9.89	mg/kg	0.000989 %		
			205-912-4	206-44-0									
21		fluorene				0.83	mg/kg		0.83	mg/kg	0.000083 %		
			201-695-5	86-73-7									
22		indeno[123-cd]pyrene				1.97	mg/kg		1.97	mg/kg	0.000197 %		
			205-893-2	193-39-5									
23		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	55	mg/kg		55	mg/kg	0.0055 %		
		082-001-00-6											
24		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
25		mercury { mercury(II) sulphide }				1	mg/kg	1.16	1.16	mg/kg	0.000116 %		
			215-696-3	1344-48-5									
26		naphthalene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-052-00-2	202-049-5	91-20-3									
27		nickel { nickel(IV) oxide (nickel dioxide) }				6.6	mg/kg	1.545	10.198	mg/kg	0.00102 %		
		028-004-00-8	234-823-3	12035-36-8									
28		phenanthrene				7.76	mg/kg		7.76	mg/kg	0.000776 %		
			201-581-5	85-01-8									
29		pyrene				7.23	mg/kg		7.23	mg/kg	0.000723 %		
			204-927-3	129-00-0									
30		selenium { selenium }				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		034-001-00-2	231-957-4	7782-49-2									
31		vanadium { divanadium pentaoxide; vanadium pentoxide }				11	mg/kg	1.785	19.637	mg/kg	0.00196 %		
		023-001-00-8	215-239-8	1314-62-1									
32		zinc { zinc oxide }				42	mg/kg	1.245	52.278	mg/kg	0.00523 %		
		030-013-00-7	215-222-5	1314-13-2									
										Total:	0.0429 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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Appendix A: Classifier defined and non CLP determinands

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

arsenic compounds, with the exception of those specified elsewhere in this Annex

CLP index number: 033-002-00-5
Description/Comments: Worst Case: IARC considers arsenic compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex

CLP index number: 048-001-00-5
Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s)/Risk Phrase(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

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- **dibenzofuran** (EC Number: 205-071-3, CAS Number: 132-64-9)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Aquatic Chronic 2 H411 , Acute Tox. 4 H332 , Acute Tox. 4 H312 , Acute Tox. 4 H302

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **lead compounds with the exception of those specified elsewhere in this Annex**

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: Lead REACH Consortium considers some lead compounds Carcinogenic category 2B
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

- **mercury(II) sulphide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Conversion factor: 1.16
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT RE 2 H373 , Acute Tox. 2 H300 , Acute Tox. 1 H310 , Acute Tox. 3 H331

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **barium sulfate** (EC Number: 231-784-4, CAS Number: 7727-43-7)

Conversion factor: 1.7
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , STOT RE 2 H373 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **benzo[bk]fluoranthene** (EC Number: [1] 205-911-9 [2] 205-916-6, CAS Number: [1] 205-99-2 [2] 207-08-9)

Description/Comments: Combined data from harmonised entries in CLP for benzo[b] and benzo[k]fluoranthene; C&L Inventory Database
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Carc. 1B H350

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Appendix B: Rationale for selection of metal species

antimony {antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex}

Most likely compound based on site history.

arsenic {arsenic compounds, with the exception of those specified elsewhere in this Annex}

Most likely compound based on site history.

beryllium {beryllium oxide}

Most likely compound based on site history.

cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Most likely compound based on site history.

chromium {chromium(III) oxide}

Most likely compound based on site history.

copper {copper(II) oxide}

Most likely compound based on site history.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Most likely compound based on site history.

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Most likely compound based on site history.

mercury {mercury(II) sulphide}

Most likely compound based on site history.

nickel {nickel(IV) oxide (nickel dioxide)}

Most likely compound based on site history.

selenium {selenium}

Most likely compound based on site history.

vanadium {divanadium pentaoxide; vanadium pentoxide}

Most likely compound based on site history.

zinc {zinc oxide}

Most likely compound based on site history.

barium {barium sulfate}

Most likely compound based on site history.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.13.4139.8254 (13 Jan 2020)
HazWasteOnline Database: 2020.13.4139.8254 (13 Jan 2020)

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This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

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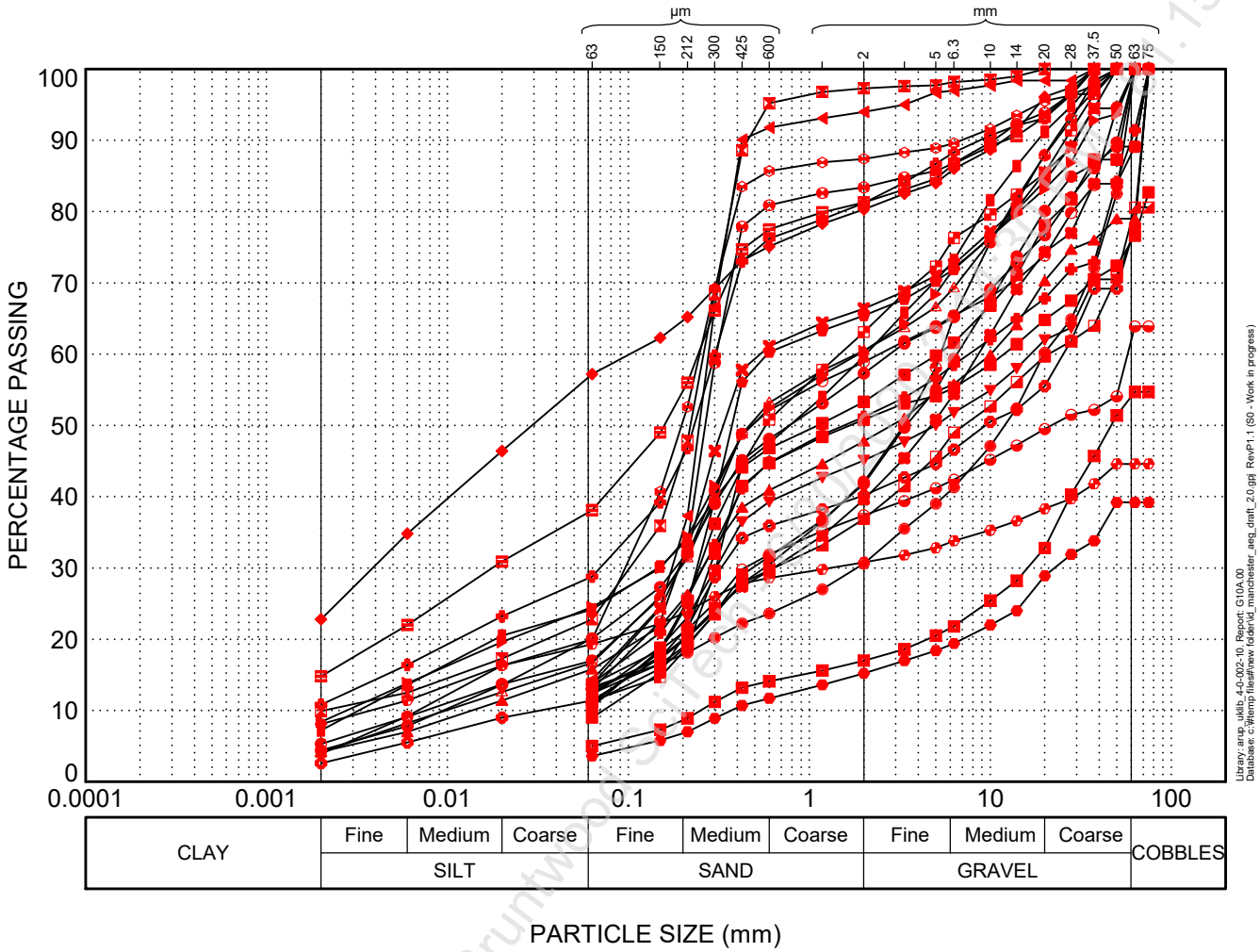
Appendix H

Geotechnical Laboratory Data and Plots

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- ARP-BH002, 32.1mOD
- ARP-BH003, 31.4mOD
- ARP-BH006A, 33.2mOD
- ARP-BH006B, 33.1mOD
- ARP-BH008, 33.5mOD
- ARP-BH008, 31.6mOD
- ARP-BH008, 29.6mOD
- ARP-BH009, 33.2mOD
- ARP-BH009, 30.5mOD
- ARP-BH012A, 31.8mOD
- ARP-BH012A, 29.3mOD
- ARP-BH014, 34.5mOD
- ARP-BH014, 32.7mOD
- ARP-BH001, 37.3mOD
- ARP-BH001, 34.8mOD
- ARP-BH004, 32.8mOD
- ARP-BH004, 29.2mOD
- ARP-BH007, 34.1mOD
- ARP-BH007, 32.2mOD
- ARP-BH011, 31.4mOD
- ARP-BH013, 31.4mOD
- ARP-TP001, 32.4mOD
- ARP-TP001, 31.7mOD
- ARP-TP002, 31.9mOD
- ARP-TP002, 30.4mOD
- ARP-TP003, 33.2mOD
- ARP-TP003, 31.2mOD
- ARP-BH005, 32.6mOD
- ARP-DS001, 33.5mOD
- ARP-DS002, 33.3mOD

Library: arup_uklib_4-0-002-10, Report: G10A.00
Database: c:\temp files\new folder\id_manchester_aeg_draft_2.0.gpj RevP1.1 (S0 - Work in progress)

ARUP, gINT v8.30.004
Made by Jordan Weddell on 24-Jan-20

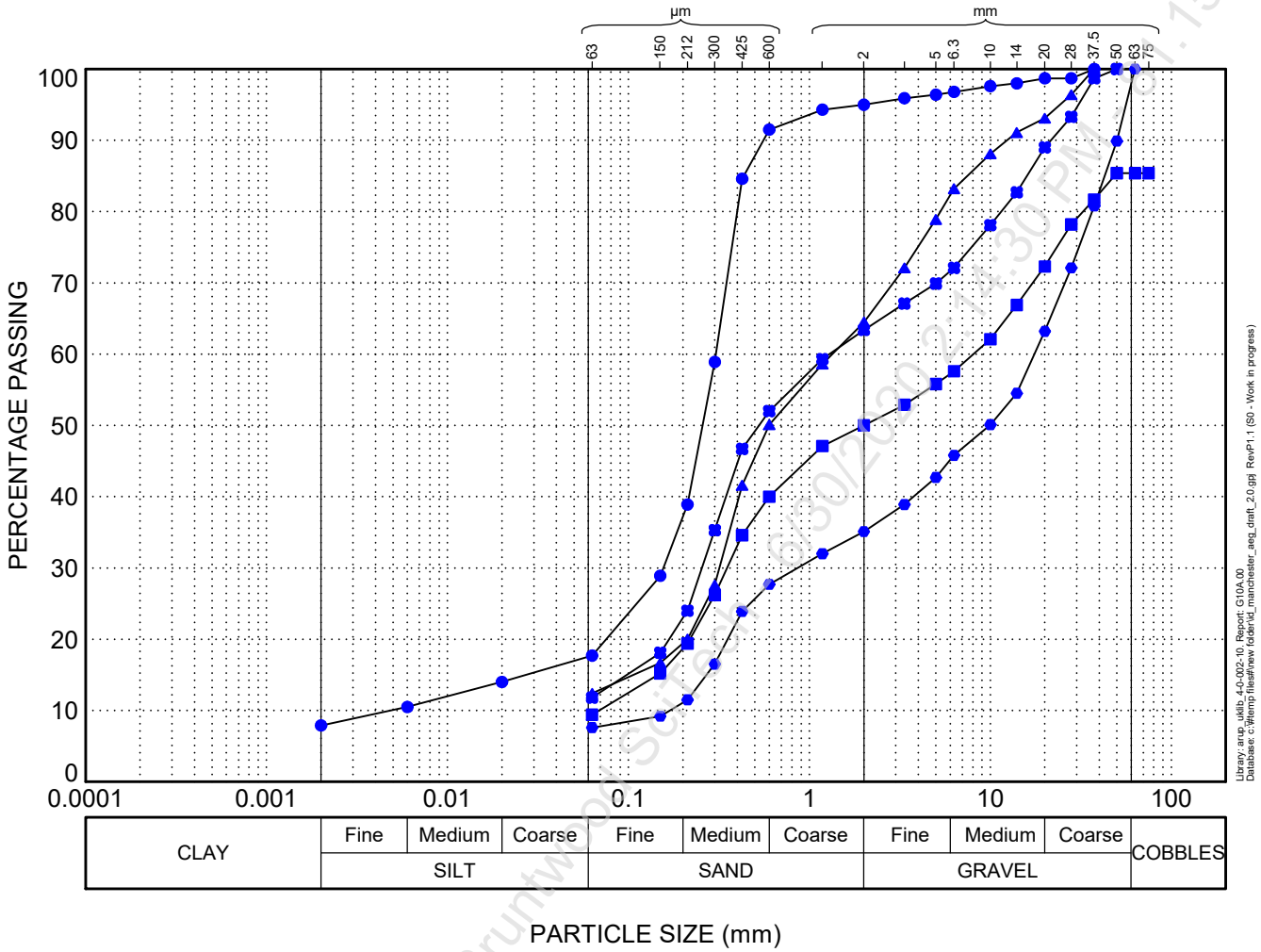
ID MANCHESTER
PARTICLE SIZE DISTRIBUTION
MADE GROUND

265190-00

FIGURE 001

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ID MANCHESTER
PARTICLE SIZE DISTRIBUTION
ALLUVIUM

265190-00

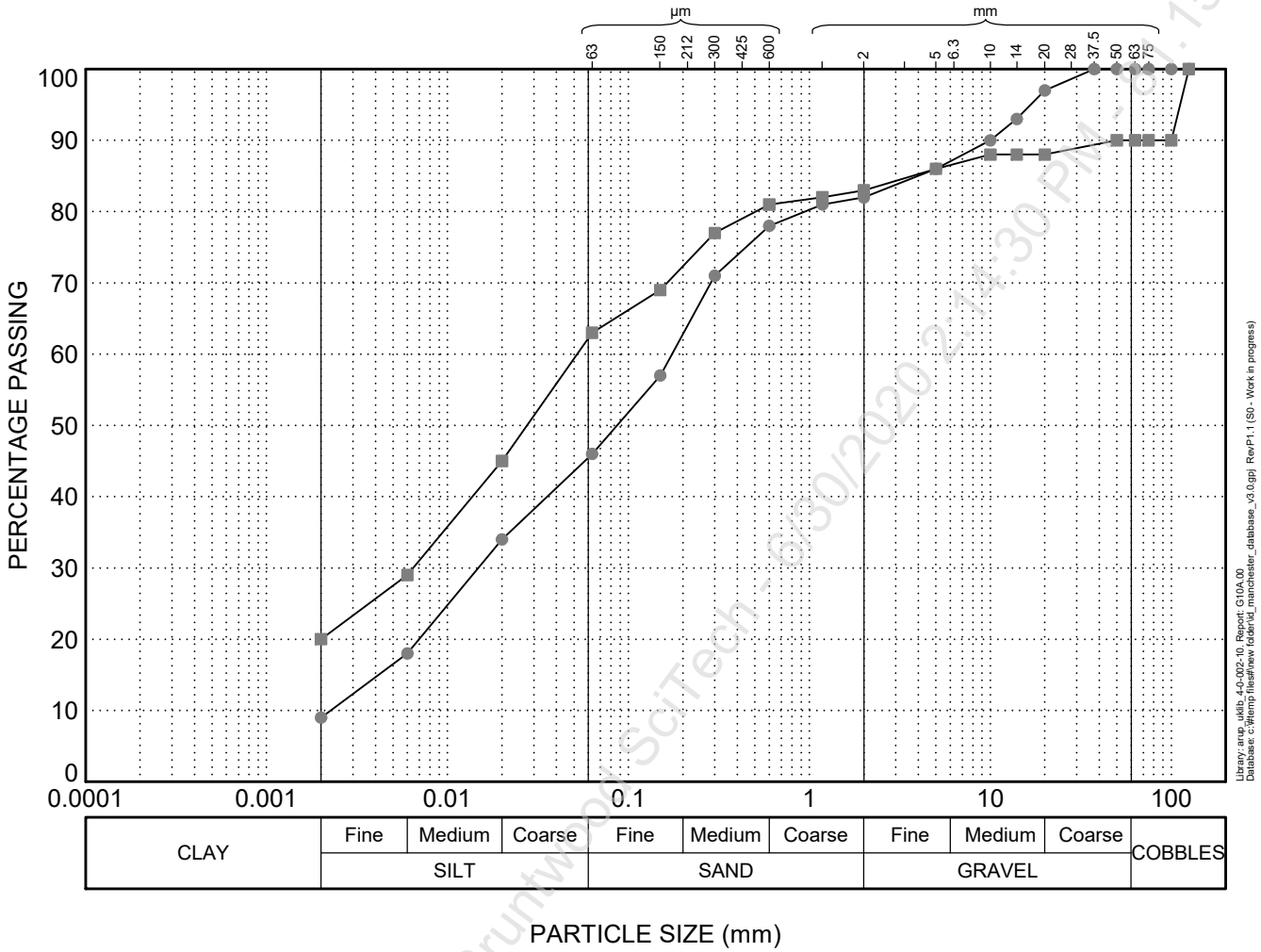
FIGURE 002

ARUP, gINT v8.30.004
Made by Jordan Weddell on 24-Jan-20

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ID MANCHESTER
PARTICLE SIZE DISTRIBUTION
GLACIAL TILL DEPOSITS

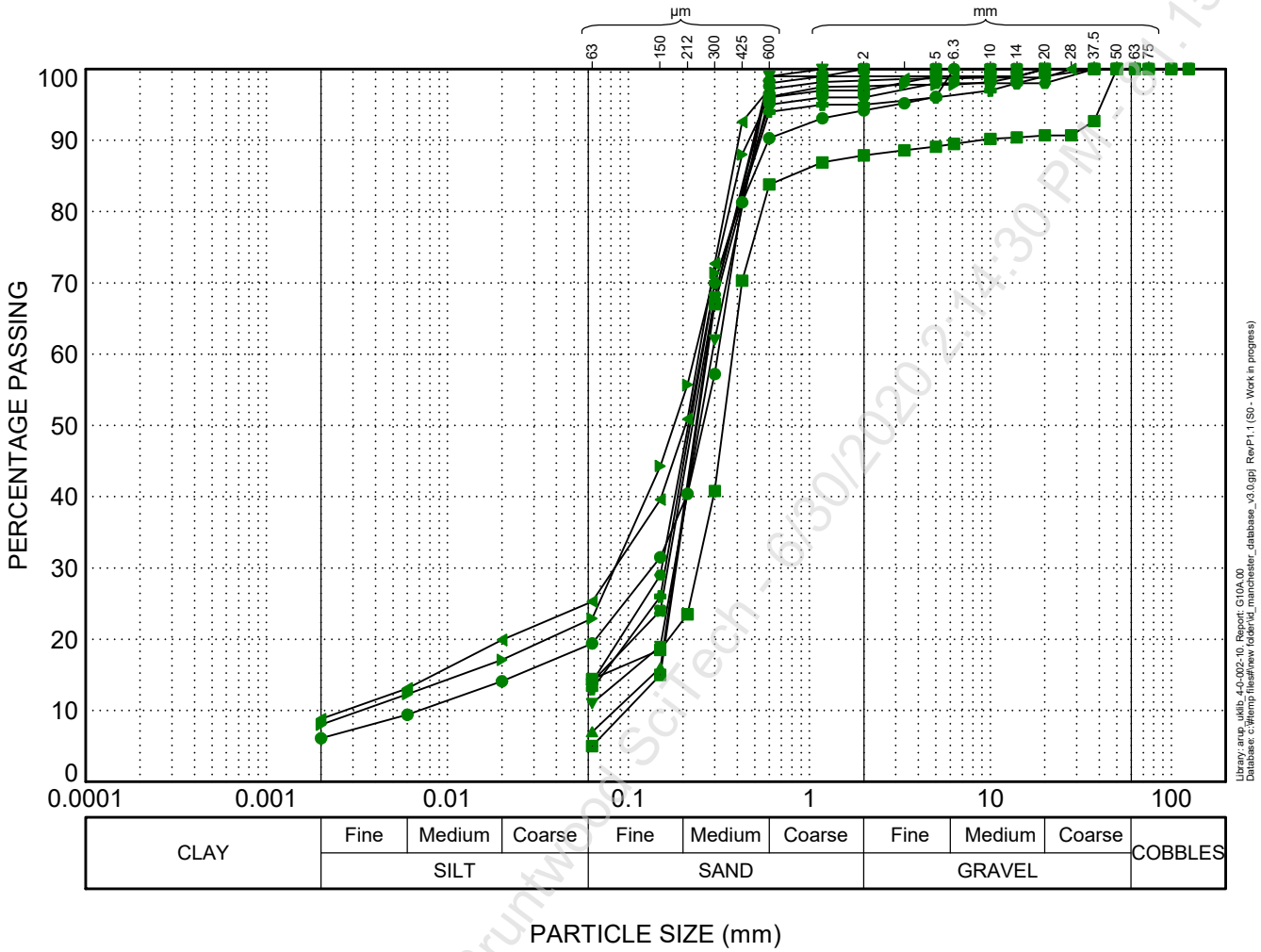
ARUP, gINT v8.30.004
Made by Jordan Weddell on 24-Jan-20

FIGURE 003

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- ARP-BH002, 29.6mOD
- ARP-BH003, 28.4mOD
- GEO-2015-CRH02A, 27.5mOD
- GEO-2015-CRH02A, 23.5mOD
- GEO-2015-CRH02A, 17.5mOD
- GEO-2015-CRH03, 30.2mOD
- GEO-2015-CRH03, 25.7mOD
- GEO-2015-CRH03, 21.2mOD
- ARP-BH001, 32.8mOD
- ARP-BH011, 29.4mOD

ID MANCHESTER
PARTICLE SIZE DISTRIBUTION
SHERWOOD SANDSTONE

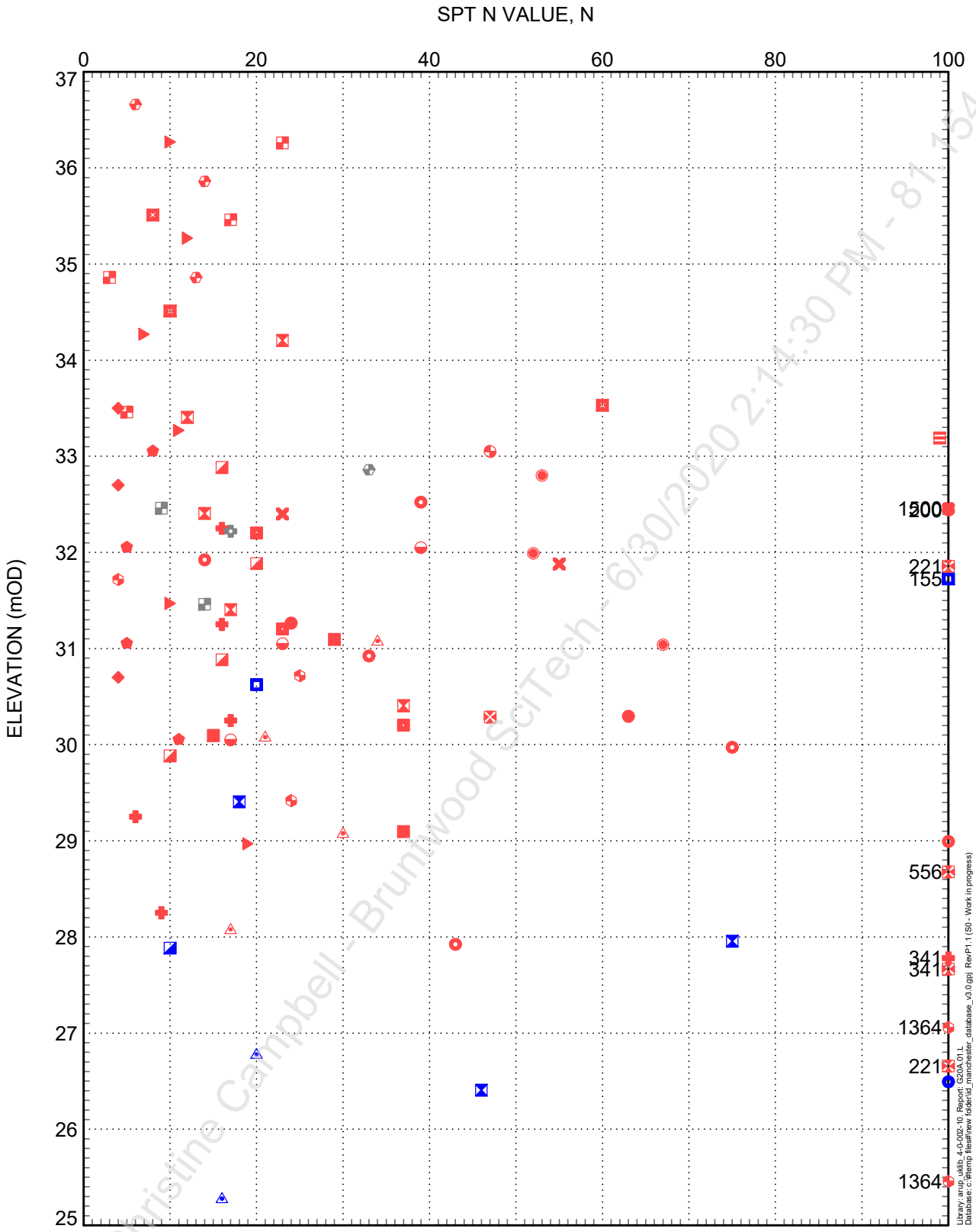
FIGURE 004

ARUP, gINT v8.30.004
Made by Jordan Weddell on 24-Jan-20

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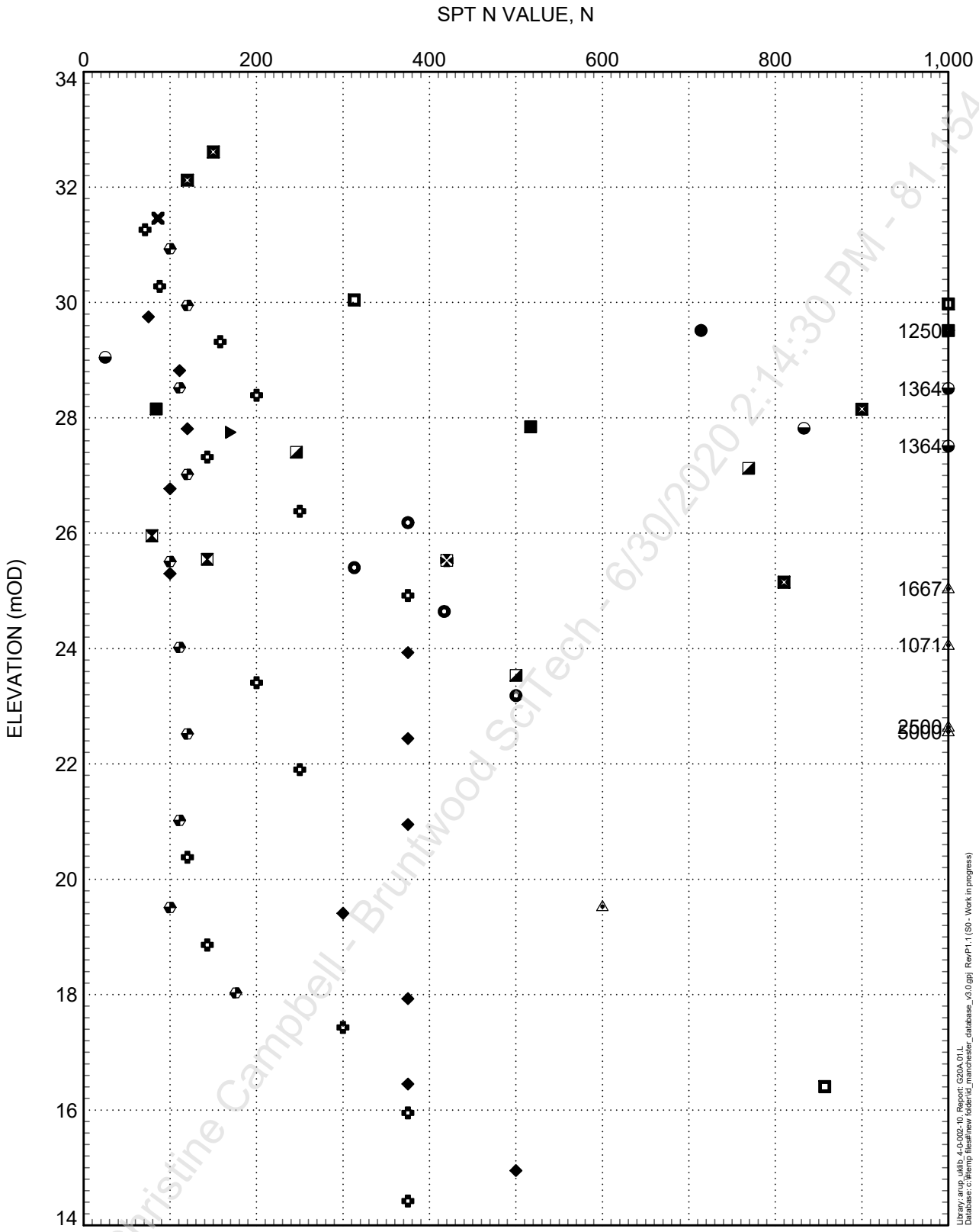
ID MANCHESTER
STANDARD PENETRATION TESTS
SUPERFICIALS

FIGURE 005

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- ARP-BH002
- ARP-BH003
- ARP-BH009
- ARP-BH012A
- ARP-BH014
- GEO-2015-CRH01B
- GEO-2015-CRH02A
- GEO-2015-CRH03
- ARP-BH001
- ARP-BH004
- ARP-BH007
- ARP-BH011
- ARP-BH013
- GEO-2015-WLS01
- ARP-BH005
- ARP-DS002

ARUP, gINT v8.30.004
Made by Jordan Weddell on 24-Jan-20

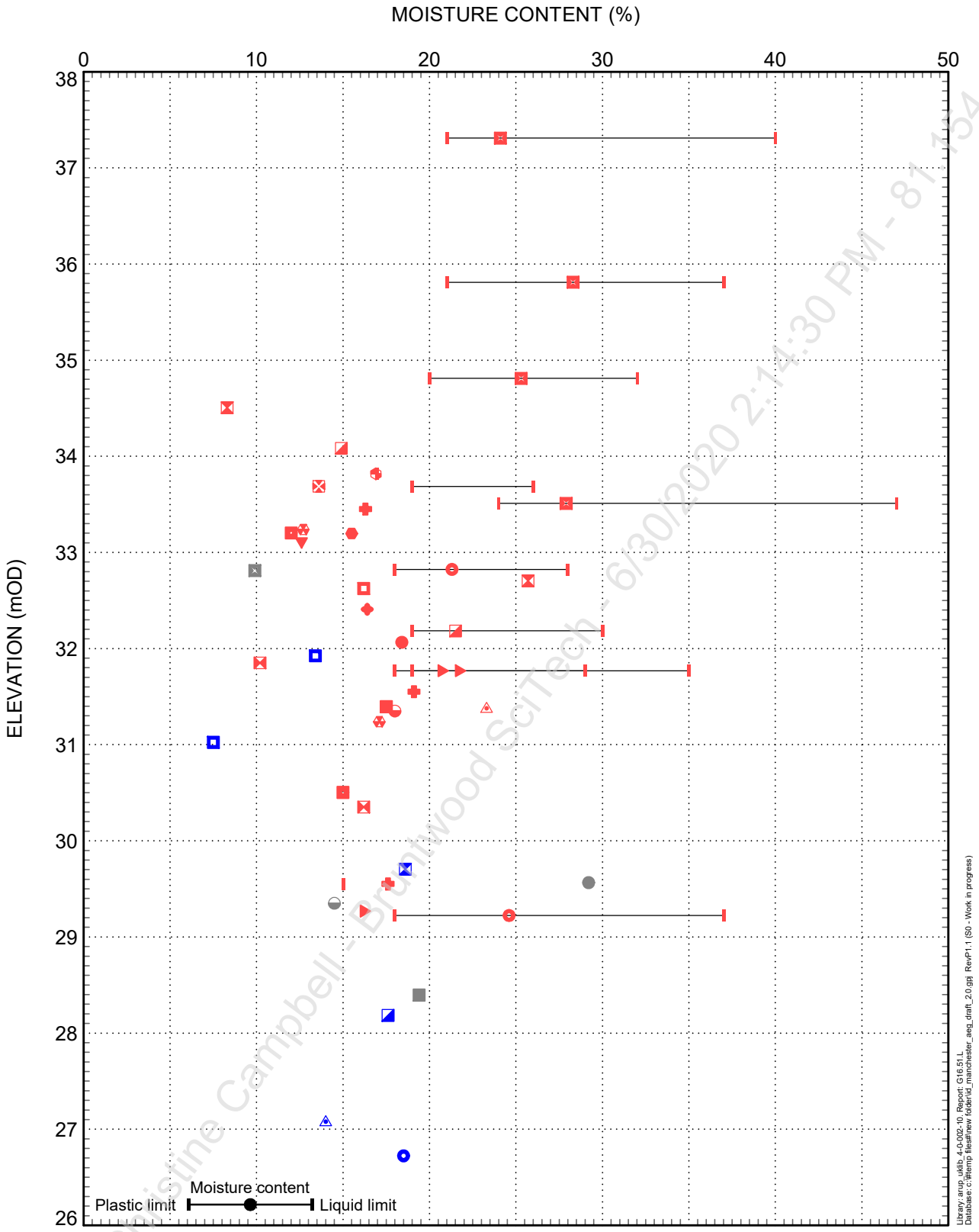
ID MANCHESTER
STANDARD PENETRATION TESTS
SHERWOOD SANDSTONE

FIGURE 006

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- Made Ground (MG)
- Alluvium (ALV)
- Sherwood Sandstone (SS)
- ARP-BH002
- ARP-BH003
- ARP-BH006A
- ARP-BH006B
- ARP-BH008
- ARP-BH009
- ARP-BH012A
- ARP-BH014
- ARP-BH001
- ARP-BH004
- ARP-BH007
- ARP-BH011
- ARP-BH013
- ARP-TP001
- ARP-TP002
- ARP-TP003
- ARP-BH005
- ARP-DS001
- ARP-DS002

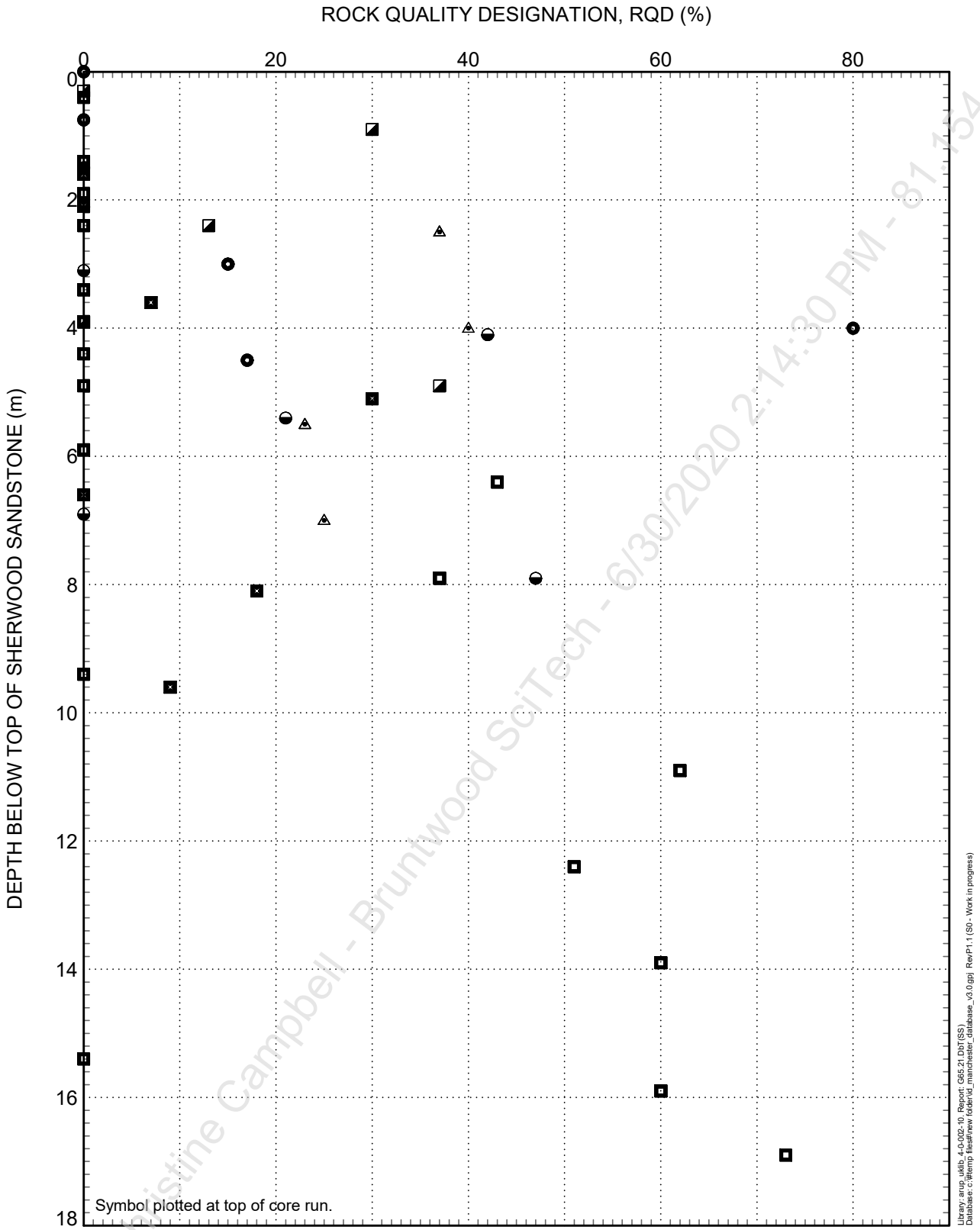
ID MANCHESTER
ATTERBERG LIMITS

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FIGURE 007

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ARP-BH001
ARP-BH004
ARP-BH007
ARP-BH011
ARP-BH013
ARP-BH005

ARUP, gINT v8.30.004
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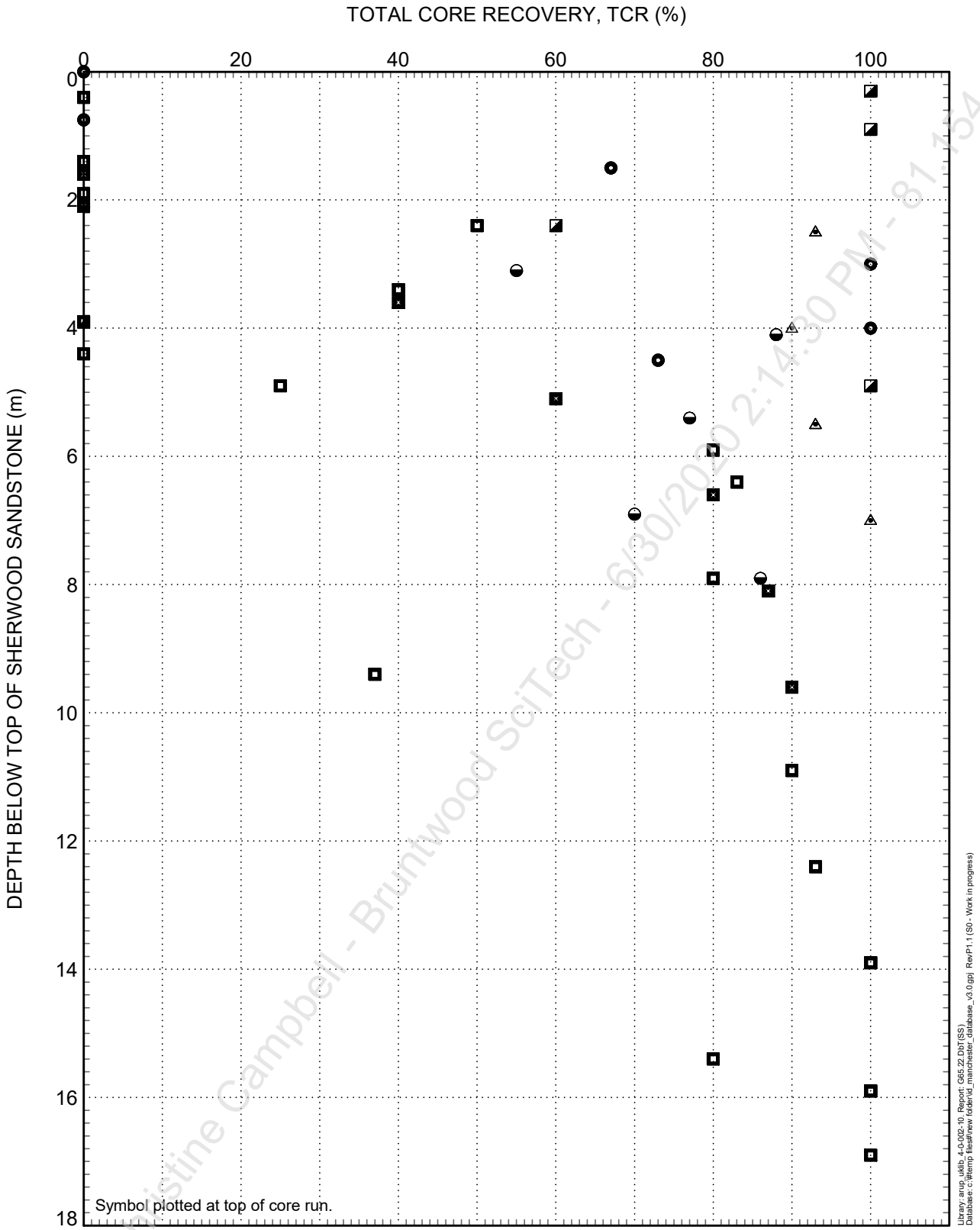
ID MANCHESTER
ROCK QUALITY DESIGNATION

FIGURE 008

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ARP-BH001
ARP-BH004
ARP-BH007
ARP-BH011
ARP-BH013
ARP-BH005

ARUP, gINT v8.30.004
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TOTAL CORE RECOVERY

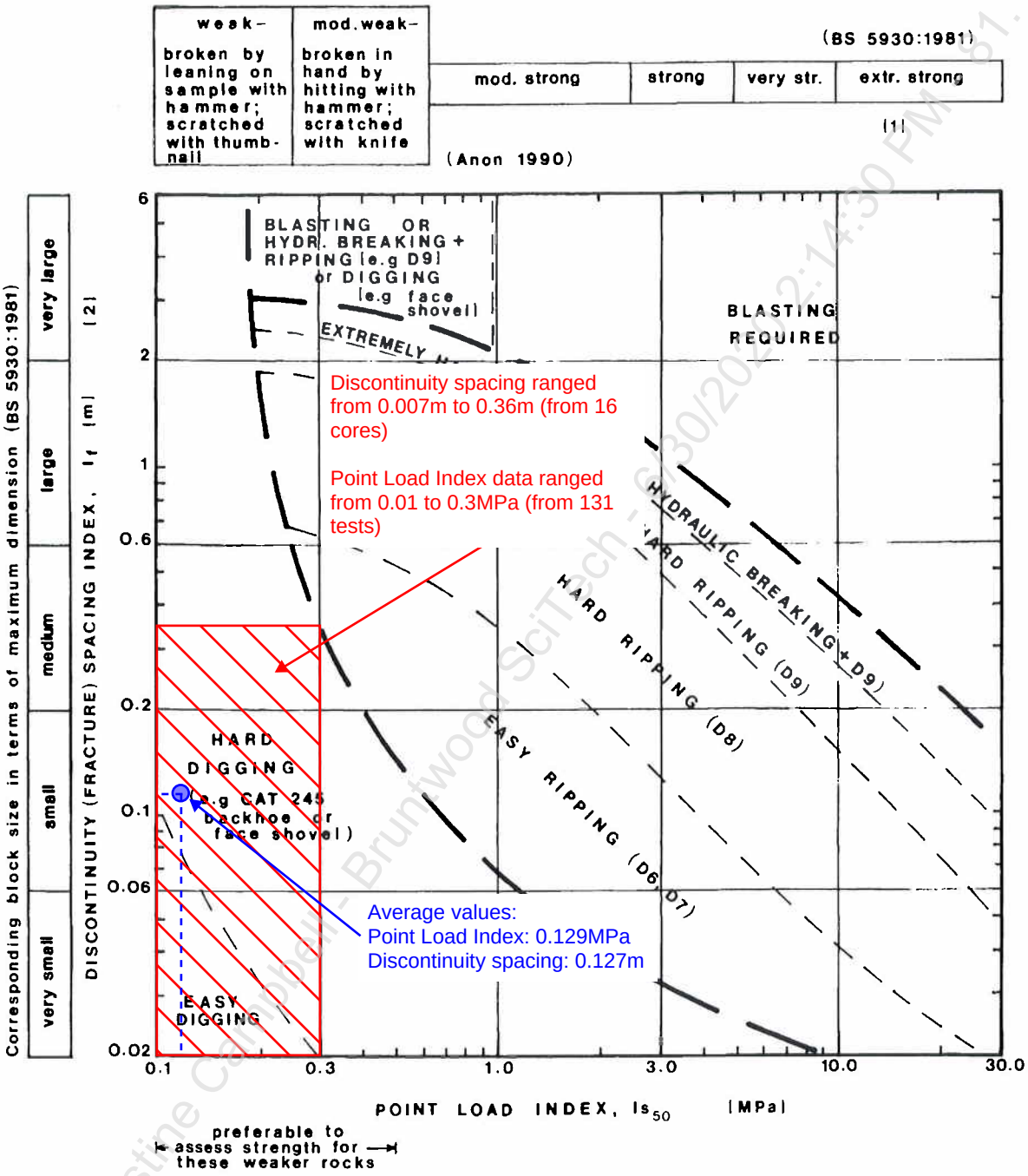
FIGURE 009

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Notes [1] Approx. correlation with point load index ($UCS = 20\,Is_{50}$ – This Study).

[2] Where the rock mass structure is unfavourable for ripping, I_f values should be increased (see Table 5).

$Jv = 3/I_f$, for a rock mass with three intersecting joint sets, where I_f is determined on a unit volume basis (see Table 4). $RQD = 115 - 3.3\,Jv$ approx. (ISRM 1981).

FIG. 10. Revised excavatability graph.

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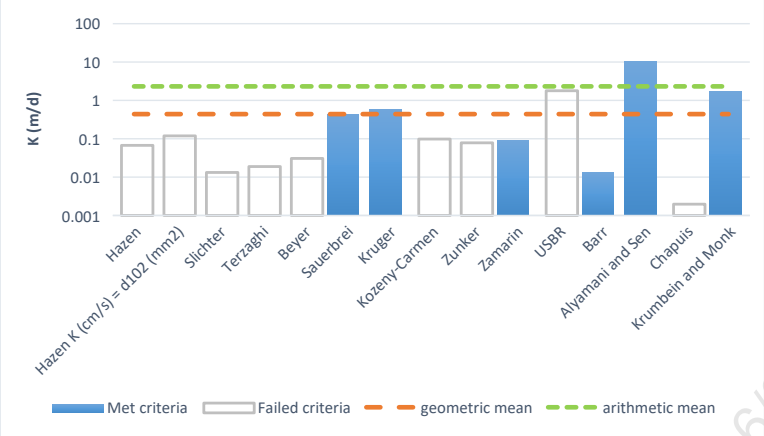
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 263

K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP001 (0.8mbgl)

Mass Sample (g): _____ T (oC) _____

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.779E-04	.779E-06	0.07
Hazen K (cm/s) = d_{10} (mm)	.138E-03	.138E-05	0.12
Slichter	.153E-04	.153E-06	0.01
Terzaghi	.218E-04	.218E-06	0.02
Beyer	.355E-04	.355E-06	0.03
Sauerbrei	.507E-03	.507E-05	0.44
Kruger	.723E-03	.723E-05	0.62
Kozeny-Carmen	.114E-03	.114E-05	0.10
Zunker	.906E-04	.906E-06	0.08
Zamarin	.112E-03	.112E-05	0.10
USBR	.207E-02	.207E-04	1.79
Barr	.164E-04	.164E-06	0.01
Alyamani and Sen	.127E-01	.127E-03	11.00
Chapuis	.228E-05	.228E-07	0.00
Krumbein and Monk	.201E-02	.201E-04	1.74
geometric mean	.508E-03	.508E-05	0.44
arithmetic mean	.268E-02	.268E-04	2.32

ID Manchester - Christine Campbell - BurtWood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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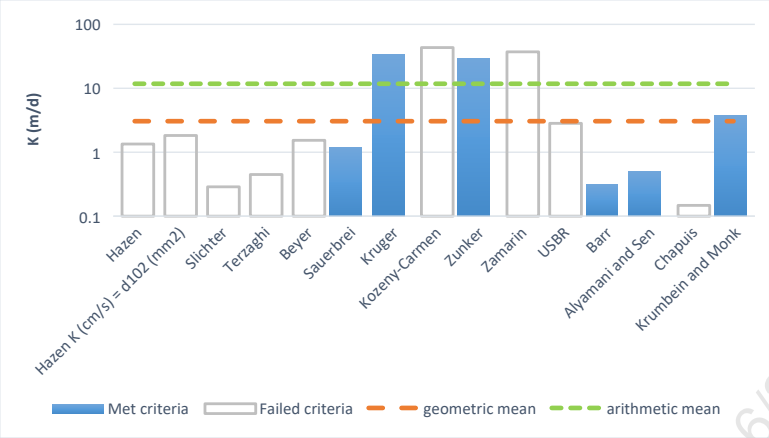
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 264

K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP001 (1.5mbgl)

Mass Sample (g): T (oC)

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.156E-02	.156E-04	1.34
Hazen K (cm/s) = d_{10} (mm)	.211E-02	.211E-04	1.83
Slichter	.333E-03	.333E-05	0.29
Terzaghi	.518E-03	.518E-05	0.45
Beyer	.178E-02	.178E-04	1.54
Sauerbrei	.141E-02	.141E-04	1.22
Kruger	.397E-01	.397E-03	34.30
Kozeny-Carmen	.502E-01	.502E-03	43.35
Zunker	.353E-01	.353E-03	30.48
Zamarin	.430E-01	.430E-03	37.17
USBR	.328E-02	.328E-04	2.83
Barr	.374E-03	.374E-05	0.32
Alyamani and Sen	.605E-03	.605E-05	0.52
Chapuis	.171E-03	.171E-05	0.15
Krumbein and Monk	.439E-02	.439E-04	3.80
geometric mean	.354E-02	.354E-04	3.06
arithmetic mean	.136E-01	.136E-03	11.77

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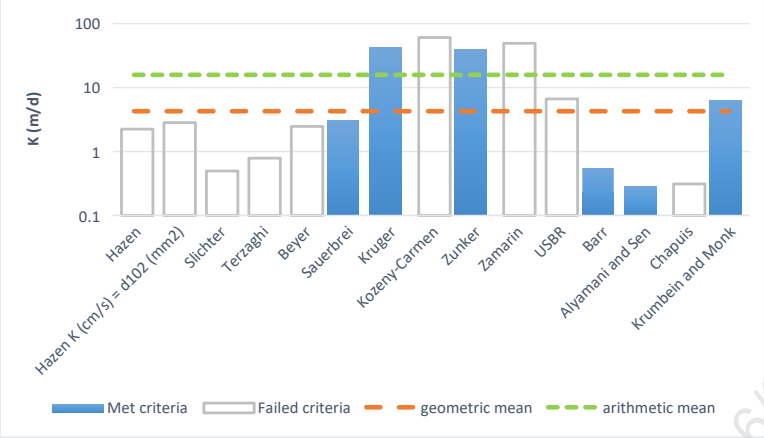
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 265

K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP002 (1mbgl)

Mass Sample (g): _____ T (oC) _____

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.259E-02	.259E-04	2.24
Hazen K (cm/s) = d_{10} (mm)	.328E-02	.328E-04	2.83
Slichter	.574E-03	.574E-05	0.50
Terzaghi	.913E-03	.913E-05	0.79
Beyer	.286E-02	.286E-04	2.47
Sauerbrei	.361E-02	.361E-04	3.12
Kruger	.505E-01	.505E-03	43.60
Kozeny-Carmen	.703E-01	.703E-03	60.71
Zunker	.473E-01	.473E-03	40.89
Zamarin	.570E-01	.570E-03	49.28
USBR	.771E-02	.771E-04	6.66
Barr	.657E-03	.657E-05	0.57
Alyamani and Sen	.344E-03	.344E-05	0.30
Chapuis	.360E-03	.360E-05	0.31
Krumbein and Monk	.752E-02	.752E-04	6.49
geometric mean	.495E-02	.495E-04	4.27
arithmetic mean	.183E-01	.183E-03	15.83

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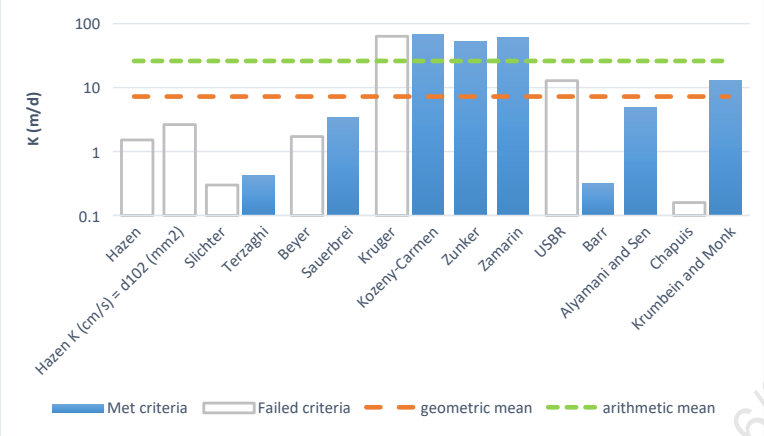
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K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP002 (2.5mbgl)

Mass Sample (g): _____ T (oC) _____

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.176E-02	.176E-04	1.52
Hazen K (cm/s) = d_{10} (mm)	.305E-02	.305E-04	2.64
Slichter	.346E-03	.346E-05	0.30
Terzaghi	.497E-03	.497E-05	0.43
Beyer	.199E-02	.199E-04	1.72
Sauerbrei	.405E-02	.405E-04	3.50
Kruger	.735E-01	.735E-03	63.49
Kozeny-Carmen	.809E-01	.809E-03	69.91
Zunker	.616E-01	.616E-03	53.19
Zamarin	.730E-01	.730E-03	63.09
USBR	.149E-01	.149E-03	12.83
Barr	.372E-03	.372E-05	0.32
Alyamani and Sen	.584E-02	.584E-04	5.05
Chapuis	.184E-03	.184E-05	0.16
Krumbein and Monk	.154E-01	.154E-03	13.29
geometric mean	.839E-02	.839E-04	7.25
arithmetic mean	.302E-01	.302E-03	26.10

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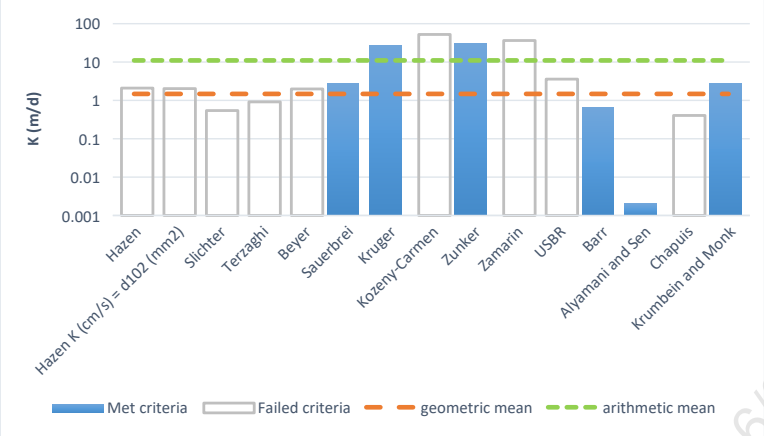
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K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP003 (1mbgl)

Mass Sample (g): _____ T (oC) _____

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.242E-02	.242E-04	2.09
Hazen K (cm/s) = d_{10} (mm)	.235E-02	.235E-04	2.03
Slichter	.629E-03	.629E-05	0.54
Terzaghi	.106E-02	.106E-04	0.91
Beyer	.230E-02	.230E-04	1.99
Sauerbrei	.323E-02	.323E-04	2.79
Kruger	.334E-01	.334E-03	28.83
Kozeny-Carmen	.606E-01	.606E-03	52.34
Zunker	.358E-01	.358E-03	30.91
Zamarin	.421E-01	.421E-03	36.39
USBR	.415E-02	.415E-04	3.58
Barr	.779E-03	.779E-05	0.67
Alyamani and Sen	.245E-05	.245E-07	0.00
Chapuis	.468E-03	.468E-05	0.40
Krumbein and Monk	.338E-02	.338E-04	2.92
geometric mean	.171E-02	.171E-04	1.48
arithmetic mean	.128E-01	.128E-03	11.02

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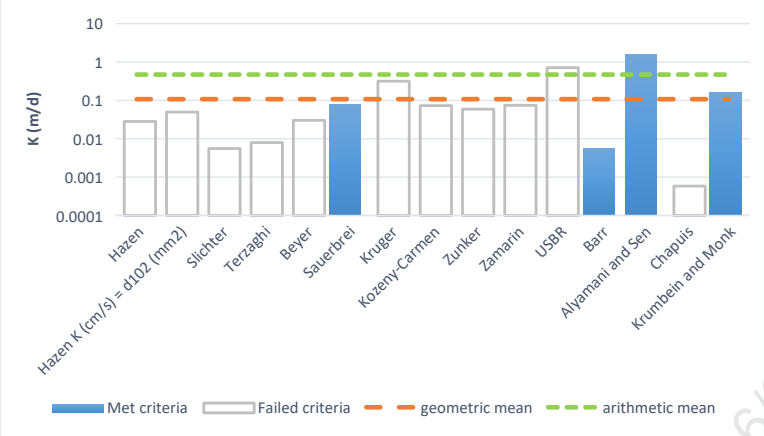
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K from Grain Size Analysis Report Date: 23/01/2020

Sample Name: TP003 (3mbgl)

Mass Sample (g): _____ T (oC) _____

Poorly sorted gravelly sand low in fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.327E-04	.327E-06	0.03
Hazen K (cm/s) = d_{10} (mm)	.574E-04	.574E-06	0.05
Slichter	.643E-05	.643E-07	0.01
Terzaghi	.919E-05	.919E-07	0.01
Beyer	.349E-04	.349E-06	0.03
Sauerbrei	.935E-04	.935E-06	0.08
Kruger	.366E-03	.366E-05	0.32
Kozeny-Carmen	.847E-04	.847E-06	0.07
Zunker	.685E-04	.685E-06	0.06
Zamarin	.860E-04	.860E-06	0.07
USBR	.826E-03	.826E-05	0.71
Barr	.690E-05	.690E-07	0.01
Alyamani and Sen	.188E-02	.188E-04	1.63
Chapuis	.674E-06	.674E-08	0.00
Krumbein and Monk	.198E-03	.198E-05	0.17
geometric mean	.125E-03	.125E-05	0.11
arithmetic mean	.545E-03	.545E-05	0.47

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Appendix I

Preliminary Ground Investigation Rationale

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ARUP

ID Manchester: Surveys

Preliminary Ground Investigation Rationale

UNMC-ARUP-ZZ-XX-RP-CG-0002

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ARUP

1. Introduction

Arup has been appointed to design a ground investigation based on the findings of earlier desk study and constraints mapping work for the ID Manchester plot.

Appointment

- Ove Arup & Partners Ltd (Arup) has previously provided support to the University of Manchester (UoM) relating to geotechnical and geoenvironmental constraints identification. This work was undertaken to support masterplan optioneering and developing a cost plan for the proposed ID Manchester development. This work is summarised in the following reports, drawings and registers:
  - UNMC-ARUP-ZZ-XX-RP-CG-0001 Ground Conditions Desk Study
  - UMNC-ARUP-ZZ-XX-DR-CG-0001 Contamination Constraints
  - UMNC-ARUP-ZZ-XX-DR-CG-0002 Geotechnical Constraints
  - UMNC-ARUP-ZZ-XX-DR-CG-0003 Contamination Potential
  - UMNC-ARUP-ZZ-XX-DR-CG-0004 Indicative Rockhead and Foundations Plan
  - UMNC-ARUP-ZZ-XX-SH-CG-0018 Ground Conditions Constraints Tracker
- Arup has been appointed by UoM to design a ground investigation to provide data to increase confidence on the level of risk associated with abnormal ground conditions and site features identified during the desk study and constraint mapping work.

Scope

- Arup has recommended a preliminary ground investigation with a focus on collecting data for those constraints that are likely to have the biggest impact on ground related costs. This includes collecting data on:
  - the depth to rock in particular near to the BT tunnel;
  - the infill within the former River Medlock;
  - contamination within the plots of the former oil works and chemical works;
  - the material behind the Altrincham Road retaining wall; and
  - soakaway tests to help with drainage assessment.
- The ground investigation design presented within this document is based upon this scope.
- In addition to this rationale report Arup has been appointed to prepare a drawing showing the proposed ground investigation positions, a schedule outlining in more detail the purpose of individual exploratory holes and provide a budget for the ground investigation based on this.
- The ground investigation design has focussed on the area shown shaded in blue in Figure 1.
- Further ground investigation will be required in the future for detailed design and to discharge planning conditions.

Limitations

- This report was prepared by Arup on behalf of the University of Manchester in connection with the ID Manchester site. It takes into account our Client's particular instructions and requirements and addresses their priorities at the time.
- All reasonable skill, care and diligence have been exercised within the timescale available and in accordance with the technical requirements of the brief.



Figure 1: Wider ID Manchester Site and area of preliminary ground investigation (blue)

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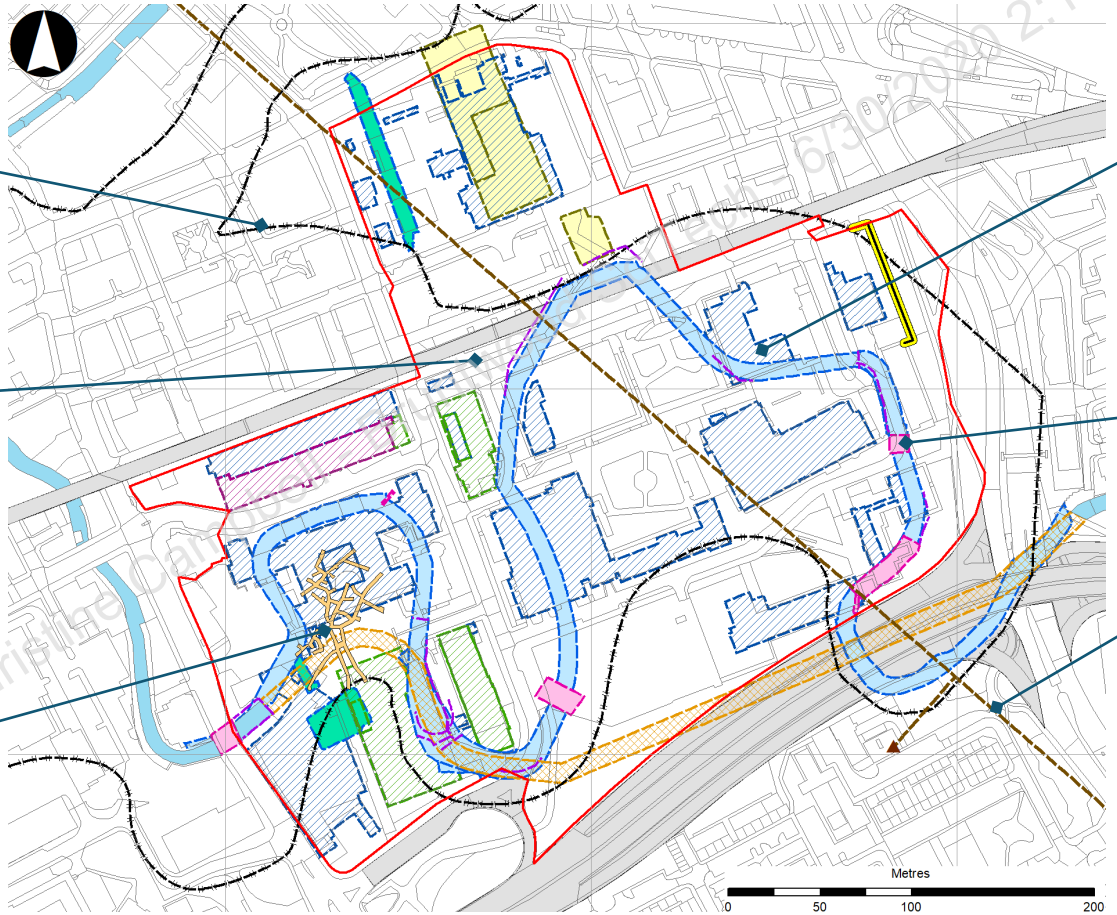
2. Summary of geotechnical and geoenvironmental constraints (wider ID site)

The site was once within a valley of the Medlock and with a varied development history dating back to the 18th Century. There is potential for soft ground, physical constraints as well as restrictions on construction around the BT tunnel.

The site is within a former valley/ basin of the River Medlock and there is a potential for soft alluvium deposits and past infill to raise site levels

Retaining wall along Altrincham Road is old and the construction and nature of retained materials is unknown

Former UMIST tunnels are located within the site but are reported to have been grouted (outside current site area)



Much of the site was formerly industrial prior to development of the university campus

Physical constraints associated with the former River Medlock may remain in the ground and there is possibility of soft ground or voids within the backfill.

The BT or Guardian Tunnel passes NW to SE through the centre of the site and has certain restrictions on development

Figure 2: Summary of geotechnical constraints (refer to Drawing UMNC-ARUP-ZZ-XX-DR-CG-0002)

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2. Summary of geotechnical and geoenvironmental constraints (wider ID site)

There is a moderate contamination potential in former industrial land and areas of backfill across much of the site with certain areas of greater contamination risk such as the former chemical and oil works

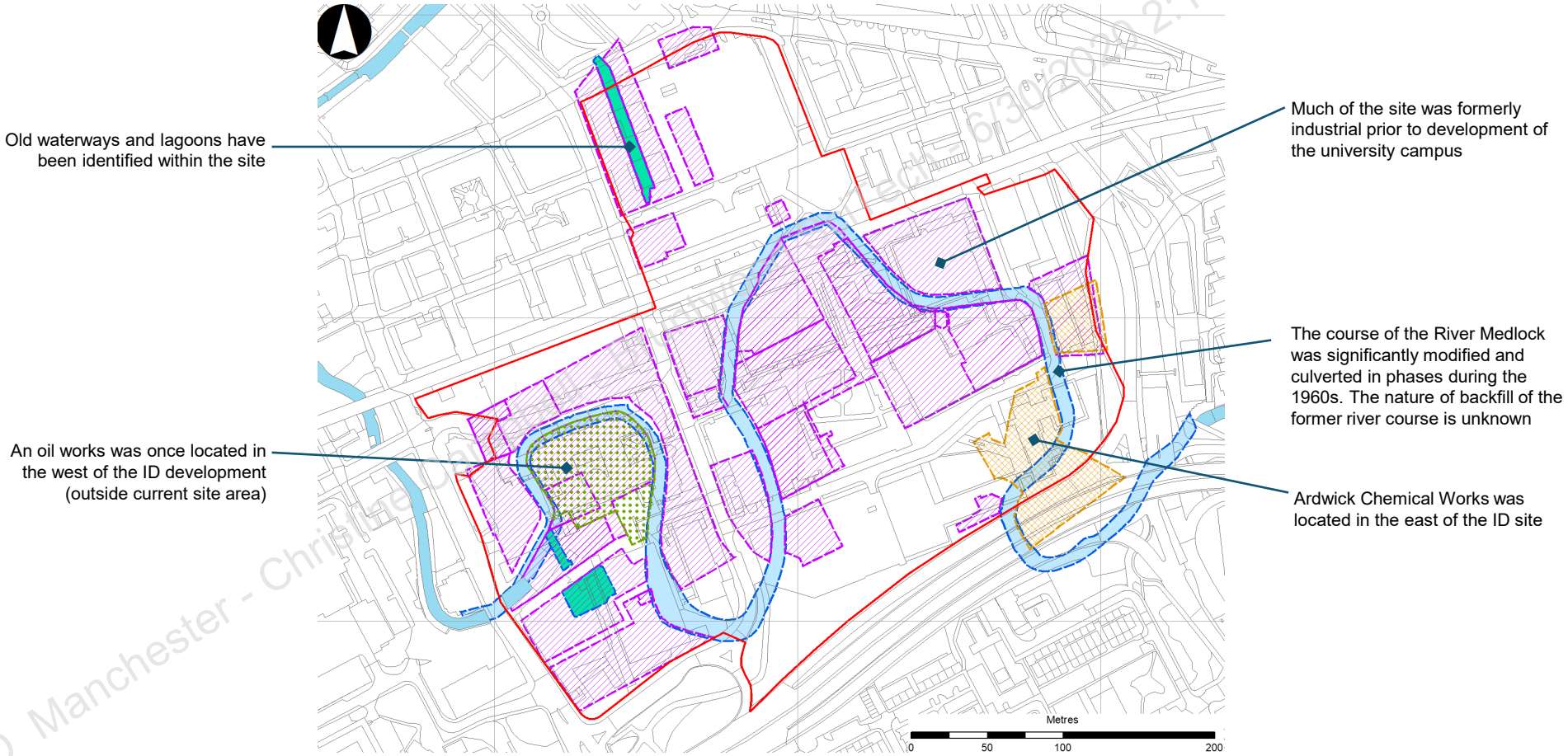


Figure 3: Summary of geoenvironmental constraints (refer to Drawing UMNC-ARUP-ZZ-XX-DR-CG-0001)

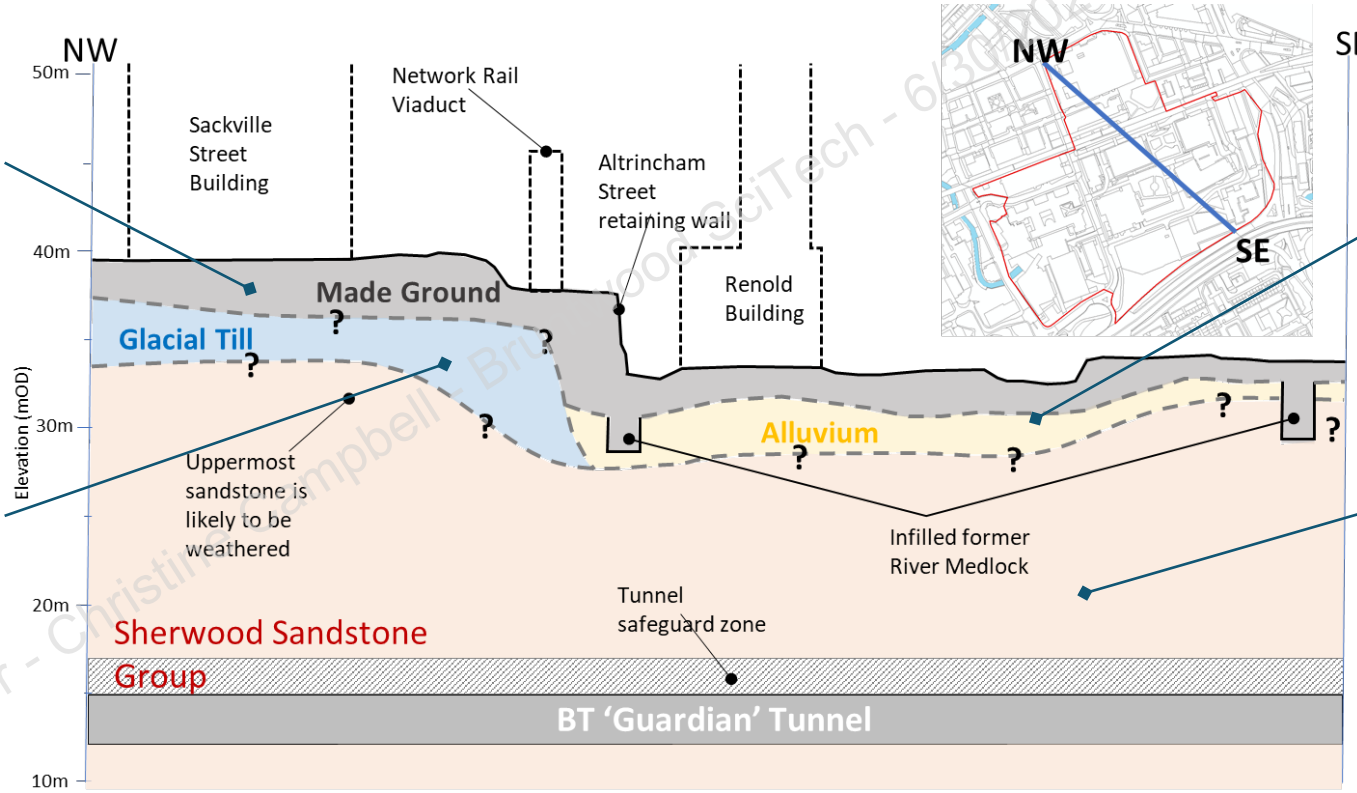
ID Manchester - Christine Darlington (christine.darlington@arup.com) - Edit - 6/30/2022 2:14:30 PM - 81.154.240.72

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3. Preliminary ground model

The ground conditions are expected to be highly variable due to the nature of the glacial and fluvial processes which formed the landscape and more recent modification by industrial development and university campus.



Made ground

Thickness range from 0.5 – 9.9m (but is typically 1 – 4m thick)

Likely infills the former River Medlock

Glacial till

Historical records indicate thickness range from 2 to 5m (typically 3 – 4m)

Unknown boundary with sandstone bedrock

Absent in the south of the site

Unknown interface with the Altrincham Street retaining wall

Alluvium

Thickness range from 1 to 2m (typically 1 – 1.5m)

Unknown boundary with sandstone bedrock

Located in the central/south of the site, in relation to the River Medlock

Sherwood Sandstone Group

Depths ranging from 2 to 9mbgl, with a weathered surface.

Rockhead drawing is available, dated 1968 but uncertainty remains in the in the accuracy of the survey

Figure 4: Summary of preliminary ground model

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4. Ground investigation design

Arup has designed a ground investigation focussing on higher risk constraints and abnormal ground conditions to provide early information to support ground related cost estimates and decision making.

Summary

- Arup has designed a ground investigation to investigate higher risk geotechnical constraints and abnormal ground conditions identified through desk based analysis (see earlier slides). Further detail on the main focus of the ground investigation is presented in the following slides and a summary of the scope presented in Figure 5 and described in the next section.

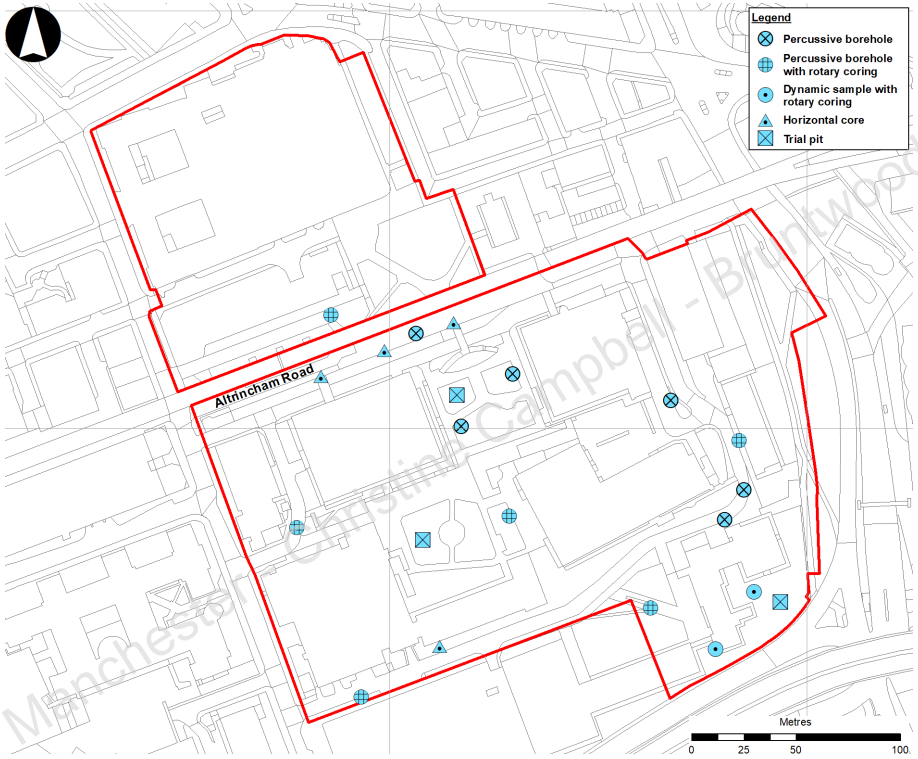


Figure 5: Ground investigation targeting rockhead (shown in blue)

- Investigation to the north of Altrincham Road is not recommended at this stage. This is because the current development proposals involve refurbishing existing structures and some external works in that area. Ground investigation will be required in this area in the future to inform external works design but is considered inappropriate at this stage.

Ground investigation scope

- 6 no. cable percussive boreholes to 10m depth
- 5 no. cable percussive borehole followed by rotary coring for 6m into sandstone bedrock
- 2 no. dynamic sample holes to 10m depth in areas with restricted access, with rotary coring in bedrock
- 3 no. trial pits to a maximum depth of 3m
- 4 no. horizontal cores in retaining walls
- Groundwater monitoring wells installed in 7 no. boreholes
- Ground gas monitoring installations in 5 no. boreholes
- Soakaway testing in the three trial pits and in situ soil/ rock density testing in boreholes
- Collection of samples for geotechnical laboratory testing (see below)
- Collection of geoenvironmental samples for laboratory for contaminants expected based on the land use (see below)
- Collection of groundwater samples and testing for contaminants expected based on the former land use (see below)
- 4 rounds of monitoring to measure groundwater levels and ground gases

Geotechnical laboratory testing (for basic classification testing)

- **Soils:** Moisture content, Atterberg limits, particle size distribution (PSD), chemical aggressivity testing (for concrete)
- **Rock:** Point load, uniaxial compressive stress (UCS), chemical aggressivity testing

Geoenvironmental laboratory testing (for initial risk assessment)

- **Soils:** Asbestos, heavy metals, polycyclic aromatic hydrocarbons (PAH), benzene, toluene, ethylbenzene, xylenes (BTEX), banded total petroleum hydrocarbons (TPH CWG) and volatile as well as semi volatile organic compounds (VOC and SVOC) in selected locations.
- **Groundwater:** Asbestos, heavy metals, inorganics, PAH, BTEX, TPH CWG as well as VOC and SVOC in selected locations.

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4. Ground investigation design

The investigation will provide data on the depth to sandstone which will be important for foundation design, especially nearby to the BT tunnel. The former course of the Medlock will be targeted to better understand this constraint.

Rockhead

- Arup has recommended thirteen boreholes to provide data on the depth to rockhead and collect data on the rock properties to inform later design. This includes five boreholes within close(>3m) proximity (but >3m) to the BT/ Guardian tunnel where the depth to rockhead has a greater importance in understanding foundation and building load configurations. It is proposed to utilise cable percussive techniques where access allows followed by rotary coring. In areas of limited access dynamic sampling is proposed to advance to rockhead before switching to rotary drilling.

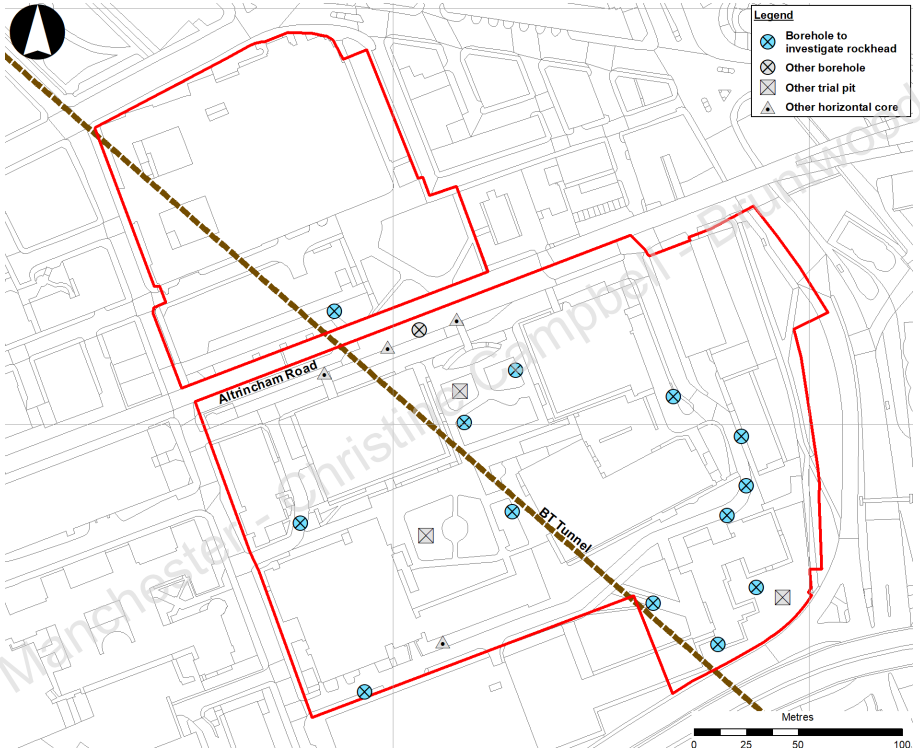


Figure 6: Ground investigation targeting rockhead (shown in blue)

Former River Medlock

- The River Medlock was infilled in stages in the 1960s. The nature of the backfill is unknown. Ground investigation is recommended to provide data on the geotechnical composition of the infill which may contain poorly compacted materials, voids. These boreholes will also provide data on the geo-environmental properties of the river infill to inform risk assessment and waste disposal options should this material need to be removed from site.

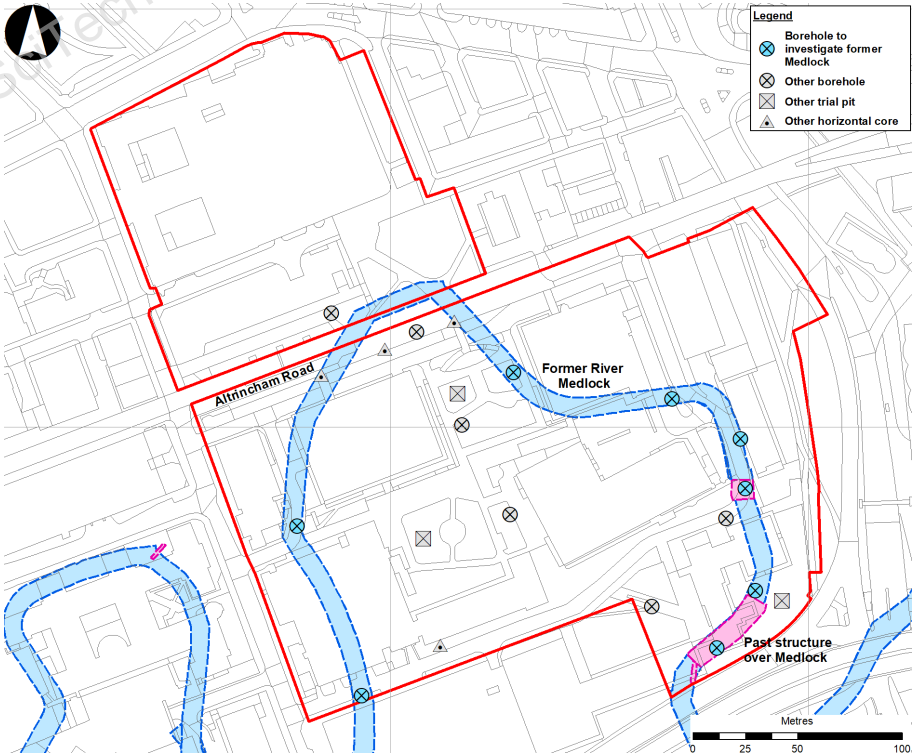


Figure 7: Ground investigation targeting the former River Medlock (shown in blue)

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4. Ground investigation design

Part of the site was a chemical works and may require specialist remediation, the investigation will provide data to assess this. The investigation will provide data on the construction and condition of retaining walls on site.

Abnormal contamination

- Much of the site was formerly industrial and although the activities may have resulted in contamination of the soil and groundwater this is expected to be typical of an urban area. However, an area in the southeast of the site was once occupied by Ardwick Chemical works and there is possibly a higher risk of contamination in that area that may require specialist remediation. Ground investigation is recommended to provide data on the levels of contamination in the soil and groundwater to inform risk assessment and remediation options in that area.

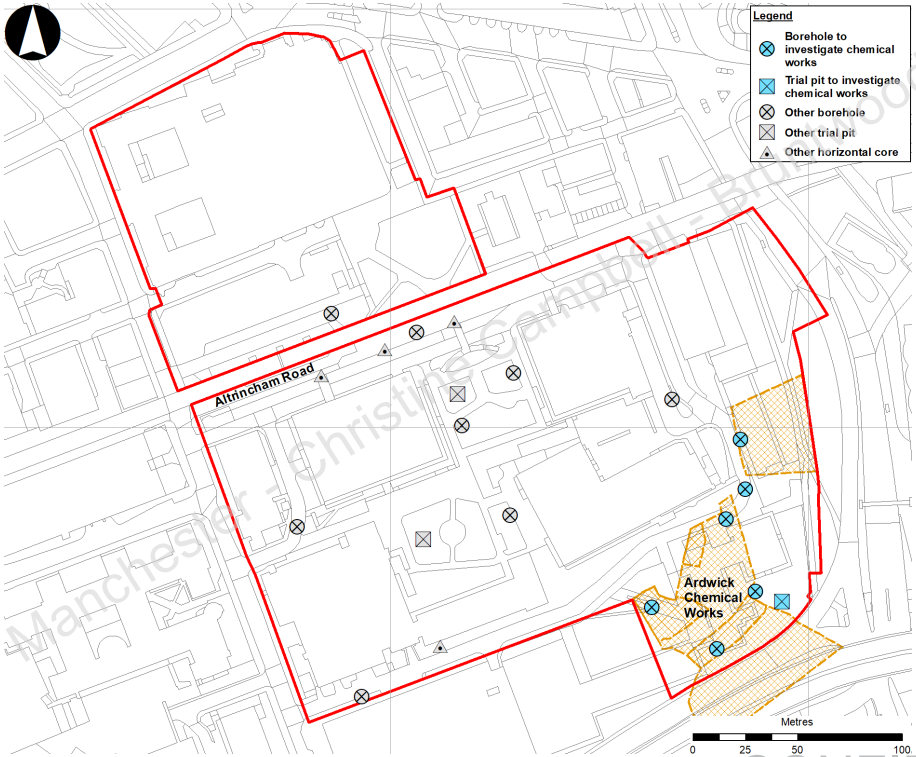


Figure 8: Ground investigation targeting abnormal contamination (blue)

Altrincham Road and other retaining walls

- Ground levels to the south of Altrincham Road undulate. At low points Altrincham Road is situated on a retaining wall that was constructed prior to 1849. The material being retained and the construction/ design of the wall is unknown. Arup recommends undertaking three horizontal cores through the retaining wall to provide data on the wall thickness and wall material. In addition to a borehole north of the retaining wall to collect data on the soil being retained.
- Arup also recommends investigating the construction build-up of, and soil behind, a retaining wall for the ramp to the basement of the Pariser building.

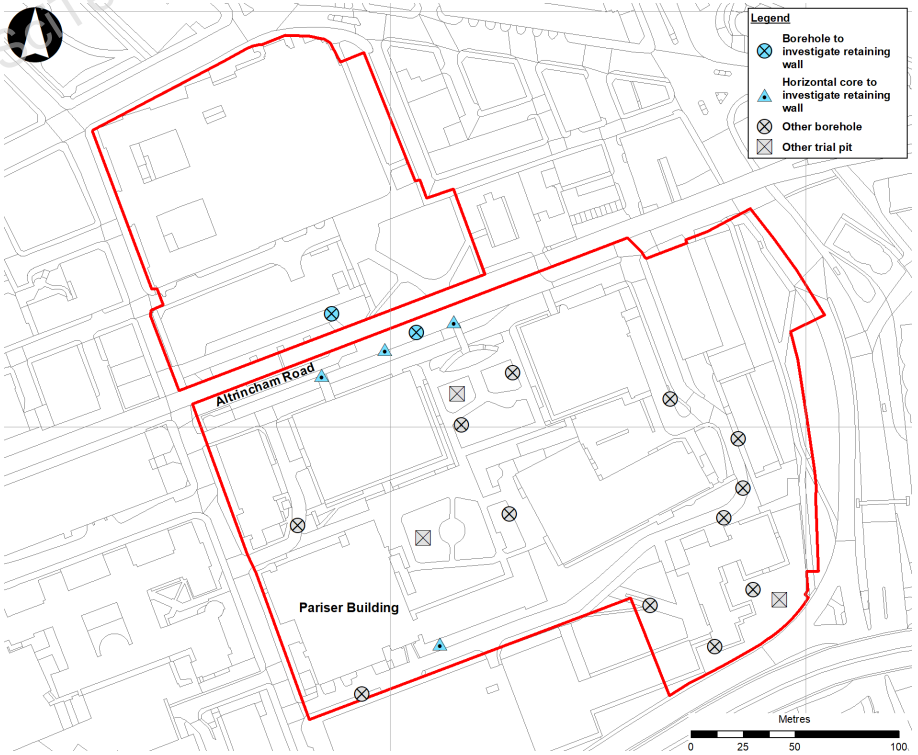


Figure 9: Ground investigation targeting retaining walls (blue)

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4. Ground investigation design

The investigation will include monitoring of groundwater levels and ground gas to inform structural and earthworks design and soakaways to assess the potential for infiltration drainage.

Infiltration drainage

- Infiltration drainage may be possible in certain areas of the site, where low permeability glacial deposits have been eroded and replaced by more permeable alluvium. Arup recommends soakaway testing is undertaken in selected locations to provide data on infiltration rates to support drainage options assessment and costs. Current costs are based on an assumption that infiltration drainage will not be possible and drainage will require a new outfall to the River Medlock culvert.

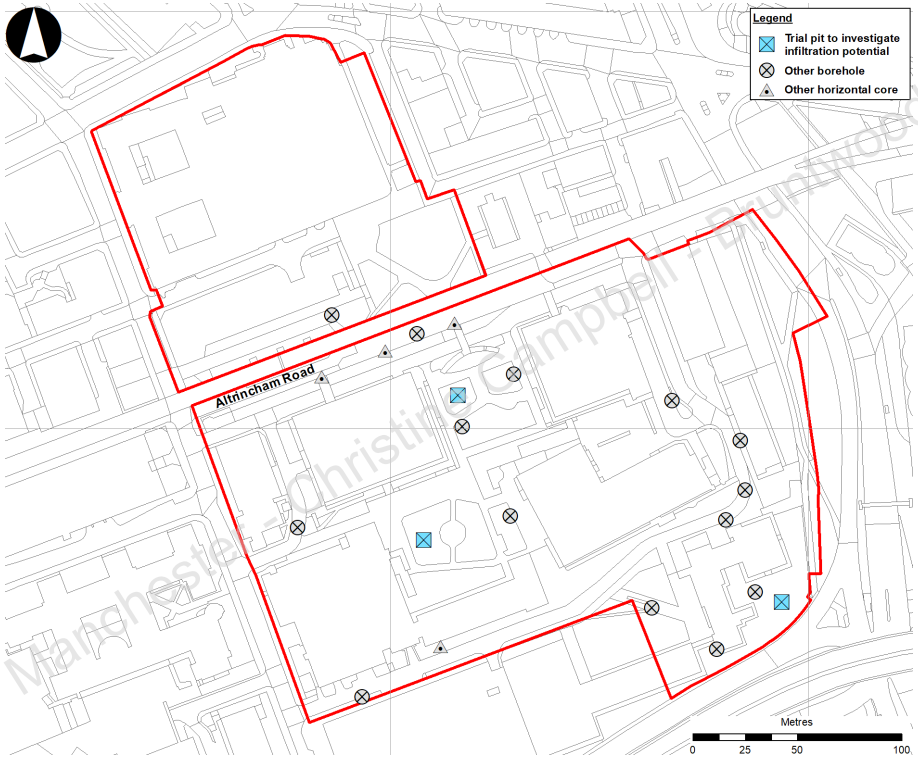


Figure 10: Locations proposed for soakaway testing (blue)

Monitoring

- Groundwater levels and ground gas monitoring is recommended to provide initial data to understand ground gas protection and provide data for, earthworks, pile design and groundwater flow direction and groundwater contaminant transport directions.

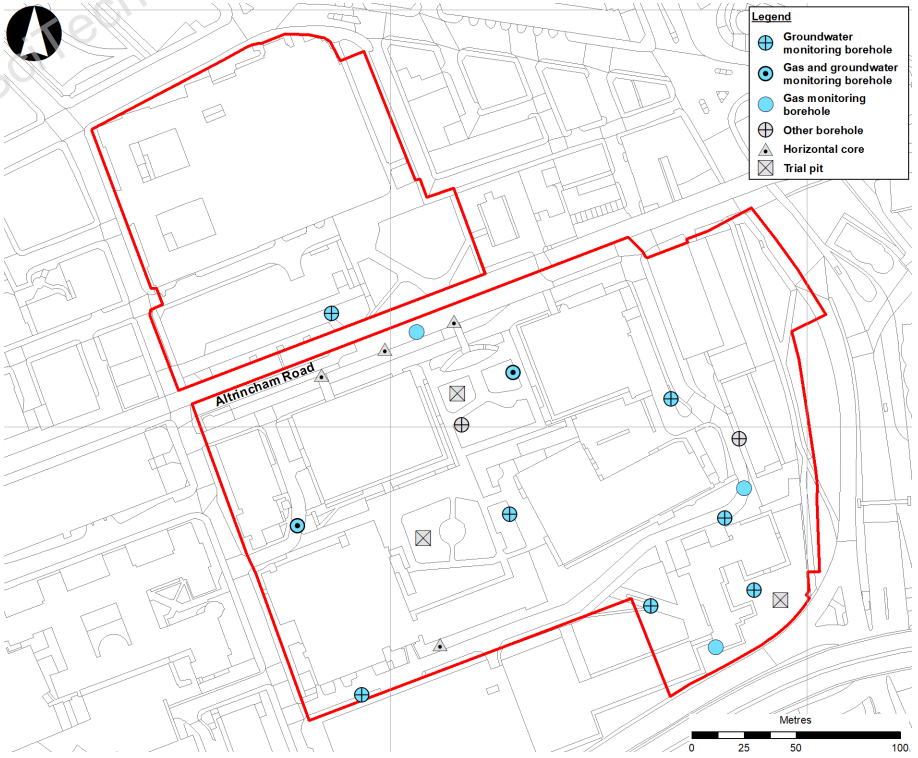


Figure 11: Indicative monitoring locations (blue)

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5. Ground investigation constraints

Constraints have been identified at the site which may have an impact on the scope, programme and cost of the ground investigation

Access

- Arup has undertaken a site walkover as part of the ground investigation scoping to identify locations where ground investigation plant can access the site without the need to create accessways or obtain permissions from third parties. Much of the site is formed of buildings and Arup considers the costs associated with in-building investigation will outweigh the benefits of the data obtained. Other constrains include narrow passages and gates which may limit access for certain plant and where this is the case investigation methods have been modified.
- Network Rail own the viaduct north of Altrincham Road and Arup has positioned investigation so not to interfere with this structure. However, approvals and a licence from Network Rail may still be required. Arup has made initial queries with Network Rail and are awaiting a response. Contingency options have been identified in the event it is not possible to undertake investigation around the rail viaduct.

UXO

- Manchester was a bomb target during the Second World War and there is evidence of bomb strikes across Manchester. A Preliminary UXO risk assessment obtained during the desk study has identified a medium UXO risk. Arup has undertaken additional risk assessment, following the approach outlined in Ciria C681, to review the outcome of the more generic preliminary assessment. Arup has concluded there is a low risk of encountering UXO on this site. This is largely due to the significant post war development.
- UXO mitigation has therefore been excluded from the ground investigation scope at this time. However, Arup recommends that UoM undertake a Detailed UXO risk assessment for the site to confirm the level of risk.

Ecology

- Arup is unaware of any ecological studies for the ID site and has assumed that there are no specific ecology requirements for the preliminary ground investigation. However, we have made an allowance under the contract for an ecology survey to confirm this.

Archaeology

- Industrial archaeology is becoming of increasing interest and given the history of this site, dating back to the mid to late 18th Century it is possible that the ground investigation may require the oversite of an archaeologist. The scope excludes this.

Utilities

- Arup has used available service and utility records provided by UoM to position investigation locations to avoid clashes with known utilities. Additional mitigation will be implemented during the fieldwork and will include hand dug inspection pits (to 1.2m below ground level) and CAT scanning prior to commencing any intrusive works.

Traffic and pedestrian management

- Traffic and pedestrian management is likely to be required to minimise health and safety risks to students, staff and other users of the site during the fieldwork.

Reinstatement

- Arup has chosen investigation locations to reduce the surface disruption and therefore reduce reinstatement costs. Boreholes have been positioned in areas of hard surfacing and trial pits in areas of soft landscaping. Arup has assumed that excavations in landscaping areas can be carefully backfilled and do not require replacement turf.

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7. Document verification

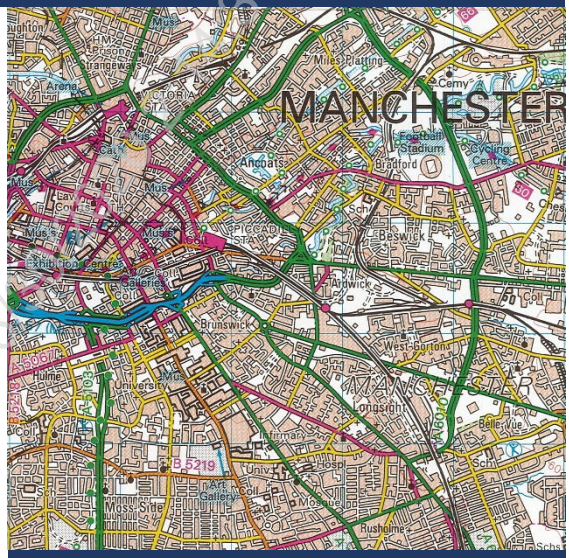
Job title		ID Manchester			**Job number** 265190-00
Document title		Preliminary Ground Investigation Rationale			**File reference** 4-05-11.3
Document ref		UNMC-ARUP-ZZ-XX-RP-CG-0002			
Revision	**Date**	**Filename**	UoM_North_Campus_GI_Rationale ISSUE.pptx		
ISSUE	20/08/19	**Description**	Issue for comment		
			Prepared by	Checked by	Approved by
		Name	Mark Griffiths	Carl Lowe	Michael Wilton
		Signature	[redacted]		
		Filename			
		Description			
			Prepared by	Checked by	Approved by
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ID MANCHESTER PRELIMINARY GROUND INVESTIGATION



Final Factual Report (Rev.00)

Contract Number: NW1588
Client: University of Manchester
Consulting Engineer: Arup

Date: April 2020

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ALLIED EXPLORATION & GEOTECHNICS LIMITED

REPORT CONTROL SHEET

Contract Details

Contract Title	**ID Manchester Preliminary Ground Investigation**
Contract Number	NW1588
Location	**Manchester**
National Grid Reference	SJ 843 975

Report Details

Report Status	Final (Rev.00)		
Report Type	**Factual**		
Volume Number	**1**	**of**	**1**
Copy Number	**PDF**	**of**	**PDF**
Report Recipient	Mark Griffiths	Arup	

Client/Consultant Engineer Details

Client	Consultant Engineer
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Signed & Approved
On Behalf of Allied Exploration & Geotechnics Limited

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Technical Manager **Kerry Wade** BSc (Hons), MSc, FGS, MCMI	**Approved:** [redacted]	**Date:** 16/04/2020
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ID MANCHESTER PRELIMINARY GROUND INVESTIGATION

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FIELD DATA ENCLOSURES:

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Exploratory Hole Location Plan 1
Borehole Records 2
Dynamic Sample Hole Records 3
Concrete Core Records 4
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Groundwater Monitoring Results 6
Gas Monitoring Results 7

***IN-SITU* TESTING ENCLOSURES:**

Test Report Certificate 0
Standard Penetration Test Results 1
In-situ Water Quality Parameter Testing 2

LABORATORY ENCLOSURES:

Laboratory Report Certificate 0
Sample Description Sheets 1
Moisture Content/Plasticity Index and Moisture Content 2
Particle Size Distribution Sieving and Sedimentation 3
Determination of Total Sulphur, Sulphate and pH (Tested Externally) 4
Determination of Dry Density/Moisture Content Relationship 5
Determination of One Dimensional Consolidation Properties 6
Consolidated Undrained Shear Strength in Triaxial Cell with Measurement of Pore Pressure 7
Moisture Content of Rock 8
Determination of Point Load Index (Some Tested Externally) 9
Determination of Unconfined Compressive Strength (Tested Externally) 10

APPENDICES:

Specialist Chemical Testing (Tested Externally) Appendix I

Abbreviation	Definition
CC	Concrete Coring
CP	Cable Percussion
DS	Dynamic Sampling
RC	Rotary Coring
RO	Rotary Openhole

Text Abbreviations

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1. INTRODUCTION

It is proposed to redevelop an area of land approximately 0.5km to the west of Manchester Picadilly Train Station. The works were commissioned in order to determine to ground and groundwater conditions on site to aid the design of the proposed works,

Allied Exploration & Geotechnics Limited (AEG) were contracted by the University of Manchester with Arup acting in the capacity of Consulting Engineer to perform a ground investigation at this site in order to provide information on the subsurface ground and groundwater conditions as well as to obtain samples for geotechnical and specialist chemical testing.

1.1 Scope of Works

The investigation works consisted of the following main elements:

- Seventeen cable percussion boreholes, six of which were further advanced using rotary coring techniques.
- Two dynamic sampling holes, both of which were continued using rotary openhole/coring techniques.
- Four concrete core holes.
- Three mechanically excavated trial pits.
- Associated sampling.
- *In-situ* Standard Penetration and Water Quality Parameter Testing.
- Installation of gas/groundwater monitoring instrumentation.
- Post site works gas and groundwater monitoring.

Site work was carried out between the 26th October and 1st December 2019 with subsequent post site work monitoring, laboratory testing and reporting thereafter. A factual report only was requested.

The comments and opinions expressed in this report are based on the ground conditions encountered during the site work and on the results of tests carried out in the field and in the laboratory. There may, however, be special conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report.

2. THE SITE

2.1 Location

The National Grid Reference of the approximate centre of the site is SJ 843 975. This can be found on Ordnance Survey 1:50,000 Sheet Number 109 (Manchester, Bolton & Warrington). Part of this sheet is reproduced as Figure 1, the Site Location Plan.

The site is located in Manchester City Centre approximately 0.5km east of Manchester Piccadilly Train Station.

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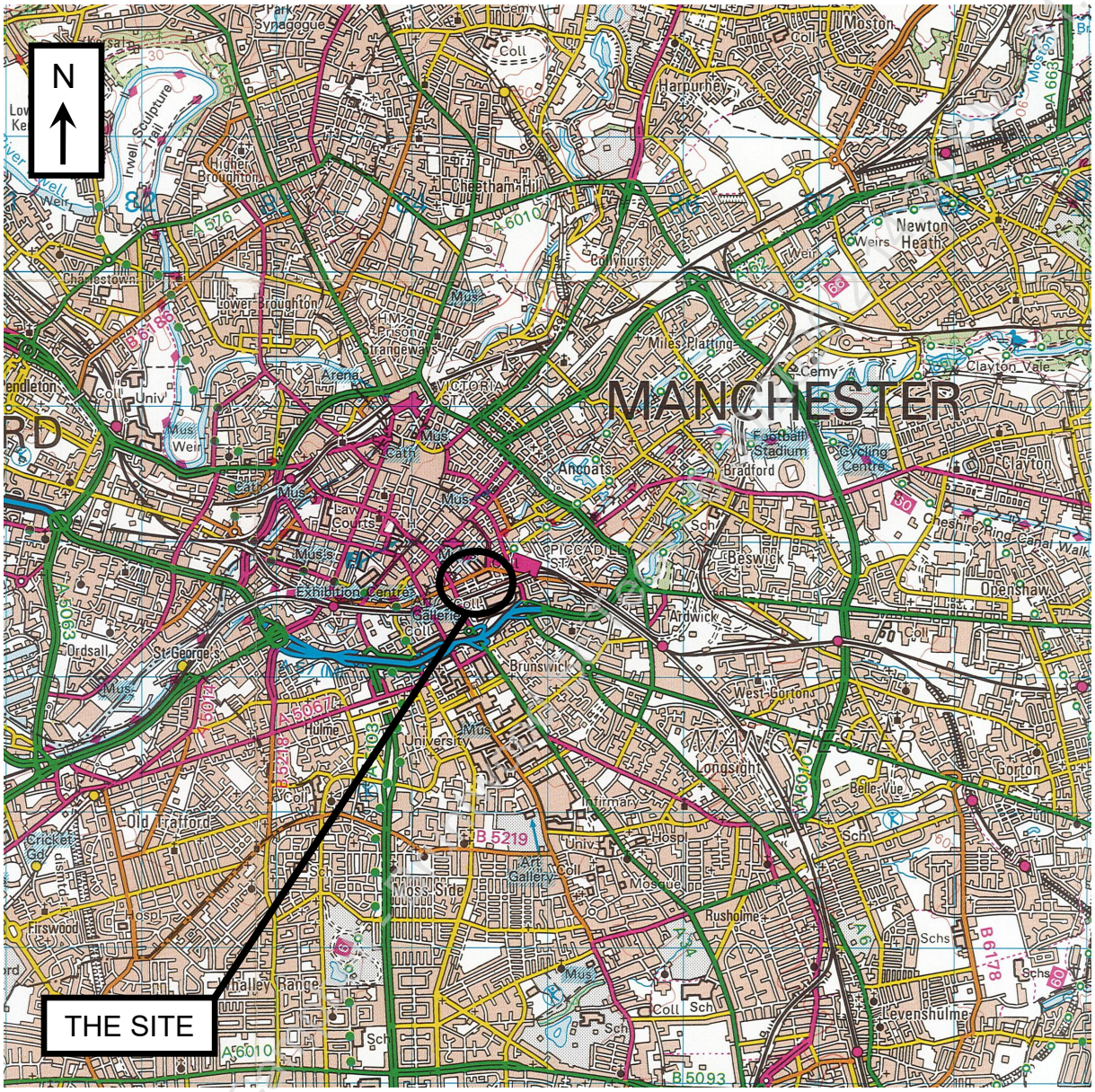


Figure 1: Site Location Plan

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2.2 Site Description and Topography

The site is located approximately 0.5km to the west of Piccadilly Train Station in Manchester and comprises a number of buildings owned by the University of Manchester along with associated landscaping, verges and roads. The site has a varied history of previous land uses including (but not limited to) mills, metal works, engineering works, timber works dye works and chemical works. The site is bound by the railway line to the north, the A57(M) to the south, London Road to the east and Sackville Street to the west.

3. SITE OPERATIONS

3.1 General

All exploratory hole work, associated sampling, *in-situ* testing and logging was carried out in accordance with techniques outlined in Table 1, as appropriate; at positions as near as practicable to those supplied by the Consulting Engineer. These are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.

Reference Code Number	Title
BS 1377:1990	Methods of Test for Soils for Civil Engineering Purposes (where not in contravention or superseded by Eurocode references)
BS 5930:2015	Code of Practice for Ground Investigation (where not in contravention or superseded by Eurocode references)
BS EN ISO 14689-1:2003	Identification and Classification of Rock
BS EN ISO 14688-1:2002 & 14688-2:2004	Identification and Classification of Soil
BS 10175:2011+A2:2017	Investigation of Potentially Contaminated Sites
BS EN ISO 22476-3: 2005	Geotechnical investigation and testing - Field testing - Part 3 Standard Penetration Testing

Table 1: British Standard Reference Code Number

The depths of all exploratory holes, descriptions of the material encountered, details of any groundwater encountered, samples taken and *in-situ* testing carried out together with any other relevant information can be found on the Borehole, Dynamic Sample Hole, Concrete Core Hole and Trial Pit Records, Field Data Enclosures 2, 3, 4 and 5 respectively. A key to all symbols and abbreviations used throughout the report is included in the Key Sheets.

In accordance with the Site Investigation Steering Group publication “Guidelines for the Safe Investigation by Drilling of Landfills and Contaminated Land” the site was classified YELLOW.

The primary purpose of ground investigation exploratory holes is to probe the stratified sequences of soil and/or rock. From the results of these probings no conclusion should be drawn concerning the presence of, size, lithological nature, and numbers per unit volume of ground cobbles and boulders in soil types such as glacial till (boulder clay). With respect to rotary coring, driller’s records and observations of the recovered core are used to determine any zones of no recovery (core loss). These zones are based on the interpretation of the logging engineer and are therefore subjective.

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3.2 Health & Safety Considerations: Services

Before the commencement of any exploratory hole a search for underground services was conducted as prescribed in HSE publication '*Avoiding Underground Services (HSG47)*' and in accordance with in-house internal safety procedure AEG-14.

Service plans were provided by the Client and were consulted prior to using a service locating device (such as a Cable Avoidance Tool or C.A.T.) to scan a working area around the proposed exploratory hole location. Where no services were indicated a '*Permit-to-Work*' form was issued by the investigation supervisor and, with the exception of trial pits, the position was commenced with a hand excavated inspection pit. The inspection pit was also scanned during the excavation procedure. It should be noted that the digging of an inspection pit only confirms or guards against the possible presence of underground public utility services within the excavated pit. Where no services were indicated by the scanning procedure or inspection pit the exploratory hole was commenced in accordance with the Contract Specification.

Where services were located or there was reasonable belief that they were present, the position was relocated in agreement with the Client. Details of any services uncovered/located during this investigation are given in Table 2.

Exploratory Hole Number	Type of Service	Orientation & Depth (size where indicated)	Status (Damaged/Undamaged)	Additional Remarks
BH012A	Ceramic drain (redundant)	047˚ at 1.10m BGL (125mm diameter)	Damaged	None

Table 2: Services Encountered

3.3 Exploratory Holes: Boreholes

Seventeen boreholes were sunk using a Dando 2000 drilling rig, utilising cable percussive (shell and clay cutter) techniques, to depths of between 0.35m (BH012) and 10.80m BGL (BH012A). Six of the boreholes were further advanced using a Comacchio GEO 205 drilling rig, utilising rotary openhole/coring methods, to depths of between 13.00m (BH011) and 21.50m BGL (BH005).

Rotary openhole drilling was performed using various diameter tri-cone rock bits in combination with water flush. Rotary coring employed a GeoBor 'S' wireline system (146mm OD) barrel in combination with an Easycut drill bit together with water/polymer flushing medium. This coring assembly was used to recover 102mm lined cylindrical specimens of rock core.

The Borehole Records are presented along with a Summary Table as Field Data Enclosure 2.

3.4 Exploratory Holes: Dynamic Sample Holes

Two dynamic sample holes were sunk using a Premier Compact 110 Series tracked rig utilising a removable liner system, to depths of 9.30m (DS001) and 9.90m BGL (DS002). The Dynamic Sample Hole Records are presented as Field Data Enclosure 3 and a summary of any relevant remarks are detailed in Table 3.

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Exploratory Hole Number	Drilling Method	Completion Depth (m BGL)	Installation	Remarks
DS001	DS/RO	9.30	Yes – refer to Section 3.9	Advanced to required depth.
DS002	DS/RO/RC	9.90	Yes – refer to Section 3.9	Advanced to required depth.
Any relevant photographs are presented after the applicable Dynamic Sample Hole Record				

Table 3: Dynamic Sample Hole Summary

3.5 Exploratory Holes: Concrete Core Holes

Four concrete core holes were advanced using an Xcalibre Vulcan coring rig to depths of either 0.46m (HC004) or 2.00m BGL (HC001 to HC003 inclusive). The Concrete Core Records are presented as Field Data Enclosure 4 and a summary of any relevant remarks are detailed in Table 4.

Exploratory Hole Number	Drilling Method	Completion Depth (m BGL)	Installation	Remarks
HC001	CC	2.00	No – reinstated	Advanced to required depth.
HC002	CC	2.00	No – reinstated	Advanced to required depth.
HC003	CC	2.00	No – reinstated	Advanced to required depth.
HC004	CC	0.46	No – reinstated	Terminated due to unsuitable material.
Any relevant photographs are presented after the applicable Concrete Core Hole Record				

Table 4: Concrete Core Hole Summary

3.6 Exploratory Holes: Mechanically Excavated Trial Pits

Three trial pits were mechanically excavated using a TB240 excavator to depths of between 2.60m (TP001) and 3.00m BGL (TP003). The Trial Pit Records are presented as Field Data Enclosure 5 and a summary of any relevant remarks are detailed in Table 5.

Exploratory Hole Number	Excavation Method	Completion Depth (m BGL)	Remarks
TP001	Machine Excavated	2.60	Terminated due to side stability. Soakaway test attempted between 1.40-2.60m BGL – unsuitable.
TP002	Machine Excavated	2.80	Advanced to required depth.
TP003	Machine Excavated	3.00	Advanced to required depth.
Any relevant photographs are presented after the applicable Trial Pit Record			

Table 5: Trial Pit Summary

3.7 Samples

Representative samples of soil, concrete core and rock were obtained from the exploratory holes and were taken to the laboratory for selected geotechnical and specialist chemical testing.

Environmental samples were taken in accordance with the contract specification during the investigation using an approved selection of container types in order to suit the encountered material properties and designated laboratory analytical parameters. Full chain of custody procedures were in place post sampling and during the transportation stage to the nominated specialist chemical laboratory. Environmental samples were administered appropriately following the best practice guidance provided in the contract specification.

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3.8 Groundwater

The comments on groundwater conditions are based on the observations made at the time of investigation. It should be noted that groundwater levels may vary due to seasonal and other effects. Furthermore, water was added during advancement of the majority of boreholes in order to facilitate drilling operations. As a consequence there is a possibility that this could have masked the discrete ingress of natural groundwater into the boreholes, which subsequently may have been sealed as a result of progressing the casing.

Distinct groundwater strikes were not encountered in any of the exploratory holes during the site works operation. Standing water levels were recorded in some boreholes and dynamic sample holes at the beginning and/or end of each drilling shift. The water level is indicated on the applicable Borehole and Dynamic Sample Hole Record as part of the boring progress information.

3.9 Instrumentation & Monitoring

Eleven boreholes and both dynamic sample holes were installed with monitoring instrumentation in accordance with the requirements of the Consulting Engineer. Details of the installations are shown in Table 6 and on the relevant Borehole and Dynamic Sample Hole Records.

Exploratory Hole Number	Instrumentation	Installation Depth (m BGL)	Response Zone (m BGL)
BH001	1 No. 50mm diameter slotted standpipe	15.50	10.00-15.50
BH002	2 No. 50mm diameter slotted standpipe	2.50 and 4.00	0.50-3.00 and 3.20-4.00
BH004	1 No. 50mm diameter slotted standpipe	14.00	11.00-14.00
BH004A	1 No. 50mm diameter slotted standpipe	4.00	1.00-4.00
BH005	1 No. 50mm diameter slotted standpipe	21.50	18.50-21.50
BH007	1 No. 50mm diameter slotted standpipe	13.60	10.60-13.60
BH008	1 No. 50mm diameter slotted standpipe	6.50	0.30-6.50
BH009	1 No. 50mm diameter slotted standpipe	1.70	0.50-1.70
BH011	1 No. 50mm diameter slotted standpipe	13.00	6.00-13.00
BH012A	1 No. 50mm diameter slotted standpipe	6.00	2.00-6.00
BH013	1 No. 50mm diameter slotted standpipe	16.50	11.00-16.50
DS001	1 No. 50mm diameter slotted standpipe	4.00	2.00-4.00
DS002	1 No. 50mm diameter slotted standpipe	9.90	8.15-9.90

Table 6: Instrumentation Summary

Instruments were monitored during site works on up to two occasions for groundwater. Post site work gas and groundwater monitoring was undertaken on four occasions at fortnightly intervals after the completion of the site works in accordance with the Contract Specification. A record of the readings is presented as Field Data Enclosure 6 (Groundwater Monitoring Results) and Field Data Enclosure 7 (Gas Monitoring Results).

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In addition during one round of post site works monitoring groundwater samples were obtained from all available instruments using low flow methods. Water Quality Parameters will be recorded for the purged water prior to sampling (see Section 4.3).

3.10 Operative Observations: Potential Contamination

For the purposes of determining the condition of the site, with regard to human health and environmental issues, reference should specifically be made to any specialist chemical testing undertaken as part of the investigation scheme, as well as any supporting desk study and risk assessment documentation. The information given herein collates the observations made by the operatives involved in the investigation only and comments that have been indicated on the engineering records.

Where there was potential evidence of contamination, principally as a consequence of olfactory and visual identification, information is provided in Table 7.

Exploratory Hole Number	Occurrence (*in-situ*/surface/ laboratory sample)	Visual / Olfactory / Laboratory Testing	Depth (m BGL)	Occurrence Type	Additional Remarks
No occurrences recorded during the investigation.					

Table 7: Potential Contamination Encountered

It should be stressed that the information provided herein is subjective, as it is based on the perceptions of individuals and not specialists routinely involved in the chemical determination of contaminated residues, liquors, vapours or solid contaminants.

3.11 Surveying

The investigation positions were surveyed after completion of site works by specialist subcontractor Site Surveying Services. These positions have been subsequently plotted in AutoCAD® software and are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.

4. *IN-SITU* TESTING

4.1 General

In-situ testing as specified by the Consulting Engineer was carried out in selected boreholes and dynamic sample holes in accordance with techniques outlined in the relevant British Standard and/or AEG Quality Procedure. The results are presented in the *In-situ* Testing Enclosures with a number of the test results summarised at the relevant depth on the Borehole and Dynamic Sample Hole Records.

4.2 Standard Penetration Test Results

Standard Penetration Testing (SPT) was carried out in the boreholes and dynamic sample holes in accordance with techniques outlined in BS EN ISO 22476-3: 2005 in order to determine the relative density and consistency of the strata encountered. The 'N' value (number of blows per 300mm penetration) or the

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penetration per blow was recorded for each test. Uncorrected 'N' values or penetration per blow data are provided on the applicable Borehole and Dynamic Sample Hole Records. (Refer to page 6 of the key sheets for further details).

More detailed information concerning the standard penetration testing is given in *In-situ* Testing Enclosure 1 which includes the following;

- Initial exploratory hole conditions prior to the test procedure.
- Calibration and energy ratio (E_m) information for the SPT hammer device used to carry out the test.
- A breakdown of blows for each 75mm penetration interval.
- Rod length (C_R) and energy (C_E) correction ratios.
- Uncorrected 'N' value.
- Corrected 'N_{60}' value that applies the rod (C_R) and energy (C_E) corrections indicated.
- Pertinent remarks corresponding to the test procedure.

In addition to the above, a graph has been prepared for each exploratory hole which plots the uncorrected and corrected 'N' value results against depth. Calibration certificates for the SPT apparatus used during the testing procedure are also presented for reference within this *In-situ* Testing Enclosure.

4.3 *In-situ* Water Quality Parameter Testing

Groundwater samples were obtained from all available installations during one round of post site works monitoring in accordance with techniques outlined in the relevant British Standard and/or AEG Quality Procedure. Water Quality Parameters were recorded for the purged water prior to sampling. The parameters tested were pH, temperature, electrical conductivity, redox potential and dissolved oxygen. The results are presented in tabular format as *In-situ* Testing Enclosure 2.

5. LABORATORY TESTING

5.1 General

Laboratory testing as scheduled by the Consulting Engineer was carried out on selected samples in accordance with techniques outlined in BS 1377:1990, AEG Laboratory Quality Procedures or other appropriate standard as quoted.

5.2 Geotechnical Testing

The results are presented in the Laboratory Enclosures with an outline list of the procedures undertaken given in Table 8.

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Test	Procedure
Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Plasticity Index and Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Particle Size Distribution Sieving	BS 1377 Part 2 1990
Particle Size Distribution Sedimentation	BS 1377 Part 2 1990
Determination of Total Sulphur, Sulphate and pH (Tested externally)	See External Laboratory Certificates
Determination of Dry Density/Moisture Content Relationship	BS 1377 Part 4 1990
Determination of One Dimensional Consolidation Properties	BS 1377 Part 5 1990
Consolidated Undrained Shear Strength in Triaxial Cell with Measurement of Pore Pressure	BS 1377 Part 8 1990
Moisture Content of Rock	ISRM 1981
Determination of Point Load Index (Some Tested Externally)	ISRM 1985
Determination of Unconfined Compressive Strength (Tested Externally)	ISRM 1985

Table 8: Geotechnical Testing

5.3 Specialist Chemical Testing

Selected samples have been submitted for chemical analysis as specified by the Consulting Engineer, conducted under a subcontract arrangement with Derwentside Environmental Testing Services (DETS). The results of this testing are presented as Appendix I.

5.4 Laboratory Identified Asbestos

Selected samples were analysed for asbestos content as specified by the Consulting Engineer. Any identified asbestos is presented in Table 9 which has been summarised from specialist chemical testing results (see Appendix I for further details).

Exploratory Hole Number	Occurrence	Depth (m BGL)	Occurrence Type	Additional Remarks
BH003	Laboratory Sample	1.00	Brown asbestos	Small bundle of Amosite
BH006	Laboratory Sample	1.20	Brown asbestos	Small bundle of Amosite
BH007	Laboratory Sample	3.30	White asbestos	Chrysotile present as microscopic loose fibrous asbestos debris
DS001	Laboratory Sample	0.60	Brown asbestos	Bundle of Amosite

Table 9: Laboratory Identified Asbestos

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Key Sheets

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Key Sheets

INTRODUCTION

The following explanatory notes define the terminologies, abbreviations and symbols pertaining to each individual column or section of the Exploratory Hole records. 'Exploratory Hole' is used as a general term in this report to comprise borehole, drillhole, and trial pit. All exploratory hole records have been produced using ' gINT®', which is an integrated software environment for the storage and manipulation of subsurface data.

The primary purpose of ground investigation exploratory holes is to probe the stratified sequences of soil and/or rock. From the results of these probings no conclusion should be drawn concerning the presence of, size, lithological nature, and numbers per unit volume of ground cobbles and boulders in soil types such as glacial till (boulder clay). With respect to rotary coring, driller's records and observations of the recovered core are used to determine any zones of no recovery (core loss). These zones are based on the interpretation of the logging engineer and are therefore potentially subjective. In addition, where relevant, every effort is made to highlight material/zones that may relate to suspected old workings. However, it should be noted that this is not straightforward (especially without detailed information regarding anticipated subsurface conditions) and therefore no guarantee can be made with regards to the accuracy of the interpretation of the recovered core.

INFORMATION COMMON TO ALL EXPLORATORY HOLE RECORDS

Status Box
The status box in the top right hand corner of each exploratory hole record gives the status of each individual record i.e. PRELIM1, PRELIM2, PRELIM3 FINAL etc. The date shown relates to the last instance the data was revised. This information is for AEG Quality Assurance only.

Exploratory Hole No
The identity number used throughout the report.

Project
The ground investigation project name. Occasionally the project name may be shortened or abbreviated due to string length restraints imposed by the gINT® computer programme.

Client
Client's name responsible for funding the ground investigation project. The Client's name may be shortened or abbreviated due to string length restraints imposed by the gINT® computer programme.

Location
The exploratory hole position given as either national grid co-ordinates, local grid if specified, or a reference name normally pertaining to the area of investigation.

Method (Equipment)
Represents the drilling, excavation or boring method(s) or equipment used.

Ground Level (m(AOD))
The precise ground level in metres above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated.

Date
The date relating to the start of the exploratory hole excavation.

Sheet
The sheet number and total number of sheets for the particular record.

Checked By
Printed signature of the person who has carried out the technical quality check on the log.

Logged By
The name of the engineer who has carried out the logging of the exploratory hole.

Contract No.
The Allied Exploration & Geotechnics Limited reference number for the project.

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INFORMATION RELEVANT TO BOREHOLE AND WINDOW/WINDOWLESS SAMPLE HOLE RECORDS

Sample & Tests Columns

Depth	The depth over which a sample or test is taken is shown in depth column of the exploratory hole record in a "from...to" format.
Type No	Indicates the type of sample/test and number given by the driller.
Test Result	Result of the test given in the applicable units.

Water Column

Water Strike	Level of groundwater strike within an exploratory hole. The symbol 1▼ denotes a water strike and is suffixed with a number, which indicates the strike order. The corresponding unfilled symbol ▽ is the depth the strike rose to.
Seepage	Groundwater seepage within an exploratory hole is denoted by the ≈ symbol.

Strata Columns

Reduced Level	The corresponding reduced level of each soil or rock boundary in metres Ordnance Datum.
Legend	A graphical representation of the materials encountered using BS 5930:1999 Amendment No.2 (Aug 2010) recommended symbols for soil and rock.
Depth (Thickness)	The depth below ground level of each soil or rock boundary in metres and the thickness of each individual stratigraphic unit (given in brackets).
Description	Engineering description of each individual soil or rock type follows recommendations outlined in Section 6 of BS 5930:1999 Amendment No.2 (Aug 2010) with the following implementation:

1 The amendment of section 6 incorporates the guidance indicated in BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003 European Standard with particular emphasis on current UK practice.

2 Supplementary laboratory or in-situ assessed measurements of undrained strength are provided where applicable information is available in parenthesis in accordance with clause 41.3.2 BS 5930:1999 Amendment No.2 (Aug 2010) after the field strength determined consistency. The description based measurement table indicating the quantitative undrained strength classification divisions is provided in Key Sheets Table 1.

Term based on measurement	**Undrained strength classification definition cu, in kPa** (from BS EN ISO 14688-2:2004, 5.3, Table 5)
Extremely low	<10
Very low	10-20
Low	20-40
Medium	40-75
High	75-150
Very High	150-300
Extremely High	300-600

KEY SHEETS TABLE 1

3 Cobble and boulder content is expressed in accordance with the terms provided in EN ISO 14688-2: 2004 where visually identified in trial pit excavations, or inferred/recovered during the drilling operations. The assessment of frequency and spatial occurrence of coarse and very coarse rock material should not be considered as precise, but only an indicator or estimate of the potential conditions. It should be noted that the recovery of coarse or very coarse particles in boreholes is dependent on the limitations imposed by the casing diameter. The terminology used is outlined in Key Sheets Table 2.

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Fraction	Percent by Mass	Term
Boulders	<5	Low boulder content
	5 to 20	Medium boulder content
	>20	High boulder content
Cobbles	<10	Low cobble content
	10 to 20	Medium cobble content
	>20	High cobble content

KEY SHEETS TABLE 2

4 Rock Strength based on assessed field or measured unconfined compressive strength follows the classification scheme given in clause 44.2.1 BS5930:1999 Amendment No.2 (Aug 2010) as outlined in Key Sheets Table 3.

Term for use in field or based on measurement	Definition for field use	Definition on basis of Unconfined Compressive Strength measurement (MPa)	*Old Classification of rock strength: Terminology (Strength Range MPa)*	*Old Classification of rock strength: Determination Method*
Extremely weak	Can be indented by thumbnail. Gravel sized lumps crush between finger and thumb.	0.6-1.0	*Very Weak (<1.25)*	*Lumps can be crushed between fingers*
Very weak	Crumbles under firm blows with point of geological hammer. Can be peeled by a pocket knife.	1-5	*Weak (1.25 – 5)*	*Lumps can be broken with heavy hand pressure*
Weak	Can be peeled by a pocket knife with difficulty. Shallow indentations made by firm blow with the point of geological hammer.	5-25	*Moderately Weak (5-12.50)*	*This slab can be broken with heavy pressure*
Medium Strong	Cannot be scraped with pocket knife. Can be fractured with a single firm blow of geological hammer.	25-50	*Moderately Strong (12.50-50)*	*Rock can be broken in the hand with a hammer*
Strong	Requires more than one blow of geological hammer to fracture.	50-100	*Strong (50-100)*	*Rock can be broken on a flat surface using a hammer*
Very Strong	Requires many blows of geological hammer to fracture.	100-250	*Very Strong (100-200)*	*Rock chipped by blows with a hammer*
Extremely strong	Can only be chipped with geological hammer.	>250	*Extremely Strong (>200)*	*Rock rings when hit with a hammer*
Based on BS EN ISO 14689-1:2003 4.2.7, Table 5			*BS5930: 1999 – Section 6 (Superseded Version)*	

KEY SHEETS TABLE 3

5 Where 'rock weathering classification' can be applied it is 'Approach 4' which will be used. If any other approach is used the factual text of the report will provide details of the applicable specific approach. (Ref.: Figure 19, p143, BS 5930:1999 Amendment No.2 (Aug 2010)). An outline of the 'Approach 4' rock weathering classification scheme is provided as Key Sheets Table 4.

APPROACH 4 CLASSIFICATION INCORPORATING MATERIAL AND MASS FEATURES		
Class	**Classifier**	**Typical characteristics**
A	Unweathered	Original strength, colour, fracture spacing
B	Partially weathered	Slightly reduced strength, slightly closer fracture spacing, weathering penetrating in from fractures, brown oxidation
C	Distinctly weathered	Further weathered, much closer fracture spacing grey reduction
D	Destructured	Greatly weakened, mottled, ordered lithorelics in matrix becoming weakened and disordered, bedding disturbed.
E	Residual or reworked	Matrix with occasional altered random or 'apparent' lithorelics, bedding destroyed. Classed as reworked when foreign inclusions are present as a result of transportation.

KEY SHEETS TABLE 4

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Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.

Boring Progress and Water Observations Columns

This section provides information on each day's production as a daily log.

Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Casing Dia	Casing's diameter at the start of the shift.
Water Depth	Water level within the borehole at the start and end of shift.

Chiselling Columns

Indicates where hard strata occurred in the borehole and breaking out was carried out to advance the borehole.

From	The depth commenced.
To	The depth finished.
Hours	The time spent for breaking out.

Water Added Columns

Indicates the depth range where water was added to the borehole to facilitate boring or to prevent stress relief disturbance "blowing/boiling" in granular soils.

From	Depth in metres from where water was added.
To	Depth in metres to where water was added.

General Remarks

Any remarks believed to be relevant to the exploratory hole.

INFORMATION RELEVANT TO PIT/TRENCH RECORDS

The pit/trench records follow the same format as the borehole and window/windowless sample hole records for the Samples & Tests, Water and Strata columns. However, in addition to these there are the following:

Plan

A schematic plan view of the pit showing its excavated dimensions together with its orientation, given as a compass bearing to magnetic north.

Groundwater

Notes on water bearing horizons.

Stability

The engineer's comments outlining the stability of the sides during pit excavation.

General Remarks

The engineer's comments of any other information relevant to construction of the pit.

Additional Information

An indication if a sketch and/or photographs accompany the record.

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Underground Services

Depth	Depth service was encountered.
Orientation	Orientation given as a compass bearing to magnetic north.
Type	Type of service encountered.
Diameter	Diameter of service encountered.
Condition	Condition the service encountered was noticed in.

INFORMATION RELEVANT TO DRILLHOLE RECORDS AND ROTARY CONTINUATION

Run Details Columns

Depth	Each drill run is highlighted by a horizontal line with the top and bottom depths shown in metres. Core diameter (C Dia) is presented also within each run.
TCR (SCR) RQD	Information provided on the total core recovery, solid core recovery and rock quality designation. Refer to Abbreviations for further details.
Fracture Index	Information given relating to the fracture index of the rock.

Strata Columns

As the strata columns for borehole and window/windowless sample hole records except for description which is as follows:

Discontinuities Detail	Information on core discontinuities, localised variations in weathering, lithology, strength and structure follows recommendations outlined in Section 6 BS 5930:1999 Amendment No.2 (Aug 2010):Clause 44.
Main	Engineering description of each individual soil or rock type follows recommendations outlined in Section 6 of BS 5930:1999 Amendment No.2 (Aug 2010).

Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.

Drilling Progress and Water Observations Columns

Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Water Strike	Depth at which water was encountered.
Water Standing	Depth at which water in the hole levelled off.
Water Remarks	Any remarks believed to be relevant to the water e.g. Artesian.

Standard Penetration Test

Depth	The depth commenced.
Type	Type of standard penetration test (SPT).
Result	Result of SPT.

Flush

From	The depth commenced.
To	The depth finished.
Type	Details of the type of flush used. A = Air, F = Foam, W = Water and Pol = Polymer.
Returns	An indication of the percentage of the returned flush material.

General Remarks

Any remarks believed to be relevant to the exploratory hole.

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SAMPLES

B	Bulk disturbed sample.
ES	Environmental soil sample.
EW	Environmental water sample.
G	Gas sample.
J	Small disturbed sample.
LB	Large bulk disturbed sample.
P	Piston sample.
P*	An attempted but failed undisturbed piston sample.
U	Undisturbed sample.
U*	An attempted but failed general purpose undisturbed sample.
$U_{(ss)}$	Sample has been subsampled.
$ES_{(U)}$	Brackets following a sample denotes a subsample. The sample information within the brackets is the origin of the subsample.
W	Water sample.

IN-SITU TESTS

CBR	California Bearing Ratio mould sample or test.
HSV	In-situ hand shear vane.
HSV*	An attempted but failed in-situ hand shear vane.
HSV result of e.g 80(20)kPa	Denotes average HSV peak result followed by average HSV residual result (in brackets).
HP	Hand penetrometer test.
K (F)	Falling head permeability test.
K (R)	Rising head permeability test.
K (C)	Constant head permeability test.
K (P)	Packer permeability test.
PT	Pressuremeter test.
PID	Photo ionisation detector test.
FID	Flame ionisation detector test.
S	Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding uncorrected 'N' value is given in the test result column with more detailed information provided in the In-Situ Testing Enclosures where applicable. Testing has been conducted in accordance with BS EN ISO 22476-3: 2005.
C	Denotes SPT test using a solid cone in preference to the split barrel sampler (usually in coarse granular soil) with all other reporting requirements as outlined above for the split barrel sampler.
S/C result of e.g. 1/2.94	Denotes where full penetration has not been achieved during the SPT test. In such cases the penetration (mm) per blow is recorded in the test result column e.g. 1/2.94 is 2.94mm of penetration per single blow.
SV	In-situ down-the-hole shear vane test. The remoulded shear strength is given in brackets.

ROCK QUALITY AND CORE RECOVERY

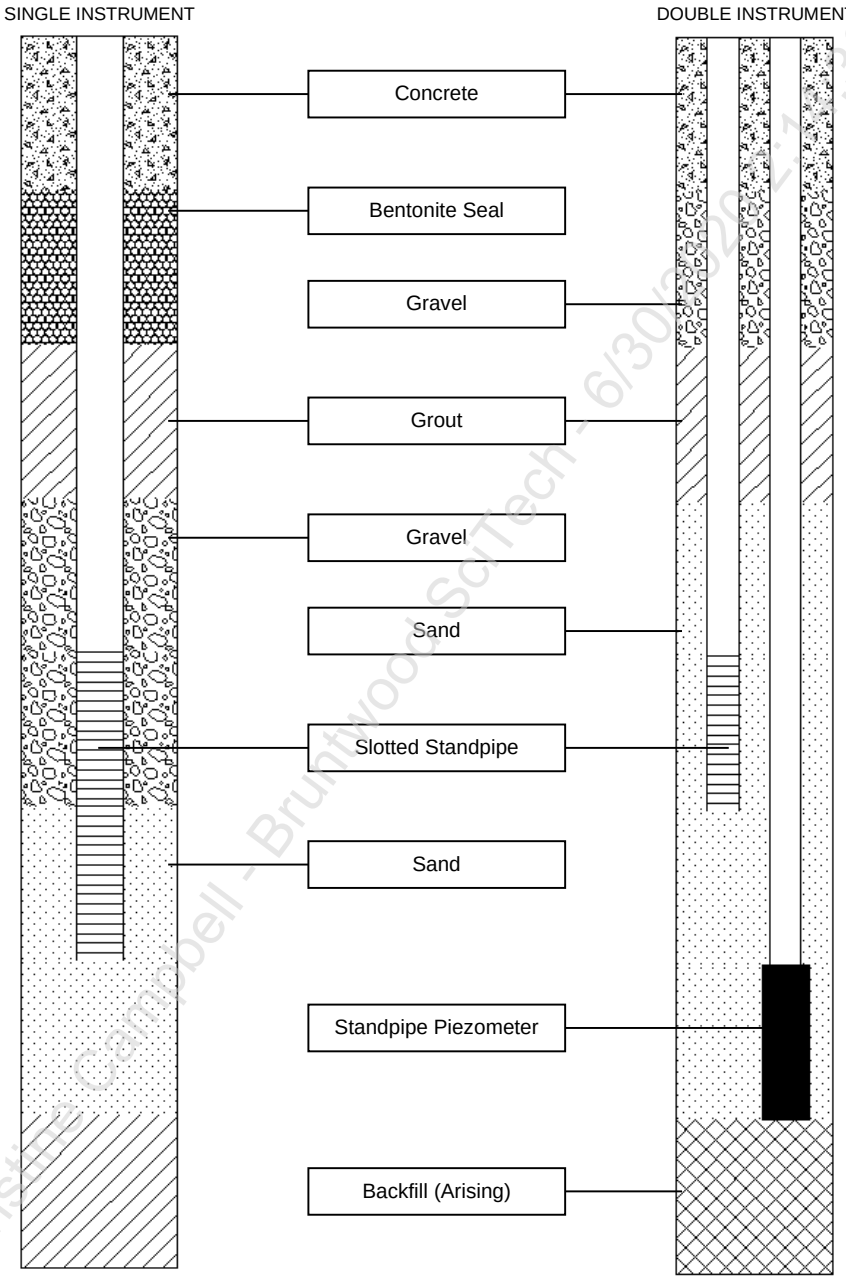
TCR	Total Core Recovery - the length of the recovered core expressed as a percentage of the length of core run.
SCR	Solid Core Recovery - the sum length of all core pieces that are recovered with at least one full diameter, expressed as a percentage of the length of core run.
RQD	Rock Quality Designation - The sum length of all core pieces that are 100mm or longer (measured along the centre of the core), expressed as a percentage of the length of core run.
FI	Fracture Index - The number of fractures per 1000mm length of solid core.
NI	Non-intact - The material recovered in a non-intact state.
NR	No recovery from the core run. These zones are based on the interpretation of the logging engineer and are therefore potentially subjective.

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Symbols and Abbreviations: Explanation of Instrumentation Legends Used



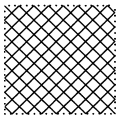
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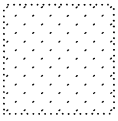
Symbols and Abbreviations: Explanation of Legends Used

Soils	Rocks		
	Sedimentary	*Metamorphic*	*Igneous*

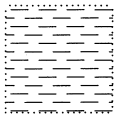

Made Ground


Cobbles and Boulders

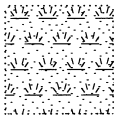

Gravel


Sand


Silt

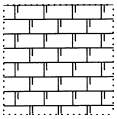

Clay

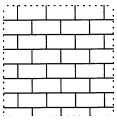

Peat

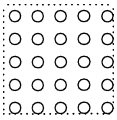

Topsoil

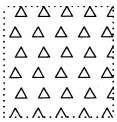
Note: Composite soil types will be signified by combined symbols e.g.

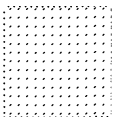

Silty Sand

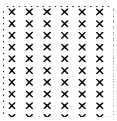

Chalk


Limestone


Conglomerate


Breccia


Sandstone


Siltstone

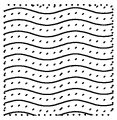

Mudstone

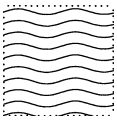

Shale


Coal

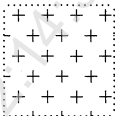

Pyroclastic (Volcanic Ash)

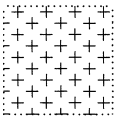

Gypsum


Coarse Grained


Medium Grained


Fine Grained


Coarse Grained


Medium Grained


Fine Grained

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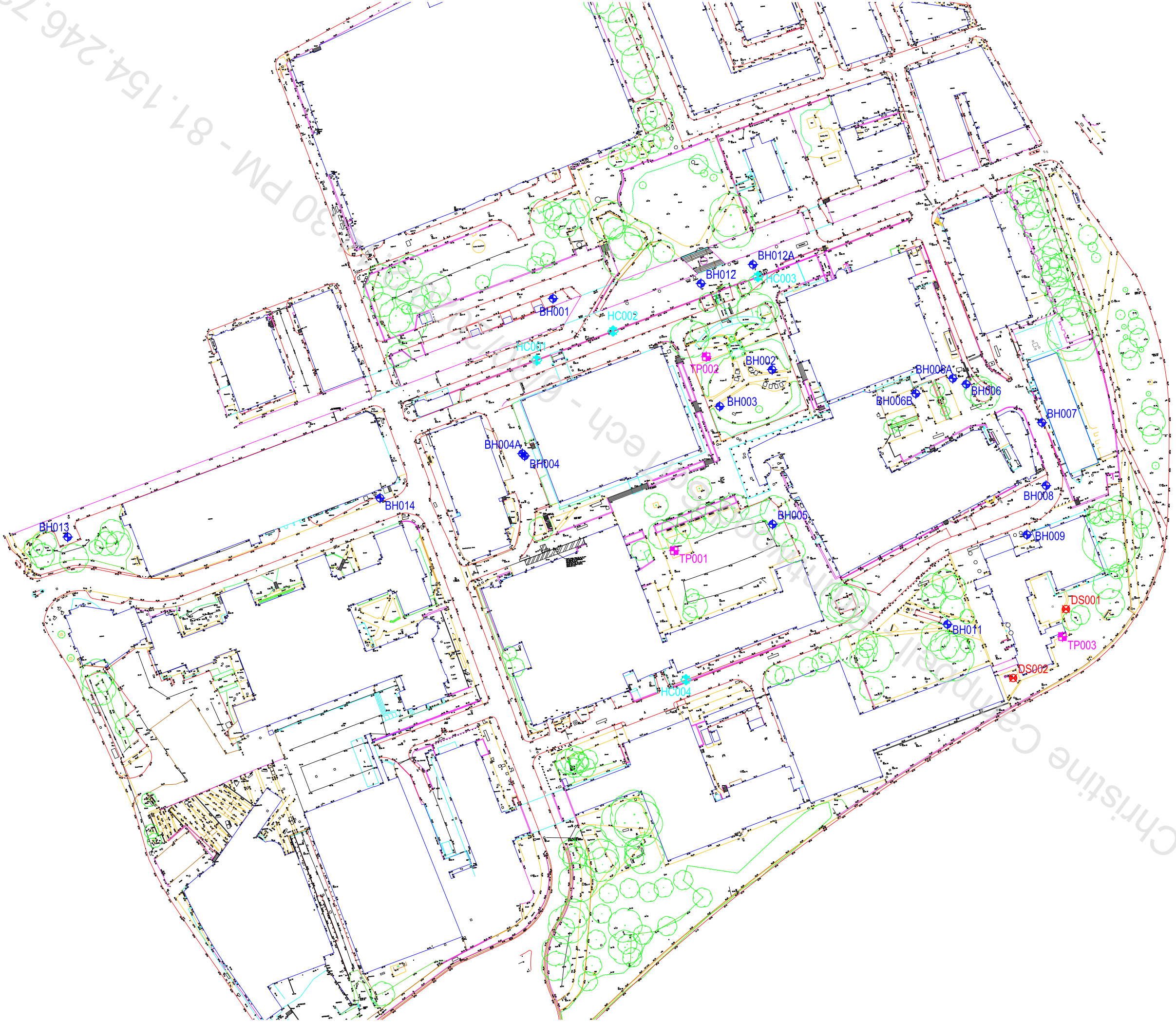
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FIELD DATA ENCLOSURE 1

Exploratory Hole Location Plan

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KEY:

BOREHOLE/DRILLHOLE

DYNAMIC SAMPLE HOLE

TRIAL PIT

CONCRETE CORING

N
W E
S

Base Plan Supplied by Consulting Engineer

Drawing Title:
ENC 01 : Exploratory Hole Location Plan

Drawing No.:
AEG/NW1588/03

Contract Title:
ID Manchester Preliminary Ground Investigation

Client:
University of Manchester

Consultant:
Arup
6th Floor, 3 Piccadilly Place,
Manchester, M1 3BN

Contract No.:
NW1588

Scale:
1:1500 @ A3

Date:
14/04/2020

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FIELD DATA ENCLOSURE 2

Borehole Records

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Borehole Summary Table

Exploratory Hole Number	Drilling Method	Completion Depth (m BGL)	Depth of instrumentation (m BGL)	Instrumentation Response zone (m BGL)	Remarks
BH001	CP/RC	15.50	15.50	10.00-15.50	Advanced to required depth.
BH002	CP	4.00	2.50	0.50-3.00	Terminated due to refusal.
			4.00	3.20-4.00	
BH003	CP	5.40	-	-	Terminated due to refusal.
BH004	CP/RC	14.00	14.00	11.00-14.00	Advanced to required depth.
BH004A	CP	4.00	4.00	1.00-4.00	Advanced to required depth.
BH005	CP/RC	21.50	21.50	18.50-21.50	Advanced to required depth.
BH006	CP	1.60	-	-	Terminated due to obstruction.
BH006A	CP	1.30	-	-	Terminated due to concrete obstruction.
BH006B	CP	0.70	-	-	Terminated due to concrete obstruction.
BH007	CP/RC	13.60	13.60	10.60-13.60	Advanced to required depth.
BH008	CP	6.50	6.50	0.30-6.50	Advanced to required depth.
BH009	CP	4.80	1.70	0.50-1.70	Terminated due to refusal
BH011	CP/RC	13.00	13.00	6.00-13.00	Advanced to required depth.
BH012	CP	0.35	-	-	Terminated due to concrete obstruction.
BH012A	CP	10.80	6.00	2.00-6.00	Advanced to required depth.
BH013	CP/RC	16.50	16.50	11.00-16.50	Advanced to required depth.
BH014	CP	10.50	-	-	Advanced to required depth.

Any relevant photographs are presented after the applicable Borehole Record
CP = Cable Percussion, RO = Rotary Openhole, RC = Rotary Coring, DS = Dynamic Sampling
All installations comprise 50mm diameter slotted standpipes

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810	**Start Date:** 26/10/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				37.71		0.10	MADE GROUND (Macadam).	
0.20	J1			37.41		0.40	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular ad includes sandstone, limestone and brick).	
0.20	ES2							
0.20-0.40	B3							
0.50	J4						MADE GROUND (Soft brown sandy gravelly clay with low cobble content with fragments of pottery, glass and wood. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone and brick. Cobbles are angular and include sandstone and brick).	
0.50	ES5							
0.50-1.00	B6							
1.00	J7							
1.00	ES8							
1.00-1.20	B9							
1.20-1.65	U10	(35)					at c.0.50m BGL ... slightly sandy slightly gravelly clay of intermediate plasticity.	
1.65	J11							
2.00	ES12						at c.2.00m BGL ... clay is of intermediate plasticity.	
2.00-2.45	B14					(3.80)		
2.00-2.45	SJ13	N8						
3.00	ES15						at c.3.00m BGL ... sandy slightly gravelly clay of low plasticity.	
3.00-3.45	B17	(10)						
3.00-3.45	SJ16	N10						
4.00	ES18			33.61		4.20		
4.00-4.45	B20							
4.00	SJ19	50/250mm		33.41		4.40	Soft black brown silty sandy gravelly CLAY with interbeds of silt and fragments of pottery and glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone and coal. (Engineer notes possible remanence of infilled river channel). at c.4.30m BGL ... clay is of intermediate plasticity.	
4.30	ES21							
4.30	J22							
5.00-5.45	B24							
5.00	SJ23	50/100mm				(1.60)	Very dense red clayey slightly gravelly SAND with clay pockets. Sand is fine to coarse. Gravel is fine to medium angular to subangular and includes sandstone. (Possible weathered sandstone).	
5.50	SJ25	50/125mm						
				31.81		6.00	*Boring complete at 6.00m BGL - continued by rotary drilling.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
26/10/2019	0.00	0.00	200	
26/10/2019	1.20	1.00	200	Dry
27/10/2019	1.20	1.00	200	Dry
27/10/2019	3.84	3.84	200	
27/10/2019	6.00	5.80	150	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
4.40 - 5.50	2:30	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00-15.50m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810 / **Start Date:** 26/10/2019	**Sheet:** 1 of 5

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
6.00 (102mm)	0 (0) 0	NR		31.81		6.00	6.00-8.90m ... no recovery.	(1) Red SANDSTONE.	
6.50							6.50m ... J26		
8.00 (102mm)	0 (0) 0					(2.90)			
9.50 (102mm)	40 (33) 7			28.91		8.90			
		NI					8.90-9.00m ... non-intact.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured with inclusions of fine to medium subrounded quartz and quartzite.	
		7					9.00-10.20m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
	60 (47) 30					(1.50)	9.50m ... J27		

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
29/10/2019	6.00	5.80	

Standard Penetration Test		
Depth	Type	Result
9.50	S	60/20mm

Flush		
From - To	Type	Returns (%)
6.00 - 6.50	Water	100
6.50 - 8.00	Water	100
8.00 - 9.50	Water	100
9.50 - 11.00	Water	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00-15.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810	**Start Date:** 26/10/2019	**Sheet:** 2 of 5

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm)		NI					10.20-10.40m ... non-intact.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured with inclusions of fine to medium subrounded quartz and quartzite. *(continued)*	
				27.41		10.40			
		NR					10.40-11.30m ... no recovery.	(1) Red SANDSTONE.	
						(0.90)			
11.00	80 (67) 0			26.51		11.30			
(102mm)		11					11.30-12.30m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth rough open clean discontinuities.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured with inclusions of fine to medium quartz and quartzite.	
		NI					12.30-12.50m ... non-intact.		
12.50	87 (80) 18	NR					12.50m ... J28 12.50-12.70m ... no recovery.		
		NI					12.70-12.80m ... non-intact.		
(102mm)		11					12.80-15.15m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
						(4.20)			
14.00									

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing

Standard Penetration Test		
Depth	Type	Result
12.50	S	27/10mm

Flush		
From - To	Type	Returns (%)
11.00 - 12.50	Water	100
12.50 - 14.00	Water	100
14.00 - 15.50	Water	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00-15.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810	**Start Date:** 26/10/2019	**Sheet:** 3 of 5

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm)	90 (83) 9	NI NR		22.31		15.50	15.15-15.35m ... non-intact. 15.35-15.50m ... no recovery.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured with inclusions of fine to medium quartz and quartzite. *(continued)*	
							15.50m ... J29	*Complete at 15.50m BGL.*	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
29/10/2019	15.50	15.50	0.00	15.50	S	100/30mm				(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) 50mm diameter slotted standpipe installed between 10.00-15.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810	**Start Date:** 26/10/2019	**Sheet:** 4 of 5

Figure BH001.1
BH001 8.00-11.00m BGL



Figure BH001.2
BH001 11.00-12.50m BGL



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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH001
Client: University of Manchester	**Location:** Manchester E:384566.052 N:397646.557		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 37.810	**Start Date:** 26/10/2019	**Sheet:** 5 of 5

Figure BH001.3
BH001 12.50-14.00m BGL



Figure BH001.4
BH001 14.00-15.50m BGL



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH002
Client: University of Manchester	**Location:** Manchester E:384655.294 N:397617.594		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 33.265	**Start Date:** 02/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				33.17		0.10	MADE GROUND (Soft brown sandy clay with many rootlets. Sand is fine to coarse).	
0.10	J1							
0.30	ES2						MADE GROUND (Medium dense brown yellow red black clayey very sandy gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, clinker, wood, glass and brick).	
0.50	B3							
1.00	ES4							
1.20	B5							
1.70-2.20	CB6	N24				(3.60)		
2.40	J7							
2.50	ES8							
2.70-3.20	CB9	50/239mm					at c.2.70m BGL ... very dense/possible obstruction.	
3.40	B10							
3.50	ES11			29.57		3.70		
3.70-4.00	B13						Very dense red clayey gravelly SAND. Sand is fine to coarse. (Possible weathered sandstone).	
3.70-4.00	SJ12	50/21mm		29.27		4.00		
4.00	S14	100/14mm					*Terminated at 4.00m BGL - due to refusal.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
02/11/2019	0.00	0.00	200	
02/11/2019	4.00	4.00	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
3.70 - 4.00	1:00	1.20 - 4.00

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Double installation: Two 50mm diameter slotted standpipe installed betweeen 0.50-3.00m and 3.20-1.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH003
Client: University of Manchester	**Location:** Manchester E:384633.942 N:397602.655		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 33.095	**Start Date:** 02/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.10	J1			32.80		0.30	MADE GROUND (Soft brown sandy clay with many rootlets. Sand is fine to coarse).	
0.30	ES2						MADE GROUND (Medium dense brown yellow red black sandy gravel with fragments of wood and glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, clinker and brick).	
0.50	B3							
1.00	ES4							
1.20	B5							
1.70-2.20	CB6	N29					at c.1.70m BGL ... clayey very gravelly sand with cobbles noted.	
						(4.10)		
2.40	J7							
2.50	ES8							
2.70-3.20	CB9	N15						
3.40	B10							
3.50	ES11							
3.70-4.20	CB12	N37					at c.3.70m BGL ... dense.	
				28.70		4.40		
4.40	J13						Very dense red clayey gravelly SAND. Sand is fine to coarse. Gravel is fine to medium angular and includes sandstone. (Possible weathered sandstone).	
4.50	ES14							
4.70-5.20	B16							
4.70-5.20	SJ15	51/182mm				(1.00)		
5.20	SJ17	50/29mm		27.70		5.40		
5.40	S18	100/22mm					*Terminated at 5.40m BGL - due to refusal.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
02/11/2019	0.00	0.00	200	
02/11/2019	5.40	5.40	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
5.20 - 5.40	1:00	1.20 - 4.40

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH004
Client: University of Manchester	**Location:** Manchester E:384554.516 N:397582.476	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.223 / **Start Date:** 02/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				34.12		0.10	MADE GROUND (Macadam).	
				33.92		0.30	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone).	
0.30	ES1							
0.30-0.65	B2							
0.70	J3						MADE GROUND (Medium dense to dense brown yellow black clayey sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick, clinker and limestone).	
0.80	ES4							
0.80-1.20	B5							
1.40-1.90	SB6	N39					at c.1.40m BGL ... very clayey gravelly sand. Clay fines are of low plasticity.	
2.00-2.50	B8							
2.00-2.45	SJ7	N14						
2.30	ES9					(4.20)		
3.00	B11							
3.00-3.50	SJ10	N33						
3.30	ES12							
4.00-4.50	SB13	50/200mm					at c.4.00m BGL ... very dense/possible obstruction.	
4.30	ES14			29.72		4.50		
5.00-5.50	B16						MADE GROUND (Soft to firm brown yellow grey black sandy gravelly clay with bands of gravel and fragments of wood. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, clinker and brick).	
5.00	SJ15	50/150mm					at c.5.00m BGL ... cobbles with much sandy gravelly clay of low plasticity.	
5.30	ES17					(2.50)		
6.00-6.50	CB18	N43						
6.30	ES19							
				27.22		7.00		
7.00	J20						Very dense brown clayey very gravelly SAND with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded and includes sandstone. Cobbles are rounded and include sandstone.	
7.30	ES21					(1.00)		
7.50-7.80	CB22	50/150mm					at c.7.50m BGL ... laboratory notes tile, wood and brick fragments (possible fall in from above).	
				26.22		8.00		

Boring complete at 8.00m BGL - continued by rotary drilling.

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
02/11/2019	0.00	0.00	200	
02/11/2019	8.00	7.90	200	7.48

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
7.80 - 8.00	0:30	7.20 - 8.00

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 11.00m and 14.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH004
Client: University of Manchester	**Location:** Manchester E:384554.516 N:397582.476		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.223	**Start Date:** 02/11/2019	**Sheet:** 1 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
8.00 (102mm) 8.75	0 (0) 0	NR		26.22		8.00	8.00-10.00m ... no recovery.	(1) Red SANDSTONE with gravel inclusions.	
(102mm) 9.50	0 (0) 0					(2.00)	8.75m ... J24		
(102mm) 11.00	67 (0) 0			24.22		10.00	9.50m ... J25		
		NI					10.00-11.00m ... non-intact.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured.	
(102mm) 12.00	100 (100) 15	13					11.00m ... J26 11.00-12.50m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
16/11/2019	8.00	7.90	

Standard Penetration Test		
Depth	Type	Result
8.75	S	50/48mm
9.50	S	50/36mm
11.00	S	50/30mm

Flush		
From - To	Type	Returns (%)
8.00 - 8.75	Water/Polymer	100
8.75 - 9.50	Water/Polymer	100
9.50 - 11.00	Water/Polymer	100
11.00 - 12.00	Water/Polymer	100
12.00 - 12.50	Water/Polymer	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 11.00m and 14.00m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH004
Client: University of Manchester	**Location:** Manchester E:384554.516 N:397582.476	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.223 / **Start Date:** 02/11/2019	**Sheet:** 2 of 3

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
(102mm) 12.50	100 (100) 80					(4.00)		Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured. *(continued)*	
(102mm)	73 (73) 17	NR					12.50-12.90m ... no recovery.		
		16					12.90-14.00m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
				20.22		14.00	14.00m ... J27	*Complete at 14.00m BGL.*	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
16/11/2019	14.00	14.00	0.00	14.00	S	50/25mm	12.50 - 14.00	Water/Polymer	100	(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) 50mm diameter slotted standpipe installed between 11.00m and 14.00m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH004
Client: University of Manchester	**Location:** Manchester E:384554.516 N:397582.476		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.223	**Start Date:** 02/11/2019	**Sheet:** 3 of 3

Figure BH004.1
BH004 9.50-12.00m BGL



Figure BH004.2
BH004 12.00-13.50m BGL



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH004A
Client: University of Manchester	**Location:** Manchester E:384553.588 N:397583.415		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 34.187	**Start Date:** 17/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	Instrument/ Backfill
				34.09		0.10	MADE GROUND (Macadam).	
				33.89		0.30	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone).	
						(3.70)	MADE GROUND (Brown yellow black clayey sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick, clinker and limestone).	
				30.19		4.00	*Complete at 4.00m BGL.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
17/11/2019	0.00	0.00	200	
17/11/2019	4.00	4.00	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) No samples taken. Advanced to install instrumentation.
(4) 50mm diameter slotted standpipe installed between 1.00m and 4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.10	J1			33.12		0.30	MADE GROUND (Grass over topsoil consisting of brown silty gravelly sand with rootlets. Sand is fine to medium. Gravel is fine to coarse subangular to angular and includes sandstone and limestone).	
0.20	ES2							
0.50	J3						MADE GROUND (Red brown very clayey very sandy gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, brick and limestone. Cobbles are angular and include brick).	
0.80	B4					(1.20)		
1.00	ES5							
				31.92		1.50		
1.50	J6						Medium dense brown to light brown clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular and includes sandstone, quartz and siltstone. at c.1.50m BGL ... very dense/probable instruction.	
1.50-2.00	CB7	50/97mm						
2.30	J8					(1.60)		
2.30	ES9							
2.50		N20						
				30.32		3.10		
3.10	J11						Extremely weak red brown SANDSTONE. (Recovered as sand and gravel. Sand is fine. Gravel is fine to medium subrounded).	
3.20	B12			30.02		3.40		
3.30	SJ13	50/48mm					*Boring complete at 3.40m BGL - continued by rotary drilling.*	

Boring Progress and Water Observations					Chiselling		Water Added	General Remarks
Date	Depth	Casing	Casing Dia (mm)	Water Standing	From - To	Duration (hh:mm)	From - To	
16/11/2019	0.00	0.00	200		1.50 - 1.60	0:30	1.20 - 3.40	(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore. (4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.
16/11/2019	3.40	3.40	200	Dry	3.30 - 3.40	1:00		

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424 / **Start Date:** 16/11/2019	**Sheet:** 1 of 8

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
3.50		RO		30.02		3.40	3.40-3.50m ... rotary openhole drilling.	(1) Red brown SANDSTONE.	
4.50 (102mm)	0 (0) 0	NR					3.50-6.00m ... no recovery.		
5.00 (102mm)	0 (0) 0					(2.60)			
5.50 (102mm)	0 (0) 0								
6.50 (102mm)	50 (0) 0								
		NI		27.42		6.00	6.00-6.50m ... non-intact.	Extremely weak red brown fine grained SANDSTONE highly weathered. (Recovered as sand and gravel. Gravel is fine to coarse).	
				26.92		(0.50) 6.50			
7.00 (102mm)	40 (18) 0	NR					6.50-6.80m ... no recovery.	Extremely weak to weak red brown fine grained SANDSTONE moderately weathered to destructured. (Engineer notes some loss of strength within 20mm from apertures with some dark red and black surface staining).	
		NI		26.42		(0.50) 7.00	6.80-7.00m ... non-intact.		
(102mm)	0 (0) 0	NR					7.00-8.75m ... no recovery.	(1) Red SANDSTONE.	

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
24/11/2019	3.40	3.40	2.70

Standard Penetration Test		
Depth	Type	Result
3.40	S	100/30mm

Flush		
From - To	Type	Returns (%)
3.50 - 4.50	Water	50
4.50 - 5.00	Water	50
5.00 - 5.50	Water	50
5.50 - 6.50	Water	50
6.50 - 7.00	Water	50
7.00 - 7.50	Water	50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore.
(4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

Print Date and Time: 16/04/2020 11:39:22

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424 / **Start Date:** 16/11/2019	**Sheet:** 2 of 8

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
7.50								(1) Red SANDSTONE. *(continued)*	
(102mm)	0 (0) 0					(1.75)			
8.00									
(102mm)	25 (3) 0								
				24.67		8.75			
9.00		NI					8.75-9.00m ... non-intact.	Extremely weak to weak red brown fine grained SANDSTONE moderately weathered to destructured. (Engineer notes some loss of strength within 20mm from apertures with some dark red and black surface staining).	
(102mm)	80 (48) 0	NR					9.00-9.10m ... no recovery.		
		NI					9.10-9.50m ... non-intact.		
9.50									
(102mm)	83 (65) 43	NR					9.50-9.75m ... no recovery.		
		7					9.75-11.00m ... subhorizontal (5-30 degrees) closely to medium spaced planar to undulating smooth infilled (sand and gravel) discontinuities.		
						(3.75)			
11.00									
	80 (75) 37	NR					11.00-11.30m ... no recovery.		
		13					11.30-12.50m ... subhorizontal (5-30 degrees) closely		

Drilling Progress and Water Observations

Date	Depth	Casing	Water Standing
24/11/2019	9.50	9.50	6.45
25/11/2019	9.50	9.50	7.00

Standard Penetration Test

Depth	Type	Result

Flush

From - To	Type	Returns (%)
7.50 - 8.00	Water	50
8.00 - 9.00	Water	50
9.00 - 9.50	Water	50
9.50 - 11.00	Water	50
11.00 - 12.50	Water	50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore.
(4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424 / **Start Date:** 16/11/2019	**Sheet:** 3 of 8

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm) 12.50				20.92		12.50	to very closely spaced planar to undulating smooth infilled (sand) discontinuities.	Extremely weak to weak red brown fine grained SANDSTONE moderately weathered to destructured. (Engineer notes some loss of strength within 20mm from apertures with some dark red and black surface staining). *(continued)*	
(102mm)	37 (32) 0	NR		19.97		(0.95) 13.45	12.50-13.45m ... no recovery.	(1) Red SANDSTONE. (Driller describes as 'broken').	
14.00		12		19.42		(0.55) 14.00	13.45-14.00m ... subhorizontal (5-30 degrees) closely to very closely spaced planar to undulating smooth infilled (sand) discontinuities.	Extremely weak to weak red brown fine grained SANDSTONE moderately weathered to destructured. (Engineer notes some loss of strength within 20mm from apertures with some dark red and black surface staining).	
(102mm)	90 (87) 62	7					14.00-15.50m ... horizontal (0-5 degrees) closely spaced planar rough to smooth partly open clean discontinuities.	Weak to medium strong red brown coarse grained SANDSTONE partially weathered.	

Drilling Progress and Water Observations

Date	Depth	Casing	Water Standing
25/11/2019	14.00	14.00	8.10
29/11/2019	14.00	14.00	

Standard Penetration Test

Depth	Type	Result

Flush

From - To	Type	Returns (%)
12.50 - 14.00	Water	50
14.00 - 15.50	Water	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore.
(4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 4 of 8

RUN DETAILS			Water	STRATA				
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
15.50								Weak to medium strong red brown coarse grained SANDSTONE partially weathered. *(continued)*	
(102mm)	93 (73) 51	NI					15.50-15.80m ... non-intact.		
		9					15.80-18.50m ... horizontal (0-5 degrees) to subhorizontal (5-30 degrees) closely spaced tight to partly open clean discontinuities.		
17.00									
(102mm)	100 (100) 60					(7.50)			
18.50									
(102mm)	80 (50) 0	NI					18.50-19.00m ... non-intact.		
19.00									
	100 (100) 60	8					19.00-21.50m ... horizontal (0-5 degrees) to subhorizontal (5-30 degrees) closely spaced tight to partly open clean discontinuities.		

Drilling Progress and Water Observations

Date	Depth	Casing	Water Standing
29/11/2019	17.00	17.00	0.00
30/11/2019	17.00	17.00	4.65

Standard Penetration Test

Depth	Type	Result
17.00	S	100/35mm

Flush

From - To	Type	Returns (%)
15.50 - 17.00	Water	100
17.00 - 18.50	Water	50
18.50 - 19.00	Water	50
19.00 - 20.00	Water	50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore.
(4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 5 of 8

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm)								Weak to medium strong red brown coarse grained SANDSTONE partially weathered. *(continued)*	
20.00									
	100 (93) 73								
(102mm)				11.92		21.50			
								Complete at 21.50m BGL.	

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
30/11/2019	21.50	21.50	3.95

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)
20.00 - 21.50	Water	50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Between 9.50-14.00m BGL driller notes sand washing into borehole. Advanced 150mm diameter casing to 7.30m BGL and continued with geobore.
(4) 50mm diameter slotted standpipe installed between 18.50m and 21.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 6 of 8

Figure BH005.1
BH005 3.50-11.00m BGL.



Figure BH005.2
BH005 11.00-14.00m BGL.



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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 7 of 8

Figure BH005.3
BH005 14.00-17.00m BGL.



Figure BH005.4
BH005 17.00-20.00m BGL.



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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH005
Client: University of Manchester	**Location:** Manchester E:384655.497 N:397554.645		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.424	**Start Date:** 16/11/2019	**Sheet:** 8 of 8

Figure BH005.5
BH005 20.00-21.50m BGL.



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH006
Client: University of Manchester	**Location:** Manchester E:384734.367 N:397611.677		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 33.967	**Start Date:** 03/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				33.87		0.10	MADE GROUND (Macadam).	
				33.64		0.33	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone and limestone).	
0.35	J1							
0.40	ES2							
0.40-1.00	B3					(1.27)	MADE GROUND (Brown yellow black sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick, clinker and limestone).	
1.20	ES4							
1.40-1.60	CB5	50/10mm		32.37		1.60	at c.1.60m BGL ... (1) Obstruction. *Terminated at 1.60m BGL - due to obstruction.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
03/11/2019	0.00	0.00	200	
03/11/2019	1.60	1.60	200	Damp

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
1.60 - 1.60	0:30	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Relocated to BH006A.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH006A
Client: University of Manchester	**Location:** Manchester E:384728.887 N:397614.035		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 33.996	**Start Date:** 17/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				33.98		0.02	MADE GROUND (Grey macadam).	
				33.94		0.06	MADE GROUND (Black macadam).	
				33.88		0.12	MADE GROUND (Light grey macadam).	
0.30	J1			33.50		(0.38) 0.50	MADE GROUND (Brown black sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, clinker, brick, ash and limestone).	
0.40	ES2							
0.50	J3							
0.80	B4					(0.80)		
1.00	ES5			32.70		1.30	MADE GROUND (Red brown clayey sand and gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, brick and limestone. Cobbles are angular and includes brick). at c.1.30m BGL ... (1) Concrete. *Terminated at 1.30m BGL - due to concrete obstruction.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
17/11/2019	0.00	0.00	200	
17/11/2019	1.30	1.30	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Relocated from BH006.
(4) Relocated to BH006B.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH006B
Client: University of Manchester	**Location:** Manchester E:384713.826 N:397607.847		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 33.497	**Start Date:** 17/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.10	J1			33.47		0.03	MADE GROUND (Grey macadam).	
0.20	ES2			33.44		0.06	MADE GROUND (Black macadam).	
0.40	B3			33.38		0.12	MADE GROUND (Light grey macadam).	
0.60	ES4			33.20		0.30	MADE GROUND (Light grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes limestone).	
						(0.40)	MADE GROUND (Red brown clayey very sandy gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, brick and limestone. Cobbles are angular and include brick). at c.0.70m BGL ... (1) Concrete.	
				32.80		0.70	*Terminated at 0.70m BGL - due to concrete obstruction.*	

Boring Progress and Water Observations					Chiselling		Water Added	General Remarks
Date	Depth	Casing	Casing Dia (mm)	Water Standing	From - To	Duration (hh:mm)	From - To	
17/11/2019	0.00	0.00	200					(1) Description derived from drillers daily report.
17/11/2019	0.70	0.60	200	Dry				(2) Inspection pit dug prior to drilling.
								(3) Relocated from BH006A.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH007
Client: University of Manchester	**Location:** Manchester E:384765.207 N:397596.049		
Method (Equipment): K.R/P.D (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.684	**Start Date:** 08/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.05	B1			34.58		0.10	MADE GROUND (Macadam).	
0.20	ES2			34.38		0.30	MADE GROUND (Concrete).	
0.30	J3						MADE GROUND (Brown yellow black clayey sandy gravel with cobbles noted and fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick and clinker).	
0.60	B4							
1.00	ES5					(1.90)		
1.20	J6							
1.50-2.00	CB7	N16					at c.1.50m BGL ... medium dense.	
				32.48		2.20		
2.20	J8						MADE GROUND (Medium dense yellow brown black clayey very sandy gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular and includes ash, sandstone, brick and clinker. Cobbles are subangular and include brick and concrete. at c.2.50m BGL ... clay is of low plasticity. Metal fragments noted.	
2.30	ES9							
2.50-3.00	B11							
2.50-3.00	SJ10	N20						
3.20	B12							
3.30	ES13							
3.50-4.00	B15							
3.50	SJ14	N16						
4.20	J16					(4.20)		
4.30	ES17							
4.50-5.00	SJ18	N10					at c.4.50m BGL ... loose and medium dense.	
				28.28		6.40		
6.40	J19						Loose and medium dense red brown clayey very gravelly SAND. Sand is fine to coarse. Gravel is fine to coarse subangular to rounded and includes sandstone. (Possible Reworked River Bed).	
6.50-7.00	CB20	N10				(0.80)		
				27.48		7.20		
7.10	B21							
7.20	SJ22	50/61mm					Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured. (Recovered as sand).	
				27.18		7.50		
7.50	SJ23	100/39mm					*Boring complete at 7.50m BGL - continued by rotary drilling.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
08/11/2019	0.00	0.00	200	
08/11/2019	1.20	0.00	200	Dry
09/11/2019	1.20	0.00	200	Dry
09/11/2019	7.50	7.50	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
4.30 - 4.40	1:00	1.20 - 7.50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.60m and 13.60m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH007
Client: University of Manchester	**Location:** Manchester E:384765.207 N:397596.049	
Method (Equipment): K.R/P.D (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.684 / **Start Date:** 08/11/2019	**Sheet:** 1 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
7.50	100 (67) 0	NI		27.18		7.50	7.50-7.70m ... non-intact.	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured.	
(102mm)		23					7.70-8.10m ... subhorizontal (10 degrees) very closely spaced planar rough undulating smooth and rough open clean discontinuities.		
8.10	100 (80) 30	NI					8.10-8.20m ... non-intact.		
(102mm)		11					8.20-9.40m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
9.60		NI					9.40-9.60m ... non-intact.		
(102mm)	60 (60) 13	NR					9.60-10.20m ... no recovery.		
		7					10.20-11.10m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
						(6.10)			
11.10	0 (0) 0	NR					11.10m ... J24 11.10-12.10m ... no recovery.		

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
17/11/2019	7.50	7.50	

Standard Penetration Test		
Depth	Type	Result
11.10	S	50/30mm

Flush		
From - To	Type	Returns (%)
7.50 - 8.10	Water/Polymer	100
8.10 - 9.60	Water/Polymer	100
9.60 - 11.10	Water/Polymer	100
11.10 - 12.10	Water/Polymer	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.60m and 13.60m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH007
Client: University of Manchester	**Location:** Manchester E:384765.207 N:397596.049		
Method (Equipment): K.R/P.D (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.684	**Start Date:** 08/11/2019	**Sheet:** 2 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm) 12.10								Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured. *(continued)*	
	100 (67) 37	28					12.10-12.30m ... subhorizontal (10 degrees) very closely spaced planar rough undulating smooth and rough open clean discontinuities.		
		NI					12.30-12.80m ... non-intact.		
(102mm)		8					12.80-13.60m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
				21.08		13.60			
							13.60m ... J25	*Complete at 13.60m BGL.*	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
17/11/2019	13.60	13.60	0.00	13.60	S	50/40mm	12.10 - 13.60	Water/Polymer	100	(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) 50mm diameter slotted standpipe installed between 10.60m and 13.60m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

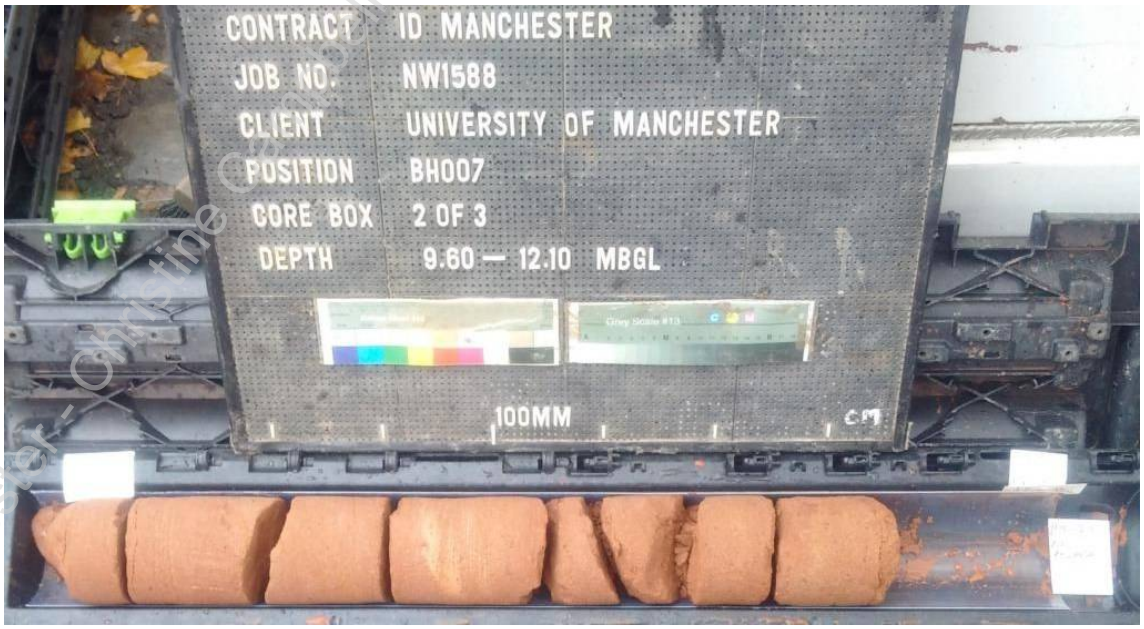
Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH007
Client: University of Manchester	**Location:** Manchester E:384765.207 N:397596.049		
Method (Equipment): K.R/P.D (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.684	**Start Date:** 08/11/2019	**Sheet:** 3 of 4

Figure BH007.1
BH007 7.50-9.60m BGL



Figure BH007.2
BH007 9.60-12.10m BGL



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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH007
Client: University of Manchester	**Location:** Manchester E:384765.207 N:397596.049		
Method (Equipment): K.R/P.D (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.684	**Start Date:** 08/11/2019	**Sheet:** 4 of 4

Figure BH007.3
BH007 12.10-13.60m BGL



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH008
Client: University of Manchester	**Location:** Manchester E:384766.896 N:397570.397	
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 34.051 / **Start Date:** 10/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				34.00		0.05	MADE GROUND (Macadam).	
						(0.45)	MADE GROUND (Concrete).	
0.40	J1			33.55		0.50		
0.50	ES2						MADE GROUND (Brown yellow black cobbles with much clayey sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick and ash).	
0.60	B3					(0.70)		
0.80	ES4			32.85		1.20		
1.50-2.00	CB5	N16					MADE GROUND (Medium dense yellow brown clayey sandy gravel with cobbles noted and fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick and ash. Cobbles are subangular and include brick and concrete).	
2.10	J6							
2.20	ES7							
2.50-3.00	CB8	N16					at c.2.50m BGL ... clayey sand and gravel with cobbles noted.	
						(3.30)		
3.10	J9							
3.20	ES10							
3.50-4.00	CB11	N17						
4.10	J12							
4.20	ES13			29.55		4.50		
4.50-5.00	B15						MADE GROUND (Loose brown clayey very sandy gravel with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone and brick).	
4.50	SJ14	N6						
5.10	B16							
5.20	ES17					(1.80)		
5.50	B19							
5.50-6.00	SJ18	N9						
6.10	J20							
6.20	SJ21	50/44mm		27.75		6.30		
				27.55		6.50	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured. (Recocvered as sand).	
6.50	SJ22	100/52mm					*Complete at 6.50m BGL.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
10/11/2019	0.00	0.00	200	
10/11/2019	6.50	6.50	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
2.30 - 2.50	0:30	1.20 - 6.50
6.20 - 6.50	0:30	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 0.30m and 6.50m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH009
Client: University of Manchester	**Location:** Manchester E:384759.087 N:397550.391		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 34.203	**Start Date:** 09/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				34.10		0.10	MADE GROUND (Macadam).	
						(0.40)	MADE GROUND (Concrete).	
0.40	B1			33.70		0.50		
0.50	ES2						MADE GROUND (Brown yellow black clayey very sandy gravel with fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick and ash).	
0.80	J3							
1.00	B4					(1.20)		
1.20	ES5							
				32.50		1.70		
1.70-2.20	B7						MADE GROUND (Medium desne red sand with bands of gravel. Sand is fine to coarse. Gravel is fine to medium subangular and includes sandstone and brick).	
1.70-2.15	SJ6	N20						
2.50	J8							
2.60	ES9							
2.70-3.20	B11							
2.70-3.15	SJ10	N23				(2.90)		
3.50	J12							
3.70-4.20	B14						at c.3.70m BGL ... dense clayey gravelly sand.	
3.70-4.15	SJ13	N37						
4.50	B15			29.60		4.60		
4.60	SJ16	25/6mm		29.40		4.80	Extremely weak red fine to coarse grained SANDSTONE distinctly weathered to destructured. (Recovered as sand).	
4.80	SJ17	100/16mm					*Terminated at 4.80m BGL - due to refusal.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
09/10/2019	0.00	0.00		
09/10/2019	2.50	2.50		Dry
10/10/2019	2.50	2.50		Dry
10/10/2019	4.80	4.60		Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
1.20 - 1.50	1:00	1.20 - 2.50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installer between 0.50-1.70m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. **NW1588**

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH011
Client: University of Manchester	**Location:** Manchester E:384726.701 N:397513.893		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.051	**Start Date:** 09/11/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	Instrument/ Backfill
				33.95		0.10	MADE GROUND (Concrete paving slab).	
0.20	J1					(0.40)	MADE GROUND (Concrete).	
0.30	ES2			33.55		0.50		
0.80	B3					(3.10)	MADE GROUND (Medium dense to dense brown yellow black clayey very sandy gravel with cobbles noted and fragments of glass. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, brick, ash and limestone).	
1.00	ES4							
1.20	J5							
1.70-2.20	CB6	N39						
2.50	J7							
2.60	ES8							
2.70-3.20	CB9	N23						
				30.45		3.60		
3.60	J10					(0.80)	MADE GROUND (Medium dense yellow brown black slightly gravelly sand. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, ash and brick).	
3.60	ES11							
3.70-4.20	B13							
3.70	SJ12	N17						
				29.65		4.40		
4.50	B14					(2.10)	Medium dense red very clayey slightly gravelly fine to coarse SAND. Gravel is fine to medium angular to subangular and includes sandstone. (Weathered Sandstone).	
4.60	ES15							
4.70-5.20	B17							
4.70-4.70	SJ16	N25						
5.30	ES18							
5.50	SJ19	50/11mm					from c.5.50m BGL ... very dense.	
6.20	SJ20	50/18mm						
				27.55		6.50		
6.50	SJ21	100/22mm					*Boring complete at 6.50m BGL - continued by rotary drilling.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
09/10/2019	0.00	0.00	200	
09/10/2019	6.50	6.50	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
6.20 - 6.50	1:00	1.20 - 6.50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00m and 13.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.P/D.S	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation		**Exploratory Hole No.** BH011
Client: University of Manchester	**Location:** Manchester E:384726.701 N:397513.893	
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.051 / **Start Date:** 09/11/2019	**Sheet:** 1 of 3

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
6.50 (102mm)	0 (0) 0	NR		27.55		6.50	6.50-7.95m ... no recovery.	(1) Red brown SANDSTONE with gravel.	
						(0.50)			
7.50				27.05		7.00		(1) Red brown SANDSTONE. (Driller describes as 'broken').	
(102mm)	55 (18) 0					(0.95)			
8.50		NI		26.10		7.95	7.95-8.50m ... non-intact.	Extremely weak to very weak red brown fine grained SANDSTONE partially to distinctly weathered, in places destructured with some local dark red and black surface staining.	
(102mm)	88 (82) 42	NR					8.50-8.65m ... no recovery.		
		13					8.65-9.80m ... subhorizontal (5-30 degrees) very closely to closely spaced planar to undulating smooth open infilled (sand) discontinuities.		
9.80									
	77 (74) 21	NR					9.80-10.15m ... no recovery.		
		10					10.15-11.30m ... subhorizontal (5-30 degrees) very closely to closely spaced planar to undulating smooth open infilled (sand) discontinuities.		
						(5.05)			

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
23/11/2019	6.50	6.50	4.75

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)
6.50 - 7.50	Water	50
7.50 - 8.50	Water	0
8.50 - 9.80	Water	0
9.80 - 11.30	Water	0

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00m and 13.00m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.P/D.S	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH011
Client: University of Manchester	**Location:** Manchester E:384726.701 N:397513.893		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.051	**Start Date:** 09/11/2019	**Sheet:** 2 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
(102mm)								Extremely weak to very weak red brown fine grained SANDSTONE partially to distinctly weathered, in places destructured with some local dark red and black surface staining. *(continued)*	
11.30									
(102mm)	70 (55) 0	NR					11.30-11.60m ... no recovery.		
		8					11.60-12.30m ... subhorizontal (5-30 degrees) very closely to closely spaced planar to undulating smooth open infilled (sand) discontinuities.		
							11.90-11.95m ... non-intact.		
12.30							12.20-12.23m ... non-intact.		
(102mm)	86 (86) 47	NR					12.30-12.40m ... no recovery.		
		5					12.40-13.00m ... subhorizontal (5-30 degrees) very closely to closely spaced planar to undulating smooth open infilled (sand) discontinuities.		
				21.05		13.00			
								Complete at 13.00m BGL.	

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
23/11/2019	13.00	13.00	10.10

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)
11.30 - 12.30	Water	0
12.30 - 13.00	Water	0

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 10.00m and 13.00m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.P/D.S	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH011
Client: University of Manchester	**Location:** Manchester E:384726.701 N:397513.893		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 34.051	**Start Date:** 09/11/2019	**Sheet:** 3 of 3

Figure BH011.1
BH011 6.50-9.80m BGL.



Figure BH011.2
BH011 9.80-13.00m BGL.



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH012
Client: University of Manchester	**Location:** Manchester E:384626.310 N:397652.656		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 38.151	**Start Date:** 26/10/2019	**Sheet:** 1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.10 0.20	B1 ES2			38.10 37.80		0.05 0.35	MADE GROUND (Concrete paving slab). MADE GROUND (Brown slightly silty very sandy gravel. Sand is fine to coarse. Gravel is fine to medium subrounded and includes sandstone and brick). at c.0.35m BGL ... concrete obstruction. *Terminated at 0.35m BGL - due to concrete obstruction.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
26/10/2019	0.00			
26/10/2019	0.35			Dry

Chiselling	
From - To	Duration (hh:mm)

Water Added
From - To

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Relocated to BH012A.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: J. Myall	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH012A
Client: University of Manchester	**Location:** Manchester E:384647.478 N:397660.412		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 38.269	**Start Date:** 26/10/2019	**Sheet:** 1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				38.22		0.05	MADE GROUND (Concrete paving slab).	
0.20	J1			37.97		0.30	MADE GROUND (Concrete).	
0.30	ES2			37.87		0.40	MADE GROUND (Granite and tar cobble sets).	
0.50	B3						MADE GROUND (Loose and medium dense dark brown slightly clayey very sandy gravel with cobbles noted and fragments of glass. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded and includes brick, sandstone and clinker. Cobbles are angular and include brick).	
0.60	J4						between c.1.10-1.20m BGL ... 125mm ceremic redundant land drain running 047 degrees.	
1.00	ES5							
1.50	B6						at c.1.70m BGL ... dense.	
1.70-2.20	B8							
1.70-2.15	SJ7	N10						
2.50	J9							
2.60	ES10							
2.70-3.20	B12							
2.70-3.15	SJ11	N12						
						(6.10)		
3.50	B13							
3.60	ES14							
3.70-4.20	B16						at c.3.70m BGL ... medium dense and dense.	
3.70-4.15	SJ15	N7						
4.60	ES17							
4.70-5.20	B19							
4.70-5.15	SJ18	N11						
6.00	ES20							
				31.77		6.50		
6.50-7.00	B22						MADE GROUND (Loose brown very clayey very sandy gravel. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded and includes brick, sandstone and clinker).	
6.50-6.95	SJ21	N10					at c.6.50m BGL ... clay is of low to intermediate plasticity.	
						(1.90)		
7.50	ES23							

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
26/10/2019	0.00	0.00	200	
26/10/2019	3.20	3.20	200	Dry
27/10/2019	3.20	3.20	200	Dry

Chiselling	
From - To	Duration (hh:mm)

Water Added
From - To
1.20 - 3.20
3.20 - 10.80

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 2.00m and 6.00m BGL.
(4) Relocated from BH012.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: J. Myall	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH012A
Client: University of Manchester	**Location:** Manchester E:384647.478 N:397660.412		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 38.269	**Start Date:** 26/10/2019	**Sheet:** 2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
8.00	J24			29.87		8.40		
8.50-8.95	U25	(39)					Medium dense brown occasionally grey very clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine subangular and includes sandstone. (Possible Made Ground).	
9.00	J26							
9.00	B28							
9.00-9.50	SJ27	N19				(2.00)		
9.80	ES29							
10.00	B30			27.87		10.40		
10.50	SJ31	50/0mm		27.47		(0.40) 10.80	Weak red fine grained SANDSTONE distinctly weathered. (Recovered as slightly gravelly sand. Sand is fine. Gravel is fine to medium angular and includes sandstone).	
10.80	SJ32	100/5mm					*Complete at 10.80m BGL.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
27/10/2019	10.80	10.80	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
10.50 - 10.80	1:00	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 2.00m and 6.00m BGL.
(4) Relocated from BH012.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: J. Myall	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				32.98		0.10	MADE GROUND (Macadam).	
0.20	J1			32.68		0.40	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, limestone and brick).	
0.30	ES2							
0.80	B3						MADE GROUND (Medium dense brown yellow black clayey very sandy gravel and cobbles. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, limestone and brick. Cobbles are angular and include brick).	
1.00	ES4							
1.50	B5							
1.70-2.20	CB6	N34						
2.30	J7							
2.50	ES8							
2.70-3.20	CB9	N21				(4.90)		
3.30	B10							
3.50	ES11							
3.70-4.20	CB12	N30						
4.30	ES13							
4.70-5.20	CB14	N17						
				27.78		5.30		
5.50	ES15						Medium dense brown clayey very gravelly SAND with cobbles noted. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded and includes sandstone. Cobbles are rounded and include sandstone.	
6.00-6.50	CB16	N20				(2.70)		
7.00	ES17							
7.20	J18							
7.50-8.00	CB19	N16						
				25.08		8.00		

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
28/10/2019	0.00	0.00	200	
28/10/2019	6.50	6.50	200	Dry
29/10/2019	6.50	6.50	200	Dry

Chiselling	
From - To	Duration (hh:mm)
1.20 - 1.70	1:00
8.00 - 8.40	1:00

Water Added
From - To
1.20 - 6.50
6.50 - 10.50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 11.00m and 16.50m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
8.00	SJ20	50/9mm					Very dense red SAND. Sand is fine to coarse. (Weathered Sandstone).	
9.00	SJ21	50/14mm				(2.50)		
10.40	SJ22	100/12mm		22.58		10.50	*Boring complete at 10.50m BGL - continued by rotary drilling.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
29/10/2019	10.50	10.50	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
10.40 - 10.50	1:00	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 11.00m and 16.50m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. **NW1588**

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 1 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
10.50	93 (80) 37	NR		22.58		10.50	10.50-10.60m ... no recovery.	Extremely weak to weak red fine to coarse grained SANDSTONE partially to distinctly weathered with inclusions of fine to medium subrounded and includes quartz and quartzite.	
		NI					10.60-10.80m ... non-intact.		
		7					10.80-13.35m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
(102mm)									
12.00	90 (90) 40								
(102mm)									
		NR					13.35-13.50m ... no recovery.		
13.50						(6.00)			
	93 (93) 23	7					13.50-14.90m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
(102mm)									

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
30/10/2019	10.50	10.50	

Standard Penetration Test		
Depth	Type	Result
10.50	S	100/6mm
13.50	S	100/50mm

Flush		
From - To	Type	Returns (%)
10.50 - 12.00	Water	100
12.00 - 13.50	Water	100
13.50 - 15.00	Water	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 11.00m and 16.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 2 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
15.00		NR					14.90-15.00m ... no recovery.	Extremely weak to weak red fine to coarse grained SANDSTONE partially to distinctly weathered with inclusions of fine to medium subrounded and includes quartz and quartzite. *(continued)*	
(102mm)	100 (100) 25	9		16.58		16.50	15.00-16.50m ... subhorizontal (10 degrees) closely spaced planar rough undulating smooth and rough open clean discontinuities.		
								Complete at 16.50m BGL.	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
30/10/2019	16.50	16.50	0.00	16.50	S	100/25mm	15.00 - 16.50	Water	100	(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) 50mm diameter slotted standpipe installed between 11.00m and 16.50m BGL.

All dimensions in metres Scale 1:25	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 3 of 4

Figure BH013.1
BH013 10.50-12.00m BGL



Figure BH013.2
BH013 12.00-13.50m BGL



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DRILLHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH013
Client: University of Manchester	**Location:** Manchester E:384368.382 N:397549.440		
Method (Equipment): Percussion/Coring (Dando 2000/Comacchio GEO 205)	**Ground Level (m):** 33.078	**Start Date:** 28/10/2019	**Sheet:** 4 of 4

Figure BH013.3
BH013 13.50-15.00m BGL



Figure BH013.4
BH013 15.00-16.50m BGL



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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH014
Client: University of Manchester	**Location:** Manchester E:384495.592 N:397565.295		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 35.705	**Start Date:** 28/10/2019	**Sheet:** 1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				35.41		0.30	MADE GROUND (Reinforced concrete with 10mm rebar).	
0.40	J1			35.11		0.60	MADE GROUND (Brown yellow sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, limestone and brick).	
0.40	ES2							
0.40-0.60	B3							
0.70	J4						MADE GROUND (Medium dense brown yellow clayey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse subangular and includes sandstone, limestone and brick).	
0.70	ES5							
0.70-1.20	B6							
1.20-1.65	B8					(1.60)		
1.20-1.65	SJ7	N23						
2.00	ES9			33.51		2.20		
2.00-2.45	B11							
2.00-2.45	SJ10	N12					MADE GROUND (Medium dense brown black clayey very sandy gravel with bands of clay. Sand is fine to coarse. Gravel is fine to coarse subangular and includes clinker, brick and sandstone).	
2.50	J12							
3.00-3.45	B14							
3.00-3.45	SJ13	N14						
						(3.60)		
4.00	ES15							
4.00-4.45	B17							
4.00-4.45	SJ16	N17						
5.00	ES18						at c.5.00m BGL ... dense.	
5.00-5.45	B20							
5.00-5.45	SJ19	N37						
				29.91		5.80		
6.00	J21						Medium dense yellow brown orange clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is fine to medium subrounded and includes sandstone.	
6.00	ES22					(0.90)		
6.00-6.45	B24							
6.00-6.45	SJ23	N18						
				29.01		6.70		
7.00	J25					(0.70)	Brown orange silty SAND. Sand is fine to coarse.	
				28.31		7.40		
7.50-7.95	B27						Very dense brown sandy GRAVEL and COBBLES. Sand is fine to coarse. Gravel is fine to coarse subrounded and includes sandstone. Cobbles are rounded and include sandstone.	
7.50	SJ26	50/200mm						

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
28/10/2019	0.00	0.00	200	
28/10/2019	5.00	4.80	200	Dry
29/10/2019	5.00	4.80	200	Dry

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
7.70 - 8.10	1:00	8.00 - 10.50

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. **NW1588**

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BOREHOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** BH014
Client: University of Manchester	**Location:** Manchester E:384495.592 N:397565.295		
Method (Equipment): Cable Percussion (Dando 2000)	**Ground Level (m):** 35.705	**Start Date:** 28/10/2019	**Sheet:** 2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
8.50	J28					(2.00)	Very dense brown sandy GRAVEL and COBBLES. Sand is fine to coarse. Gravel is fine to coarse subrounded and includes sandstone. Cobbles are rounded and include sandstone. *(continued)*	
9.00-9.45	CB29	N46		26.31		9.40	at c.9.00m BGL ... dense.	
9.50-9.95	B31						Red brown SAND. Sand is fine to coarse. (Weathered Sandstone).	
9.50	SJ30	50/190mm				(1.10)		
10.00	J32							
10.00-10.45	B34							
10.00	SJ33	50/105mm		25.21		10.50		
							Complete at 10.50m BGL.	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
29/10/2019	10.50	9.80	200	0.71

Chiselling		Water Added
From - To	Duration (hh:mm)	From - To
9.40 - 10.00	2:00	

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Portsmouth	Contract No. NW1588

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FIELD DATA ENCLOSURE 3

Dynamic Sample Hole Record

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DYNAMIC SAMPLE HOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** DS001
Client: University of Manchester	**Location:** Manchester E:384774.985 N:397520.083		
Method (Equipment): Rotary Coring (Comacchio GEO 205)	**Ground Level (m):** 34.217	**Start Date:** 30/11/2019	**Sheet:** 1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
0.05	J1						MADE GROUND (Topsoil consisting of soft dark brown sandy slightly gravelly clay with many rootlets. Sand is fine to coarse. Gravel is fine subangular and includes clinker).	
0.10	ES2			33.917		0.30		
0.20-0.30	B3						MADE GROUND (Soft brown grey clayey very sandy gravel with cobbles noted and glass and metal fragments. Sand is fine to coarse. Gravel is fine to coarse angular to subangular and includes sandstone, concrete, brick and clinker. Cobbles are angular and include brick).	
0.40	J4							
0.60	ES5					(0.90)		
0.70-1.00	B6							
				33.017		1.20		
1.20	$U7_{(SS)}$						MADE GROUND (Black grey clayey slightly gravelly sand with pockets of sandy slightly gravelly clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded and includes mudstone, brick and sandstone. Cobbles are angular to subrounded and includes sandstone).	
1.50-1.80	$ES16_{(U7)}$							
						(1.20)		
2.20	$U9_{(SS)}$							
2.20	SJ8	N4		31.817		2.40		
2.40-2.70	$ES17_{(U9)}$						MADE GROUND (Firm black grey sandy slightly gravelly clay with cobbles noted. Gravel is fine to coarse angular to subrounded and includes sandstone, mudstone and brick. Cobbles are angular to rounded and include sandstone and brick).	
						(0.80)		
				31.017		3.20		
3.20	SJ10	N25					(1) MADE GROUND (Medium dense sand and gravel. Gravel includes brick).	
						(1.20)		
				29.817		4.40		
4.50	SJ11	N24					(1) MADE GROUND (Black silt with river ballast gravel). at c.4.50m BGL ... brown dark grey slightly silty slightly gravelly sand. Sand is fine to coarse. Gravel is fine to coarse subangular to sounrded and includes sandstone, mudstone and brick.	
						(4.50)		
7.00	C12	50/11mm					at c.7.00m BGL ... very dense/possible obstruction.	
7.50	U*13							

Boring Progress and Water Observations

Date	Depth	Casing	Casing Dia (mm)	Water Standing
30/11/2019	0.00	0.00	150	
30/11/2019	1.20	1.20	150	
01/12/2019	1.20	1.20	150	

Liner Sample Information

From - To	Internal Dia (mm)	Recovery (%)	Subsampled

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 2.00m and 4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DYNAMIC SAMPLE HOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** DS001
Client: University of Manchester	**Location:** Manchester E:384774.985 N:397520.083		
Method (Equipment): Rotary Coring (Comacchio GEO 205)	**Ground Level (m):** 34.217	**Start Date:** 30/11/2019	**Sheet:** 2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
							(1) MADE GROUND (Black silt with river ballast gravel). *(continued)*	
8.60		50/11mm		25.317		8.90	at c.8.60m BGL ... very dense/possible obstruction.	
				24.917		(0.40) 9.30	(1) Red SANDSTONE.	
9.30	C15	50/47mm					*Complete at 9.30m BGL.*	

Boring Progress and Water Observations				
Date	Depth	Casing	Casing Dia (mm)	Water Standing
01/12/2019	9.30	7.50	150	

Liner Sample Information			
From - To	Internal Dia (mm)	Recovery (%)	Subsampled

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 2.00m and 4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DYNAMIC SAMPLE HOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** DS002
Client: University of Manchester	**Location:** Manchester E:384753.487 N:397492.025		
Method (Equipment): Rotary Coring (Comacchio GEO 205)	**Ground Level (m):** 34.087	**Start Date:** 01/12/2019	**Sheet:** 1 of 3

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				33.787		0.30	MADE GROUND (Topsoil consisting of soft dark brown sandy slightly gravelly clay with many rootlets. Sand is fine to coarse. Gravel is fine subangular and includes clinker).	
0.30	ES1						MADE GROUND (Soft brown grey clayey very sandy gravel with pockets of clay and cobbles noted and fragments of glass and metal. Sand is fine to coarse. Gravel is fine to coarse angular to subangular and includes sandstone, concrete, brick and clinker. Cobbles are angular and include brick).	
0.40	B2					(0.90)		
0.80	ES3							
0.80	B4			32.887		1.20		
1.20	$U5_{(SS)}$						at c.0.40m BGL ... clay pockets of low plasticity.	
1.70-2.20	$ES13_{(U5)}$						MADE GROUND (Black grey clayey gravelly sand with cobbles noted and pockets of sandy slightly gravelly clay. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded and includes mudstone, brick and sandstone. Cobbles are angular to subrounded and include sandstone and brick).	
2.20	SJ6	50/68mm				(2.30)	at c.2.20m BGL ... very dense/possible obstruction.	
2.40-2.70	$ES14_{(U7)}$							
2.50	$U7_{(SS)}$							
				30.587		3.50		
3.50	SJ8	N47					MADE GROUND (Red grey brown sandy gravel. Sand is medium to coarse. Gravel is fine to coarse subangular to subrounded and includes brick, flint, chert, ash, sandstone and mudstone).	
						(0.90)		
				29.687		4.40		
4.40-5.40	C13			29.487		4.60	MADE GROUND (Red brick) (Recovered cobbles. Cobbles are subangular).	
							(1) MADE GROUND (Brick, concrete, ash, gravel, black silty fill).	
						(0.80)		
				28.687		5.40		
5.40-6.40	C14			28.487		5.60	MADE GROUND (Red brick) (Recovered as slightly sandy gravel and cobbles. Sand is fine to coarse. Gravel is coarse subangular. Cobbles are subangular).	
5.40	C9	50/27mm					at c.5.40m BGL ... very dense/possible obstruction.	
							(1) MADE GROUND (Brick, concrete, ash, gravel, black silty fill).	
6.40-7.40	C15						at c.6.40m BGL ... very dense/possible obstruction.	
6.40	C10	50/44mm				(2.50)		
7.40-8.40	C16						at c.7.40m BGL ... very dense/possible obstruction.	
7.40	C11	50/68mm						

Boring Progress and Water Observations

Date	Depth	Casing	Casing Dia (mm)	Water Standing
01/12/2019	0.00	0.00	150	

Liner Sample Information

From - To	Internal Dia (mm)	Recovery (%)	Subsampled
1.20 - 2.20	101	90	Yes
2.50 - 3.50	101	80	Yes

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 8.15m and 9.90m BGL.
(4) Between 1.20-2.50 and 2.50-4.40m BGL redrilled using openhole techniques.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DYNAMIC SAMPLE HOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** DS002
Client: University of Manchester	**Location:** Manchester E:384753.487 N:397492.025		
Method (Equipment): Rotary Coring (Comacchio GEO 205)	**Ground Level (m):** 34.087	**Start Date:** 01/12/2019	**Sheet:** 2 of 3

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description	
				25.987		8.10		
8.40-9.90 8.40	C17 C12	14/10mm				(1.50)	Medium strong red brown fine to medium grained SANDSTONE unweathered locally destructured.	
				24.487		9.60		
				24.187		9.90	(1) Red brown SANDSTONE.	
							Complete at 9.90m BGL.	

Boring Progress and Water Observations

Date	Depth	Casing	Casing Dia (mm)	Water Standing
01/12/2019	9.90	9.90	146	7.40

Liner Sample Information

From - To	Internal Dia (mm)	Recovery (%)	Subsampled

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 8.15m and 9.90m BGL.
(4) Between 1.20-2.50 and 2.50-4.40m BGL redrilled using openhole techniques.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D.S/N.W	Contract No. NW1588

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DYNAMIC SAMPLE HOLE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** DS002
Client: University of Manchester	**Location:** Manchester E:384753.487 N:397492.025		
Method (Equipment): Rotary Coring (Comacchio GEO 205)	**Ground Level (m):** 34.087	**Start Date:** 01/12/2019	**Sheet:** 3 of 3

Figure DS002.1
DS002 - 4.40-9.60m BGL



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FIELD DATA ENCLOSURE 4

Concrete Core Hole Records

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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC001
Client: University of Manchester	**Location:** Manchester E:384559.377 N:397621.484		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.344	**Start Date:** 09/11/2019	**Sheet:** 1 of 2

RUN DETAILS		STRATA			
Depth & (Core Ø)	Recovery %	Reduced Level	Legend	Depth (Thickness)	Description
0.000 (80mm)	100	34.34		(0.190) 0.190	MADE GROUND (Strong orange red brick with moderately strong light grey mortar, well bonded. (Facing brick)).
				(1.810)	MADE GROUND (Moderately weak to moderately strong dark to light orange red brick with weak dark grey mortar, poorly bonded).
		34.34		2.000	
					Complete at 2.000m BGL.

Drilling Progress and Water Observations			Flush		Samples		PAK Marker		General Remarks
Date	Depth	Water Standing	Depth	Flush	Depth	Type & No.	Depth	Result	
09/11/2019	0.00				0.00-2.00	C1			(1) Description derived from drillers daily report. (2) Horizontal core.
09/11/2019	2.00	Dry							

All dimensions in metres Scale 1:13.75	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC001
Client: University of Manchester	**Location:** Manchester E:384559.377 N:397621.484		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.344	**Start Date:** 09/11/2019	**Sheet:** 2 of 2

Figure HC001.1
HC001 0.00-2.00m BGL



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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC002
Client: University of Manchester	**Location:** Manchester E:384590.548 N:397633.327		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.307	**Start Date:** 03/11/2019	**Sheet:** 1 of 2

RUN DETAILS		STRATA			
Depth & (Core Ø)	Recovery %	Reduced Level	Legend	Depth (Thickness)	Description
0.000 (80mm)	100	34.31		(0.190) 0.190	MADE GROUND (Strong orange red brick with moderately strong light grey mortar, well bonded. (Facing Brick)).
		34.31		(1.810) 2.000	MADE GROUND (Moderately weak to medium strong dark to light orange red brick with weak dark grey mortar, poorly bonded).
					Complete at 2.000m BGL.

Drilling Progress and Water Observations			Flush		Samples		PAK Marker		General Remarks
Date	Depth	Water Standing	Depth	Flush	Depth	Type & No.	Depth	Result	
03/11/2019	0.00				0.00-2.00	C1			(1) Description derived from drillers daily report. (2) Horizontal core.
03/11/2019	2.00	Dry							

All dimensions in metres Scale 1:13.75	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC002
Client: University of Manchester	**Location:** Manchester E:384590.548 N:397633.327		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.307	**Start Date:** 03/11/2019	**Sheet:** 2 of 2

Figure HC002.1
HC002 0.00-2.00m BGL



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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC003
Client: University of Manchester	**Location:** Manchester E:384649.515 N:397655.474		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.771	**Start Date:** 02/11/2019	**Sheet:** 1 of 2

RUN DETAILS		STRATA			
Depth & (Core Ø)	Recovery %	Reduced Level	Legend	Depth (Thickness)	Description
0.000 (80mm)	100	34.77		0.100	MADE GROUND (Strong orange red brick with moderately strong light grey mortar, well bonded. (Facing brick)).
		34.77		(0.230) 0.330	MADE GROUND (Medium strong to strong light red brick with medium strong light grey mortar, well bonded).
		34.77		(0.220) 0.550	MADE GROUND (Strong light grey concrete with 2-4% voids. 70-80% of aggregate is fine to coarse subrounded to angular basalt, dolomite and limestone).
		34.77		(1.450) 2.000	MADE GROUND (Moderately weak to medium strong dark to light orange red brick with weak dark grey mortar, poorly bonded).
					Complete at 2.000m BGL.

Drilling Progress and Water Observations			Flush		Samples		PAK Marker		General Remarks
Date	Depth	Water Standing	Depth	Flush	Depth	Type & No.	Depth	Result	
02/11/2019	0.00				0.00-2.00	C1			(1) Description derived from drillers daily report. (2) Horizontal core.
02/11/2019	2.00	Dry							

All dimensions in metres Scale 1:13.75	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC003
Client: University of Manchester	**Location:** Manchester E:384649.515 N:397655.474		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 34.771	**Start Date:** 02/11/2019	**Sheet:** 2 of 2

Figure HC003.1
HC003 0.00-2.00m BGL



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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC004
Client: University of Manchester	**Location:** Manchester E:384620.234 N:397491.337		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 31.630	**Start Date:** 10/11/2019	**Sheet:** 1 of 2

RUN DETAILS		STRATA			
Depth & (Core Ø)	Recovery %	Reduced Level	Legend	Depth (Thickness)	Description
0.000 (80mm)	91	31.63		(0.420) 0.420	MADE GROUND (Extremely strong light grey concrete with 5% voids. 85% of agregate is fine to coarse subrounded to angular basalt, dolomite and limestone). at c.0.05-0.10m BGL ... 5mm diameter reinforcement bars noted. at c.0.36-0.42m BGL ... 8-10mm diameter reinforcement bars noted.
		31.63		0.460	MADE GROUND (Hardcore/Gravel. Engineer notes coarse angular material behind concrete wall). *Terminated at 0.460m BGL - due to unsuitable material.*

Drilling Progress and Water Observations			Flush		Samples		PAK Marker		General Remarks
Date	Depth	Water Standing	Depth	Flush	Depth	Type & No.	Depth	Result	
10/11/2019	0.00				0.00-0.42	C1			(1) Description derived from drillers daily report. (2) Horizontal core.
10/11/2019	0.46	Dry							

All dimensions in metres Scale 1:12.5	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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CONCRETE CORE RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** HC004
Client: University of Manchester	**Location:** Manchester E:384620.234 N:397491.337		
Method (Equipment): Concrete Coring (Xcalibre Vulcan)	**Ground Level (m):** 31.630	**Start Date:** 10/11/2019	**Sheet:** 2 of 2

Figure HC004.1
HC004 0.00-0.46m BGL



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FIELD DATA ENCLOSURE 5

Trial Pit Records

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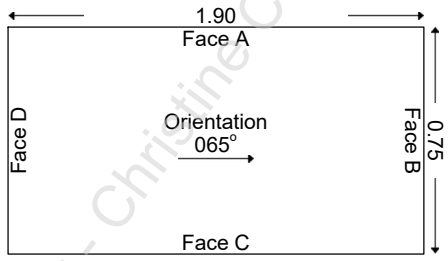
TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP001
Client: University of Manchester	**Location:** Manchester E:384615.418 N:397543.899		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 33.208	**Start Date:** 28/10/2019	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.25	B1			32.91		0.30	MADE GROUND (Grass over topsoil consisting of dark brown gravelly sand with medium cobble and boulder content. Sand is fine to medium. Gravel is fine to coarse and includes sandstone, quartz and brick. Cobbles and boulders are subangular and includes sandstone).
0.25	J2						
0.25	ES3					(1.10)	
0.80	B4						MADE GROUND (Brown clayey very gravelly sandy with medium cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular and includes sandstone, concrete, coal, clinker and brick. Cobbles are subrounded to angular and includes sandstone and brick. Boulders are angular and include sandstone).
0.80	J5						
0.80	ES6			31.81		1.40	
1.50	B7						Light brown clayey very gravelly SAND with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse rounded to subangular and includes sandstone and quartz.
1.50	J8						
1.50	ES9					(1.20)	between c.1.40-2.60m BGL ... occasional pockets of brown sandy silt.
2.50	B10			30.61		2.60	
2.50	J11						*Terminated at 2.60m BGL - due to side stability.*

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides moderately unstable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS
(1) Soakaway test attempted between 1.40-2.60m BGL but unable to fill pit due to infiltration rate. Engineer notes flow rate of 33 litres per minute.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP001
Client: University of Manchester	**Location:** Manchester E:384615.418 N:397543.899		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 33.208	**Start Date:** 28/10/2019	**Sheet:** 2 of 4

Figure TP001.1
TP001 Before investigation works



Figure TP001.2
TP001



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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP001
Client: University of Manchester	**Location:** Manchester E:384615.418 N:397543.899		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 33.208	**Start Date:** 28/10/2019	**Sheet:** 3 of 4

Figure TP001.3
TP001



Figure TP001.4
TP001 Spoil



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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP001
Client: University of Manchester	**Location:** Manchester E:384615.418 N:397543.899		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 33.208	**Start Date:** 28/10/2019	**Sheet:** 4 of 4

Figure TP001.5
TP001 Reinstatement



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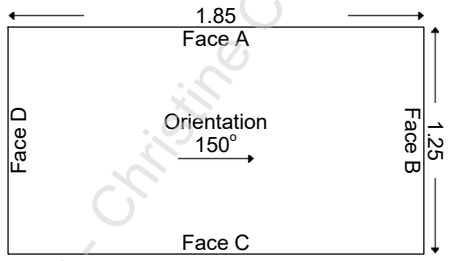
TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP002
Client: University of Manchester	**Location:** Manchester E:384628.470 N:397622.871		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 32.851	**Start Date:** 29/10/2019	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
				32.80		0.05	MADE GROUND (Concrete flag slabs).
				32.55		0.30	MADE GROUND (Concrete).
				32.45		0.40	MADE GROUND (Brown grey gravel. Gravel is coarse subangular to angular and includes limestone (sub-base)).
0.40	B1						
0.40	J2						
0.40	ES3					(0.65)	
				31.80		1.05	MADE GROUND (Grey clayey very gravelly sand with medium cobble content and glass bottles. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular and includes sandstone, quartz, coal, brick, concrete and clinker. Cobbles are subangular to angular and includes sandstone and brick).
1.00	B4						
1.00	J5						
1.00	ES6					(0.75)	
1.50	B7						
1.50	J8			31.05		1.80	MADE GROUND (Red brown gravelly sand with low cobble content. Sand is fine to medium. Gravel s fine to coarse rounded to subangular and includes sandstone and quartz).
1.50	ES9						
						(1.00)	MADE GROUND (Grey brown clayey very gravelly sand with medium cobble content and glass bottles. Sand is fine to coarse. Gravel is fine to coarse subrounded to angular and includes sandstone, quartz, coal, brick and clinker. Cobbles are subangular to angular and includes sandstone, masonary and brick).
2.50	B10						
2.50	J11						
2.50	ES12			30.05		2.80	
							Complete at 2.80m BGL.

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides unstable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. **NW1588**

Print Date and Time: 16/04/2020 11:48:38

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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP002
Client: University of Manchester	**Location:** Manchester E:384628.470 N:397622.871		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 32.851	**Start Date:** 29/10/2019	**Sheet:** 2 of 4

Figure TP002.1
TP002 Before investigation works



Figure TP002.2
TP002



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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP002
Client: University of Manchester	**Location:** Manchester E:384628.470 N:397622.871		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 32.851	**Start Date:** 29/10/2019	**Sheet:** 3 of 4

Figure TP002.3
TP002



Figure TP002.4
TP002



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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP002
Client: University of Manchester	**Location:** Manchester E:384628.470 N:397622.871		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 32.851	**Start Date:** 29/10/2019	**Sheet:** 4 of 4

Figure TP002.5
TP002 Spoil



Figure TP002.6
TP002 Reinstatement



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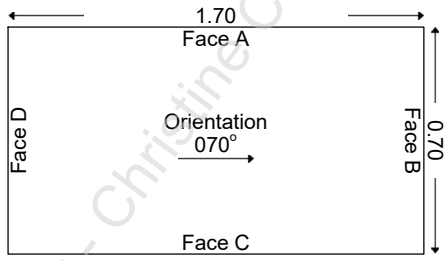
TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP003
Client: University of Manchester	**Location:** Manchester E:384773.569 N:397508.869		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 34.238	**Start Date:** 28/10/2019	**Sheet:** 1 of 3

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
				33.99		0.25	MADE GROUND (Grass over topsoil consisting of dark black brown slightly silty sand with some rootlets. Sand is medium.
0.20	B1						
0.20	J2			33.74		0.50	MADE GROUND (Brown grey very gravelly sand with medium cobble content. Sand is fine to medium. Gravel is fine to coarse subangular and includes sandstone, concrete and brick. Cobbles are angular and includes brick).
0.20	ES3						
0.40	B4						
0.40	J5						
0.40	ES6						
1.00	B7						
1.00	J8						
1.00	ES9					(2.50)	MADE GROUND (Orange clayey gravelly sand with medium cobble and low boulder content and fragments of plastic, ceramic and iron. Sand is fine to medium. Gravel is fine to coarse rounded to subangular and includes sandstone, brick, quartz and coal. Cobbles are rounded to angular and includes sandstone and brick. Boulders are subrounded to angular and include sandstone).
2.00	B10						
2.00	J11						
				31.24		3.00	
3.00	B12						*Complete at 3.00m BGL.*
3.00	J13						

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides relatively stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: K.W.	Logged by: D. Susnik	Contract No. NW1588

Print Date and Time: 16/04/2020 11:48:52

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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP003
Client: University of Manchester	**Location:** Manchester E:384773.569 N:397508.869		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 34.238	**Start Date:** 28/10/2019	**Sheet:** 2 of 3

Figure TP003.1
TP003



Figure TP003.2
TP003



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TRIAL PIT RECORD

Status:- FINAL

Project: ID Manchester Preliminary Ground Investigation			**Exploratory Hole No.** TP003
Client: University of Manchester	**Location:** Manchester E:384773.569 N:397508.869		
Method (Equipment): Machine Excavated (TB240)	**Ground Level (m):** 34.238	**Start Date:** 28/10/2019	**Sheet:** 3 of 3

Figure TP003.3
TP003 Spoil



Figure TP003.4
TP003 Reinstatement



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FIELD DATA ENCLOSURE 6

Groundwater Monitoring Results

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GROUNDWATER MONITORING RESULTS

Monitoring Point	Date and Time	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Remarks
BH001	22/11/2019 10:30	15.50m 50mm SP	37.81	9.47	28.34	
BH001	03/12/2019 07:15	15.50m 50mm SP	37.81	9.52	28.29	
BH001	16/01/2020 15:30	15.50m 50mm SP	37.81	9.50	28.31	
BH001	06/02/2020 12:04	15.50m 50mm SP	37.81	9.73	28.08	
BH001	20/02/2020 15:40	15.50m 50mm SP	37.81	9.75	28.06	
BH001	06/03/2020 09:55	15.50m 50mm SP	37.81	9.80	28.01	
BH002	22/11/2019 13:25	3.00m 50mm SP	33.27	Wet at Tip		
BH002	03/12/2019 07:25	3.00m 50mm SP	33.27	Wet at Tip		
BH002	17/01/2020 10:15	3.00m 50mm SP	33.27	Dry		
BH002	06/02/2020 12:19	3.00m 50mm SP	33.27	Dry		
BH002	20/02/2020 15:55	3.00m 50mm SP	33.27	Dry		
BH002	06/03/2020 10:12	3.00m 50mm SP	33.27	Wet at Tip		
BH002	22/11/2019 13:25	4.00m 50mm SP	33.27	Dry		
BH002	03/12/2019 07:25	4.00m 50mm SP	33.27	Dry		
BH002	17/01/2020 10:15	4.00m 50mm SP	33.27	Dry		
BH002	06/02/2020 12:17	4.00m 50mm SP	33.27	Dry		
BH002	20/02/2020 15:55	4.00m 50mm SP	33.27	Dry		
BH002	06/03/2020 10:10	4.00m 50mm SP	33.27	Wet at Tip		
BH004	22/11/2019 13:20	14.00m 50mm SP	34.22	5.98	28.24	
BH004	03/12/2019 07:05	14.00m 50mm SP	34.22	6.01	28.21	

SP = Standpipe - SPIE = Standpipe Piezometer.

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

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GROUNDWATER MONITORING RESULTS

Monitoring Point	Date and Time	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Remarks
BH004	17/01/2020 09:00	14.00m 50mm SP	34.22	6.06	28.16	
BH004	06/02/2020 13:03	14.00m 50mm SP	34.22	6.15	28.07	
BH004	20/02/2020 15:34	14.00m 50mm SP	34.22	6.20	28.02	
BH004	06/03/2020 09:45	14.00m 50mm SP	34.22	6.20	28.02	
BH004A	22/11/2019 13:20	4.00m 50mm SP	34.19	Wet at Tip		
BH004A	03/12/2019 07:10	4.00m 50mm SP	34.19	Wet at Tip		
BH004A	17/01/2020 16:20	4.00m 50mm SP	34.19	Dry		
BH004A	06/02/2020 15:30	4.00m 50mm SP	34.19	Dry		
BH004A	20/02/2020 15:30	4.00m 50mm SP	34.19	Wet at Tip		
BH004A	06/03/2020 09:45	4.00m 50mm SP	34.19	Wet at Tip		
BH005	17/01/2020 13:30	21.50m 50mm SP	33.42	5.60	27.82	
BH005	06/02/2020 12:32	21.50m 50mm SP	33.42	5.27	28.15	
BH005	20/02/2020 16:10	21.50m 50mm SP	33.42	5.30	28.12	
BH005	06/03/2020 10:20	21.50m 50mm SP	33.42	5.25	28.17	
BH007	22/11/2019 13:35	13.60m 50mm SP	34.68	6.02	28.66	
BH007	03/12/2019 07:35	13.60m 50mm SP	34.68	3.00	31.68	
BH007	17/01/2020 11:20	13.60m 50mm SP	34.68	6.07	28.61	
BH007	06/02/2020 12:48	13.60m 50mm SP	34.68	6.27	28.41	
BH007	20/02/2020 16:20	13.60m 50mm SP	34.68	6.20	28.48	
BH007	06/03/2020 10:30	13.60m 50mm SP	34.68	6.10	28.58	

SP = Standpipe - SPIE = Standpipe Piezometer.

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Certificate No. :- GWMR/NW1588/2	Date of Issue :- 06/03/2020	Page No. :- 2 of 4
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GROUNDWATER MONITORING RESULTS

Monitoring Point	Date and Time	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Remarks
BH008	22/11/2019 13:40	6.50m 50mm SP	34.05	5.32	28.73	
BH008	03/12/2019 07:40	6.50m 50mm SP	34.05	5.29	28.76	
BH008	17/01/2020 11:50	6.50m 50mm SP	34.05	Wet at Tip		
BH008	06/02/2020 13:20	6.50m 50mm SP	34.05	5.51	28.54	
BH008	20/02/2020 16:24	6.50m 50mm SP	34.05	5.50	28.55	
BH008	06/03/2020 10:40	6.50m 50mm SP	34.05	5.50	28.55	
BH009	22/11/2019 13:45	1.70m 50mm SP	34.20	Dry		
BH009	03/12/2019 07:45	1.70m 50mm SP	34.20	Dry		
BH009	17/01/2020 12:10	1.70m 50mm SP	34.20	Dry		
BH009	06/02/2020 13:41	1.70m 50mm SP	34.20	Dry		
BH009	20/02/2020 16:30	1.70m 50mm SP	34.20	Dry		
BH009	06/03/2020 10:50	1.70m 50mm SP	34.20	Wet at Tip		
BH011	03/12/2019 07:50	13.00m 50mm SP	34.05	5.56	28.49	
BH011	17/01/2020 12:40	13.00m 50mm SP	34.05	7.40	26.65	
BH011	06/02/2020 14:50	13.00m 50mm SP	34.05	5.65	28.40	
BH011	20/02/2020 17:03	13.00m 50mm SP	34.05	5.70	28.35	
BH011	06/03/2020 11:15	13.00m 50mm SP	34.05	5.60	28.45	
BH012A	22/11/2019 13:00	6.00m 50mm SP	38.27	5.99	32.28	
BH012A	03/12/2019 07:20	6.00m 50mm SP	38.27	5.98	32.29	
BH012A	17/01/2020 10:30	6.00m 50mm SP	38.27	Wet at Tip		

SP = Standpipe - SPIE = Standpipe Piezometer.

Contract Title :- ID Manchester Preliminary Ground Investigation

Client :- University of Manchester

Certificate No. :- GWMR/NW1588/3

Date of Issue :- 06/03/2020

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GROUNDWATER MONITORING RESULTS

Monitoring Point	Date and Time	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Remarks
BH012A	06/02/2020 15:02	6.00m 50mm SP	38.27	5.98	32.29	
BH012A	20/02/2020 15:50	6.00m 50mm SP	38.27	Wet at Tip		
BH012A	06/03/2020 10:05	6.00m 50mm SP	38.27	Wet at Tip		
BH013	22/11/2019 13:15	16.50m 50mm SP	33.08	5.30	27.78	
BH013	03/12/2019 06:55	16.50m 50mm SP	33.08	5.33	27.75	
BH013	15/01/2020 15:30	16.50m 50mm SP	33.08	5.30	27.78	
BH013	06/02/2020 15:18	16.50m 50mm SP	33.08	5.40	27.68	
BH013	20/02/2020 15:15	16.50m 50mm SP	33.08	5.40	27.68	
BH013	06/03/2020 09:30	16.50m 50mm SP	33.08	5.30	27.78	
DS001	03/12/2019 08:05	4.00m 50mm SP	34.22	2.60	31.62	
DS001	17/01/2020 12:20	4.00m 50mm SP	34.22	Wet at Tip		
DS001	06/02/2020 14:06	4.00m 50mm SP	34.22	3.17	31.05	
DS001	20/02/2020 16:40	4.00m 50mm SP	34.22	3.05	31.17	
DS001	06/03/2020 11:00	4.00m 50mm SP	34.22	3.00	31.22	
DS002	03/12/2019 08:00	9.90m 50mm SP	34.09	5.32	28.77	
DS002	17/01/2020 12:30	9.90m 50mm SP	34.09	9.70	24.39	
DS002	06/02/2020 14:30	9.90m 50mm SP	34.09	5.51	28.58	
DS002	20/02/2020 16:50	9.90m 50mm SP	34.09	5.45	28.64	
DS002	06/03/2020 11:05	9.90m 50mm SP	34.09	5.40	28.69	

SP = Standpipe - SPIE = Standpipe Piezometer.

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Certificate No. :- GWMR/NW1588/4	Date of Issue :- 06/03/2020	Page No. :- 4 of 4	
Checked B[redacted]		AEG Contract No. :- NW1588	

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FIELD DATA ENCLOSURE 7

Gas Monitoring Results

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GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
BH001	16/01/2020 15:30	Rain	10	15.50m 50mm SP	37.81	9.50	28.31	0.0	0.05	997	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.4	20.4	1	<1.0	
BH001	06/02/2020 12:04	Sunny	6	15.50m 50mm SP	37.81	9.73	28.08	0.0	0.09	1031	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.5	20.5	<1.0	<1.0	
BH001	20/02/2020 15:40	Fair	4	15.50m 50mm SP	37.81	9.75	28.06	0.0	0.07	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.4	20.4	<1.0	<1.0	
BH001	06/03/2020 09:55	Sunny	6	15.50m 50mm SP	37.81	9.80	28.01	0.0	0.06	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.1	20.2	20.8	<1.0	<1.0	
BH002	17/01/2020 10:15	Rain	9	3.00m 50mm SP	33.27	Dry		0.0	-0.05	1000	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.7	20.7	<1.0	<1.0	
BH002	06/02/2020 12:19	Sunny	6	3.00m 50mm SP	33.27	Dry		0.0	0.04	1030	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.1	20.1	<1.0	<1.0	
BH002	20/02/2020 15:55	Fair	4	3.00m 50mm SP	33.27	Dry		0.0	-0.05	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.1	20.3	20.3	<1.0	<1.0	
BH002	06/03/2020 10:12	Sunny	6	3.00m 50mm SP	33.27	Wet at Tip		0.0	-0.04	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.3	20.4	<1.0	<1.0	
BH002	17/01/2020 10:15	Rain	9	4.00m 50mm SP	33.27	Dry		0.0	-0.03	1000	<0.1	<0.1	<2.0	<2.0	0.5	0.5	20.5	20.5	<1.0	<1.0	
BH002	06/02/2020 12:17	Sunny	6	4.00m 50mm SP	33.27	Dry		0.0	-0.02	1031	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.0	20.0	<1.0	1.0	
BH002	20/02/2020 15:55	Fair	4	4.00m 50mm SP	33.27	Dry		0.0	-0.03	1001	<0.1	<0.1	<2.0	<2.0	0.4	0.4	20.0	20.1	<1.0	<1.0	

See attached Calibration Certificate for Model No. and any other details. SP = Standpipe - SPIE = Standpipe Piezometer. (P) = Peak - (S) = Steady - (D) = Decline.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 06/03/2020	Page No. :- 1 of 6	Checked By :- [redacted]	Certificate No. :- MON/NW1588/1

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
BH002	06/03/2020 10:10	Sunny	6	4.00m 50mm SP	33.27	Wet at Tip		0.0	-0.04	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.1	20.2	20.2	<1.0	<1.0	
BH004	17/01/2020 09:00	Rain	9	14.00m 50mm SP	34.22	6.06	28.16	0.0	0.05	1000	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.4	20.4	1	<1.0	
BH004	06/02/2020 13:03	Sunny	6	14.00m 50mm SP	34.22	6.15	28.07	0.0	0.14	1030	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.3	20.3	1.0	<1.0	
BH004	20/02/2020 15:34	Fair	4	14.00m 50mm SP	34.22	6.20	28.02	0.0	0.08	1001	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.6	<1.0	<1.0	
BH004	06/03/2020 09:45	Sunny	6	14.00m 50mm SP	34.22	6.20	28.02	0.0	0.07	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.1	20.5	20.5	<1.0	<1.0	
BH004A	17/01/2020 16:20	Rain	9	4.00m 50mm SP	34.19	Dry		0.0	0.02	999	<0.1	<0.1	<2.0	<2.0	1.3	1.3	19.6	19.6	1	<1.0	
BH004A	06/02/2020 15:30	Sunny	7	4.00m 50mm SP	34.19	Dry		0.0	0.02	1029	<0.1	<0.1	<2.0	<2.0	0.7	0.4	20.1	20.1	<1.0	<1.0	
BH004A	20/02/2020 15:30	Fair	4	4.00m 50mm SP	34.19	Wet at Tip		0.0	0.04	1001	<0.1	<0.1	<2.0	<2.0	0.5	0.2	20.3	20.3	<1.0	<1.0	
BH004A	06/03/2020 09:45	Sunny	6	4.00m 50mm SP	34.19	Wet at Tip		0.0	0.05	1001	<0.1	<0.1	<2.0	<2.0	0.6	0.4	20.4	20.5	<1.0	<1.0	
BH005	17/01/2020 13:30	Rain	9	21.50m 50mm SP	33.42	5.60	27.82	0.0	-0.04	1000	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.4	20.4	<1.0	<1.0	
BH005	06/02/2020 12:32	Sunny	6	21.50m 50mm SP	33.42	5.27	28.15	0.0	-0.02	1030	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.4	20.5	<1.0	<1.0	

See attached Calibration Certificate for Model No. and any other details. SP = Standpipe - SPIE = Standpipe Piezometer. (P) = Peak - (S) = Steady - (D) = Decline.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 06/03/2020	Page No. :- 2 of 6	Checked E [redacted]	Certificate No. :- MON/NW1588/2

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ALLIED EXPLORATION & GEOTECHNICS LIMITED

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GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
BH005	20/02/2020 16:10	Fair	4	21.50m 50mm SP	33.42	5.30	28.12	0.0	-0.01	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.1	20.1	<1.0	<1.0	
BH005	06/03/2020 10:20	Sunny	6	21.50m 50mm SP	33.42	5.25	28.17	0.0	-0.02	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.2	20.2	20.3	<1.0	<1.0	
BH007	17/01/2020 11:20	Rain	9	13.60m 50mm SP	34.68	6.07	28.61	0.0	-0.08	1000	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.6	20.6	<1.0	<1.0	
BH007	06/02/2020 12:48	Sunny	6	13.60m 50mm SP	34.68	6.27	28.41	0.0	-0.10	1030	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.6	<1.0	<1.0	
BH007	20/02/2020 16:20	Fair	4	13.60m 50mm SP	34.68	6.20	28.48	0.0	-0.08	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.3	20.3	<1.0	<1.0	
BH007	06/03/2020 10:30	Sunny	6	13.60m 50mm SP	34.68	6.10	28.58	0.0	-0.08	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.3	20.4	<1.0	<1.0	
BH008	17/01/2020 11:50	Rain	9	6.50m 50mm SP	34.05	Wet at Tip		0.0	-0.03	1000	<0.1	<0.1	<2.0	<2.0	0.5	0.5	20.2	20.2	<1.0	<1.0	
BH008	06/02/2020 13:20	Sunny	6	6.50m 50mm SP	34.05	5.51	28.54	0.0	0.12	1030	<0.1	<0.1	<2.0	<2.0	0.4	0.4	20.1	20.1	<1.0	<1.0	
BH008	20/02/2020 16:24	Fair	4	6.50m 50mm SP	34.05	5.50	28.55	0.0	0.04	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.4	20.4	<1.0	<1.0	
BH008	06/03/2020 10:40	Sunny	6	6.50m 50mm SP	34.05	5.50	28.55	0.0	0.04	1001	<0.1	<0.1	<2.0	<2.0	0.1	<0.1	20.5	20.5	<1.0	<1.0	
BH009	17/01/2020 12:10	Rain	9	1.70m 50mm SP	34.20	Dry		0.0	-0.02	1000	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.6	<1.0	<1.0	

See attached Calibration Certificate for Model No. and any other details. SP = Standpipe - SPIE = Standpipe Piezometer. (P) = Peak - (S) = Steady - (D) = Decline.

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 06/03/2020	Page No. :- 3 of 6	Checked By [redacted]
		Certificate No. :- MON/NW1588/3

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GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
BH009	06/02/2020 13:41	Sunny	6	1.70m 50mm SP	34.20	Dry		0.0	-0.02	1030	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.7	20.7	<1.0	<1.0	
BH009	20/02/2020 16:30	Fair	4	1.70m 50mm SP	34.20	Dry		0.0	-0.03	1001	<0.1	<0.1	<2.0	<2.0	0.1	<0.1	20.7	20.8	<1.0	<1.0	
BH009	06/03/2020 10:50	Sunny	6	1.70m 50mm SP	34.20	Wet at Tip		0.0	-0.03	1001	<0.1	<0.1	<2.0	<2.0	0.1	<0.1	20.4	20.5	<1.0	<1.0	
BH011	17/01/2020 12:40	Rain	9	13.00m 50mm SP	34.05	7.40	26.65	0.0	0.05	1000	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.6	<1.0	<1.0	
BH011	06/02/2020 14:50	Sunny	7	13.00m 50mm SP	34.05	5.65	28.40	0.0	0.07	1029	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.7	20.7	<1.0	<1.0	
BH011	20/02/2020 17:03	Fair	4	13.00m 50mm SP	34.05	5.70	28.35	0.0	0.04	1001	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.7	<1.0	<1.0	
BH011	06/03/2020 11:15	Sunny	6	13.00m 50mm SP	34.05	5.60	28.45	0.0	0.03	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.5	20.5	<1.0	<1.0	
BH012A	17/01/2020 10:30	Rain	9	6.00m 50mm SP	38.27	Wet at Tip		0.0	-0.04	1000	<0.1	<0.1	<2.0	<2.0	0.6	0.1	20.5	20.6	<1.0	<1.0	
BH012A	06/02/2020 15:02	Sunny	7	6.00m 50mm SP	38.27	5.98	32.29	0.0	0.04	1029	<0.1	<0.1	<2.0	<2.0	0.3	0.2	20.5	20.5	<1.0	<1.0	
BH012A	20/02/2020 15:50	Fair	4	6.00m 50mm SP	38.27	Wet at Tip		0.0	0.06	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.2	20.2	<1.0	<1.0	
BH012A	06/03/2020 10:05	Sunny	6	6.00m 50mm SP	38.27	Wet at Tip		0.0	0.06	1001	<0.1	<0.1	<2.0	<2.0	0.4	0.2	20.2	20.3	<1.0	<1.0	

See attached Calibration Certificate for Model No. and any other details. SP = Standpipe - SPIE = Standpipe Piezometer. (P) = Peak - (S) = Steady - (D) = Decline.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 06/03/2020	Page No. :- 4 of 6	Che [redacted]	Certificate No. :- MON/NW1588/4

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GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
BH013	15/01/2020 15:30	Rain	9	16.50m 50mm SP	33.08	5.30	27.78	0.2	0.50	999	<0.1	<0.1	<2.0	<2.0	0.5	0.5	20.3	20.3	1	<1.0	
BH013	06/02/2020 15:18	Sunny	7	16.50m 50mm SP	33.08	5.40	27.68	0.1	-0.09	1029	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.3	20.3	<1.0	<1.0	
BH013	20/02/2020 15:15	Fair	4	16.50m 50mm SP	33.08	5.40	27.68	0.0	-0.06	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.6	20.6	<1.0	<1.0	
BH013	06/03/2020 09:30	Sunny	6	16.50m 50mm SP	33.08	5.30	27.78	0.0	-0.04	1001	<0.1	<0.1	<2.0	<2.0	0.1	0.1	20.6	20.6	<1.0	<1.0	
DS001	17/01/2020 12:20	Rain	9	4.00m 50mm SP	34.22	Wet at Tip		0.0	-0.04	1000	<0.1	<0.1	<2.0	<2.0	0.4	0.4	20.2	20.2	<1.0	<1.0	
DS001	06/02/2020 14:06	Sunny	6	4.00m 50mm SP	34.22	3.17	31.05	0.0	0.27	1029	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.4	20.4	<1.0	<1.0	
DS001	20/02/2020 16:40	Fair	4	4.00m 50mm SP	34.22	3.05	31.17	0.0	0.12	1001	<0.1	<0.1	<2.0	<2.0	0.4	0.4	20.5	20.4	<1.0	<1.0	
DS001	06/03/2020 11:00	Sunny	6	4.00m 50mm SP	34.22	3.00	31.22	0.0	0.09	1001	<0.1	<0.1	<2.0	<2.0	0.2	0.2	20.2	20.2	<1.0	<1.0	
DS002	17/01/2020 12:30	Rain	9	9.90m 50mm SP	34.09	9.70	24.39	0.0	-0.08	1000	<0.1	<0.1	<2.0	<2.0	0.6	0.6	20.1	20.1	<1.0	<1.0	
DS002	06/02/2020 14:30	Sunny	6	9.90m 50mm SP	34.09	5.51	28.58	0.0	0.16	1029	<0.1	<0.1	<2.0	<2.0	0.5	0.5	20.1	20.1	<1.0	<1.0	
DS002	20/02/2020 16:50	Fair	4	9.90m 50mm SP	34.09	5.45	28.64	0.0	0.04	1001	<0.1	<0.1	<2.0	<2.0	0.4	0.4	20.2	20.2	<1.0	<1.0	

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Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 06/03/2020	Page No. :- 5 of 6	Checked E [redacted]	Certificate No. :- MON/NW1588/5

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GAS MONITORING RESULTS

Monitoring Point	Date and Time	Weather Condition	Temperature °C	Depth and Type of Well	Ground Level (mAOD)	Water Depth (mBGL)	Reduced Water Level (mAOD)	Flow Range (l/hr)	Diff Pressure (mbar)	ATM Pressure Range (mbar)	Methane % v/v		Methane % LEL		Carbon Dioxide % v/v		Oxygen % v/v		Hydrogen Sulphide (ppm)	Carbon Monoxide (ppm)	Remarks
											(P)	(S)	(P)	(S)	(P)	(S)	(D)	(S)			
DS002	06/03/2020 11:05	Sunny	6	9.90m 50mm SP	34.09	5.40	28.69	0.0	0.06	1001	<0.1	<0.1	<2.0	<2.0	0.3	0.3	20.4	20.4	<1.0	<1.0	

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Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
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CERTIFICATION OF CALIBRATION

4533

Date Of Calibration: 21-Feb-2019

Certificate Number: G506065_2/22573

Issued by: QED Environmental Systems Ltd.

Customer: **Lombard North Central Plc**
Royal Bank of Scotland The Gemini Building 24-25 St Andrew Square
Edinburgh EH2 1AF UNITED KINGDOM

Description: Gas Analyser

Model: GA5000

Serial Number: G506065

UKAS Accredited results:

Methane (CH_4)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.0	4.8	0.41
15.0	14.8	0.64
49.9	49.3	0.94

Carbon Dioxide (CO_2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
5.0	4.9	0.43
15.0	14.8	0.70
50.1	50.1	1.1

Oxygen (O_2)		
Certified Gas (%)	**Instrument Reading (%)**	**Uncertainty (%)**
21.0	21.1	0.31

All concentrations are molar.

CH_4, CO_2 readings recorded at : 33.1 °C ± 2.5 °C

O2 readings recorded at : 22.8 °C ± 2.5 °C

Barometric Pressure : 1013 mbar ± 4 mbar

Method of Test : The analyser is calibrated in a temperature controlled chamber using a series of reference gases, in compliance with procedure LP004.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance: 101 IGC Instance: N/A

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM

Registered in England and Wales 1898734

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CERTIFICATION OF CALIBRATION

4533

Date Of Calibration: 21-Feb-2019

Certificate Number: G506065_2/22573

Issued by: QED Environmental Systems Ltd.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Calibrations marked 'Non-UKAS Accredited results' on this certificate have been included for completeness.

Non-UKAS accredited results after adjustment:

Barometer (mbar)	
Reference	**Instrument Reading**
1013	1013

Additional Gas Cells		
Gas	**Certified Gas (ppm)**	**Instrument Reading (ppm)**
CO	497	507
H_2S	257	257

Internal Flow	
Applied (l/hr)	**Instrument Reading (l/hr)**
5	5.2
10	10.3

Date of Issue : 25-Feb-2019

Approved by Signatory [redacted]

Dawn Hemings

Laboratory Inspection

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This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Calibration Instance:101 IGC Instance:N/A

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

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In-situ Test Report Certificate

IN-SITU TESTING ENCLOSURES

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL – Tel: 01254 503 200 Fax: 01254 662 590

IN-SITU TESTING REPORT CERTIFICATE

UKAS TESTING 1367

Contract Title: ID Manchester Preliminary Ground Investigation

AEG Reference: NW1588

Client Address: University of Manchester

I certify that *In-situ* testing was carried out on the above contract in accordance with techniques outlined in BS 1377: 1990: Part 9 or other appropriate standards as quoted, and the following results, given on the attached enclosures, were obtained.

The tests carried out are indicated in the attached table showing the enclosure number and the total number of pages.

For and on behalf of Allied Exploration & Geotechnics Limited

☐ Nick Vater (Managing Director)

☑ Kerry Wade (Technical Manager)

Signed [redacted] Date: 15 April 2020

Tests marked not UKAS accredited in this certificate are not included in the UKAS accreditation schedule for our laboratory. Any opinions and interpretations expressed herein are outside the scope of the laboratory's UKAS accreditation

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IN-SITU TESTING REPORT CERTIFICATE

ENCLOSURES

Enclosure Number	Description	UKAS Accredited	Reference	No. of Pages
0	Test Report Certificate	N/A		2
1	Standard Penetration Test Results (SPT)	Yes	BS 1377 Part 9 1990	29
-	Hand Shear Vane Test Results	No		-
-	Variable Head Permeability Test Results	No	BS 5930 1999:Section 4	-
2	*In-situ* Water Quality Parameter Test Results	No		4
-	Density by Sand Replacement Method	Yes	BS 1377 Part 9 1990	-
-	Density by Core Cutter Method	Yes	BS 1377 Part 9 1990	-
-	Determination of the Vane Shear Strength (Down the Hole)	Yes	BS 1377 Part 9 1990	-
-	Shallow Pad (skip) Load Test Results	No	BS 1377 Part 9 1990	-
-	Determination of the California Bearing Ratio	Yes	BS 1377 Part 9 1990	-
-	Plate Loading Test Results	No	BS 1377 Part 9 1990	-
-	Apparent Resistivity of Soil	No	BS 1377 Part 9 1990	-
-	Redox Potential of Soil	No	BS 1377 Part 9 1990	-
-	Determination of the Soil Infiltration Rate for Soakaway Design	No	BRE Digest 365:1991	-

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Standard Penetration Test Results

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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH001	2.00 (35.81)	Dry (1.80)	2.00	ATH02	54	75	2	75	2	150	4	75	2	75	2	75	2	75	2	300	8	0.68	0.90	37.50	8	5	S	
BH001	3.00 (34.81)	Dry (2.80)	3.00	ATH02	54	75	2	75	2	150	4	75	2	75	2	75	3	75	3	300	10	0.72	0.90	30.00	10	6	S	
BH001	4.00 (33.81)	Dry (3.80)	4.00	ATH02	54	75	2	75	2	150	4	75	10	75	15	75	18	25	7	250	50	0.76	0.90	5.00	-	-	S	
BH001	5.00 (32.81)	Dry (4.80)	5.00	ATH02	54	75	6	75	11	150	17	75	20	25	30					100	50	0.80	0.90	2.00	-	-	S	
BH001	5.50 (32.31)	Dry (5.30)	5.50	ATH02	54	75	15	50	10	125	25	75	25	50	25					125	50	0.82	0.90	2.50	-	-	S	
BH001	9.50 (28.31)	0.00 (9.50)	9.50	ATH05	70	75	20	75	40	150	60	20	60							20	60	0.98	1.17	0.33	-	-	S	
BH001	12.50 (25.31)	0.00 (12.50)	12.50	ATH05	70	75	26	75	73	150	99	10	27							10	27	1.00	1.17	0.37	-	-	S	
BH001	15.50 (22.31)	0.00 (15.50)	15.50	ATH05	70	30	25			30	25	30	100							30	100	1.00	1.17	0.30	-	-	S	
BH002	1.70 (31.57)	Dry (1.70)	1.70	ATH01	55	75	3	75	5	150	8	75	5	75	7	75	6	75	6	300	24	0.67	0.92	12.50	24	15	C	
BH002	2.70 (30.57)	Dry (2.70)	2.70	ATH01	55	75	6	75	6	150	12	75	8	75	12	75	20	14	10	239	50	0.71	0.92	4.78	-	-	C	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH002	3.70 (29.57)	Dry (3.70)	3.70	ATH01	55	38	25			38	25	21	50							21	50	0.75	0.92	0.42	-	-	S	
BH002	4.00 (29.27)	Dry (4.00)	4.00	ATH01	55	12	50			12	50	14	100							14	100	0.76	0.92	0.14	-	-	S	
BH003	1.70 (31.40)	Dry (1.70)	1.70	ATH01	55	75	3	75	5	150	8	75	2	75	6	75	7	75	14	300	29	0.67	0.92	10.34	29	18	C	
BH003	2.70 (30.40)	Dry (2.70)	2.70	ATH01	55	75	6	75	6	150	12	75	3	75	4	75	4	75	4	300	15	0.71	0.92	20.00	15	10	C	
BH003	3.70 (29.40)	Dry (3.70)	3.70	ATH01	55	75	1	75	0	150	1	75	3	75	8	75	17	75	9	300	37	0.75	0.92	8.11	37	26	C	
BH003	4.70 (28.40)	Dry (4.70)	4.70	ATH01	55	75	6	75	8	150	14	75	11	75	15	32	25			182	51	0.79	0.92	3.57	-	-	S	
BH003	5.20 (27.90)	Dry (5.20)	5.20	ATH01	55	36	25			36	25	29	50							29	50	0.81	0.92	0.58	-	-	S	
BH003	5.40 (27.70)	Dry (5.40)	5.40	ATH01	55	33	50			33	50	22	100							22	100	0.82	0.92	0.22	-	-	S	
BH004	1.40 (32.82)	Dry (1.20)	1.40	ATH07	60	75	4	75	8	150	12	75	14	75	10	75	8	75	7	300	39	0.66	1.00	7.69	39	26	S	
BH004	2.00 (32.22)	Dry (2.00)	2.00	ATH07	60	75	3	75	4	150	7	75	4	75	3	75	3	75	4	300	14	0.68	1.00	21.43	14	10	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH004	3.00 (31.22)	Dry (2.96)	3.00	ATH07	60	75	3	75	4	150	7	75	4	75	8	75	10	75	11	300	33	0.72	1.00	9.09	33	24	S	
BH004	4.00 (30.22)	Dry (3.79)	4.00	ATH07	60	75	5	75	12	150	17	75	23	75	16	50	11			200	50	0.76	1.00	4.00	-	-	S	
BH004	5.00 (29.22)	Dry (4.82)	5.00	ATH07	60	75	7	75	8	150	15	75	13	75	31	0	6			150	50	0.80	1.00	3.00	-	-	S	
BH004	6.00 (28.22)	Dry (5.94)	6.00	ATH07	60	75	5	75	8	150	13	75	10	75	8	75	13	75	12	300	43	0.84	1.00	6.98	43	36	C	
BH004	7.50 (26.72)	7.12 (7.50)	7.50	ATH07	60	75	8	75	12	150	20	75	18	75	27	0	5			150	50	0.90	1.00	3.00	-	-	C	
BH004	8.00 (26.22)	7.48 (7.90)	8.00	ATH07	60	20	25			20	25	40	50							40	50	0.92	1.00	0.80	-	-	S	
BH004	8.75 (25.47)	0.00 (8.75)	8.75	ATH05	70	50	25			50	25	48	50							48	50	0.95	1.17	0.96	-	-	S	
BH004	9.50 (24.72)	0.00 (9.50)	9.50	ATH05	70	60	25			60	25	36	50							36	50	0.98	1.17	0.72	-	-	S	
BH004	11.00 (23.22)	0.00 (11.00)	11.00	ATH05	70	20	25			20	25	30	50							30	50	1.00	1.17	0.60	-	-	S	
BH004	14.00 (20.22)	0.00 (14.00)	14.00	ATH05	70	20	25			20	25	25	50							25	50	1.00	1.17	0.50	-	-	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

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STANDARD PENETRATION TEST RESULTS

(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH005	1.50 (31.92)	Dry (1.50)	1.50	ATH01	55	75	6	75	12	150	18	75	27	22	23					97	50	0.66	0.92	1.94	-	-	S	
BH005	2.50 (30.92)	Dry (2.50)	2.50	ATH01	55	75	3	75	4	150	7	75	6	75	5	75	6	75	3	300	20	0.70	0.92	15.00	20	13	C	
BH005	3.30 (30.12)	Dry (3.30)	3.30	ATH01	55	52	25			52	25	48	50							48	50	0.73	0.92	0.96	-	-	S	
BH005	3.40 (30.02)	Dry (3.40)	3.40	ATH01	55	32	50			32	50	30	100							30	100	0.74	0.92	0.30	-	-	S	
BH005	17.00 (16.42)	0.00 (17.00)	17.00	ATH05	50	35	100			35	100											1.00	0.83		-	-	S	
BH006	1.40 (32.57)	Damp (1.40)	1.40	ATH07	60	75	8	30	17	105	25	10	50							10	50	0.66	1.00	0.20	-	-	C	
BH007	1.50 (33.18)	Dry (1.50)	1.50	ATH01	55	75	4	75	4	150	8	75	2	75	4	75	5	75	5	300	16	0.66	0.92	18.75	16	10	C	
BH007	2.50 (32.18)	Dry (2.50)	2.50	ATH01	55	75	3	75	4	150	7	75	8	75	4	75	4	75	4	300	20	0.70	0.92	15.00	20	13	S	
BH007	3.50 (31.18)	Dry (3.50)	3.50	ATH01	55	75	3	75	4	150	7	75	4	75	5	75	3	75	4	300	16	0.74	0.92	18.75	16	11	S	
BH007	4.50 (30.18)	Dry (4.50)	4.50	ATH01	55	75	18	75	6	150	24	75	2	75	2	75	3	75	3	300	10	0.78	0.92	30.00	10	7	C	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

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STANDARD PENETRATION TEST RESULTS

(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH007	6.50 (28.18)	Dry (6.50)	6.50	ATH01	55	75	2	75	2	150	4	75	3	75	2	75	3	75	2	300	10	0.86	0.92	30.00	10	8	C	
BH007	7.20 (27.48)	Dry (7.20)	7.20	ATH01	55	53	25			53	25	61	50							61	50	0.89	0.92	1.22	-	-	S	
BH007	7.50 (27.19)	Dry (7.50)	7.50	ATH01	55	41	50			41	50	39	100							39	100	0.90	0.92	0.39	-	-	S	
BH007	11.10 (23.58)	0.00 (12.10)	11.10	ATH05	70	35	25			35	25	30	50							30	50	1.00	1.17	0.60	-	-	S	
BH007	13.60 (21.08)	0.00 (13.60)	13.60	ATH05	70	20	25			20	25	40	50							40	50	1.00	1.17	0.80	-	-	S	
BH008	1.50 (32.55)	Dry (1.50)	1.50	ATH01	55	75	3	75	4	150	7	75	4	75	4	75	3	75	5	300	16	0.66	0.92	18.75	16	10	C	
BH008	2.50 (31.55)	Dry (2.50)	2.50	ATH01	55	75	2	75	5	150	7	75	5	75	4	75	4	75	3	300	16	0.70	0.92	18.75	16	10	C	
BH008	3.50 (30.55)	Dry (3.50)	3.50	ATH01	55	75	3	75	4	150	7	75	5	75	3	75	5	75	4	300	17	0.74	0.92	17.65	17	12	C	
BH008	4.50 (29.55)	Dry (4.50)	4.50	ATH01	55	75	2	75	1	150	3	75	2	75	1	75	2	75	1	300	6	0.78	0.92	50.00	6	4	S	
BH008	5.50 (28.55)	Dry (5.50)	5.50	ATH01	55	75	1	75	1	150	2	75	2	75	3	75	2	75	2	300	9	0.82	0.92	33.33	9	7	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

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STANDARD PENETRATION TEST RESULTS

(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH008	6.20 (27.85)	Dry (6.20)	6.20	ATH01	55	46	25			46	25	44	50							44	50	0.85	0.92	0.88	-	-	S	
BH008	6.50 (27.55)	Dry (6.50)	6.50	ATH01	55	40	50			40	50	52	100							52	100	0.86	0.92	0.52	-	-	S	
BH009	1.70 (32.50)	Dry (1.70)	1.70	ATH01	55	75	4	75	5	150	9	75	5	75	4	75	5	75	6	300	20	0.67	0.92	15.00	20	12	S	
BH009	2.70 (31.50)	Dry (2.70)	2.70	ATH01	55	75	3	75	4	150	7	75	5	75	5	75	6	75	7	300	23	0.71	0.92	13.04	23	15	S	
BH009	3.70 (30.50)	Dry (3.70)	3.70	ATH01	55	75	4	75	4	150	8	75	6	75	8	75	9	75	14	300	37	0.75	0.92	8.11	37	26	S	
BH009	4.60 (29.60)	Dry (4.60)	4.60	ATH01	55	75	17	14	25	89	42	6	25							6	25	0.78	0.92	0.24	-	-	S	
BH009	4.80 (29.40)	Dry (4.60)	4.80	ATH01	55	38	50			38	50	16	100							16	100	0.79	0.92	0.16	-	-	S	
BH011	1.70 (32.35)	Dry (1.70)	1.70	ATH01	55	75	12	75	8	150	20	75	10	75	9	75	9	75	11	300	39	0.67	0.92	7.69	39	24	C	
BH011	2.70 (31.35)	Dry (2.70)	2.70	ATH01	55	75	7	75	5	150	12	75	5	75	5	75	6	75	7	300	23	0.71	0.92	13.04	23	15	C	
BH011	3.70 (30.35)	Dry (3.70)	3.70	ATH01	55	75	3	75	4	150	7	75	4	75	4	75	5	75	4	300	17	0.75	0.92	17.65	17	12	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH011	4.70 (29.35)	Dry (4.70)	4.70	ATH01	55	75	5	75	4	150	9	75	5	75	6	75	6	75	8	300	25	0.79	0.92	12.00	25	18	S	
BH011	5.50 (28.55)	Dry (5.50)	5.50	ATH01	55	38	25			38	25	11	50							11	50	0.82	0.92	0.22	-	-	S	
BH011	6.20 (27.85)	Dry (6.20)	6.20	ATH01	55	25	25			25	25	18	50							18	50	0.85	0.92	0.36	-	-	S	
BH011	6.50 (27.55)	Dry (6.50)	6.50	ATH01	55	33	50			33	50	22	100							22	100	0.86	0.92	0.22	-	-	S	
BH012A	1.70 (36.57)	Dry (1.70)	1.70	ATH01	55	75	2	75	2	150	4	75	3	75	1	75	2	75	4	300	10	0.67	0.92	30.00	10	6	S	
BH012A	2.70 (35.57)	Dry (2.70)	2.70	ATH01	55	75	1	75	2	150	3	75	2	75	5	75	3	75	2	300	12	0.71	0.92	25.00	12	8	S	
BH012A	3.70 (34.57)	Dry (3.70)	3.70	ATH01	55	75	2	75	3	150	5	75	3	75	1	75	1	75	2	300	7	0.75	0.92	42.86	7	5	S	
BH012A	4.70 (33.57)	Dry (4.70)	4.70	ATH01	55	75	1	75	3	150	4	75	4	75	2	75	2	75	3	300	11	0.79	0.92	27.27	11	8	S	
BH012A	6.50 (31.77)	Dry (6.50)	6.50	ATH01	55	75	2	75	2	150	4	75	4	75	5	75	1	75	0	300	10	0.86	0.92	30.00	10	8	S	
BH012A	9.00 (29.27)	Dry (9.00)	9.00	ATH01	55	75	3	75	4	150	7	75	4	75	4	75	6	75	5	300	19	0.96	0.92	15.79	19	17	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 15/04/2020	Page No. :- 7 of 11	Checked [redacted]	Certificate No. :- SPT/NW1588/7

UKAS TESTING 1367

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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH012A	10.50 (27.77)	Dry (10.50)	10.50	ATH01	55	44	25			44	25	0	50							0	50	1.00	0.92	0.00	-	-	S	
BH012A	10.80 (27.47)	Dry (10.80)	10.80	ATH01	55	17	50			17	50	5	100							5	100	1.00	0.92	0.05	-	-	S	
BH013	1.70 (31.38)	Dry (1.70)	1.70	ATH01	55	75	4	75	4	150	8	75	5	75	8	75	11	75	10	300	34	0.67	0.92	8.82	34	21	C	
BH013	2.70 (30.38)	Dry (2.70)	2.70	ATH01	55	75	5	75	3	150	8	75	4	75	5	75	6	75	6	300	21	0.71	0.92	14.29	21	14	C	
BH013	3.70 (29.38)	Dry (3.70)	3.70	ATH01	55	75	2	75	2	150	4	75	8	75	7	75	7	75	8	300	30	0.75	0.92	10.00	30	21	C	
BH013	4.70 (28.38)	Dry (4.70)	4.70	ATH01	55	75	5	75	5	150	10	75	5	75	4	75	5	75	3	300	17	0.79	0.92	17.65	17	12	C	
BH013	6.00 (27.08)	Damp (6.00)	6.00	ATH01	55	75	3	75	4	150	7	75	4	75	4	75	5	75	7	300	20	0.84	0.92	15.00	20	15	C	
BH013	7.50 (25.58)	Damp (7.50)	7.50	ATH01	55	75	2	75	2	150	4	75	3	75	4	75	4	75	5	300	16	0.90	0.92	18.75	16	13	C	
BH013	8.00 (25.08)	Damp (8.00)	8.00	ATH01	55	36	25			36	25	9	50							9	50	0.92	0.92	0.18	-	-	S	
BH013	9.00 (24.08)	Damp (9.00)	9.00	ATH01	55	17	25			17	25	14	50							14	50	0.96	0.92	0.28	-	-	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 15/04/2020	Page No. :- 8 of 11	Checked [redacted]	Certificate No. :- SPT/NW1588/8

UKAS TESTING 1367

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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH013	10.40 (22.68)	Damp (10.40)	10.40	ATH01	55	31	50			31	50	12	100							12	100	1.00	0.92	0.12	-	-	S	
BH013	10.50 (22.58)	Damp (10.50)	10.50	ATH01	55	15	50			15	50	6	100							6	100	1.00	0.92	0.06	-	-	S	
BH013	13.50 (19.58)	0.00 (13.50)	13.50	ATH05	70	20	25			20	25	50	100							50	100	1.00	1.17	0.50	-	-	S	
BH013	16.50 (16.58)	0.00 (16.50)	16.50	ATH05	70	30	25			30	25	25	100							25	100	1.00	1.17	0.25	-	-	S	
BH014	1.20 (34.51)	Dry (1.00)	1.20	ATH02	54	75	4	75	5	150	9	75	4	75	5	75	6	75	8	300	23	0.65	0.90	13.04	23	13	S	
BH014	2.00 (33.71)	Dry (1.80)	2.00	ATH02	54	75	1	75	2	150	3	75	3	75	3	75	3	75	3	300	12	0.68	0.90	25.00	12	7	S	
BH014	3.00 (32.71)	Dry (2.80)	3.00	ATH02	54	75	2	75	3	150	5	75	3	75	3	75	4	75	4	300	14	0.72	0.90	21.43	14	9	S	
BH014	4.00 (31.71)	Dry (3.80)	4.00	ATH02	54	75	3	75	4	150	7	75	4	75	5	75	4	75	4	300	17	0.76	0.90	17.65	17	12	S	
BH014	5.00 (30.71)	Dry (4.80)	5.00	ATH02	54	75	4	75	10	150	14	75	12	75	13	75	5	75	7	300	37	0.80	0.90	8.11	37	27	S	
BH014	6.00 (29.71)	Dry (5.80)	6.00	ATH02	54	75	3	75	4	150	7	75	4	75	5	75	4	75	5	300	18	0.84	0.90	16.67	18	14	S	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 15/04/2020	Page No. :- 9 of 11	Checked By :- [redacted]	Certificate No. :- SPT/NW1588/9

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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
BH014	7.50 (28.21)	Dry (7.30)	7.50	ATH02	54	75	6	75	11	150	17	75	14	75	22	50	14			200	50	0.90	0.90	4.00	-	-	S	
BH014	9.00 (26.71)	0.62 (8.80)	9.00	ATH02	54	75	4	75	9	150	13	75	10	75	11	75	11	75	14	300	46	0.96	0.90	6.52	46	40	C	
BH014	9.50 (26.21)	0.91 (9.30)	9.50	ATH02	54	75	7	75	11	150	18	75	14	75	20	40	16			190	50	0.98	0.90	3.80	-	-	S	
BH014	10.00 (25.71)	0.77 (9.80)	10.00	ATH02	54	75	10	35	15	110	25	75	27	30	23					105	50	1.00	0.90	2.10	-	-	S	
DS001	2.20 (32.02)	Dry (2.20)	2.20	ATH01	55	75	1	75	0	150	1	75	1	75	1	75	1	75	1	300	4	0.69	0.92	75.00	4	3	S	
DS001	3.20 (31.02)	1.06 (3.20)	3.20	ATH01	55	75	1	75	1	150	2	75	6	75	7	75	6	75	6	300	25	0.73	0.92	12.00	25	17	S	
DS001	4.50 (29.72)	3.19 (4.50)	4.50	ATH01	55	75	6	75	5	150	11	75	6	75	9	75	4	75	5	300	24	0.78	0.92	12.50	24	17	S	
DS001	7.00 (27.22)	2.11 (7.00)	7.00	ATH01	55	75	14	75	16	150	30	11	50							11	50	0.88	0.92	0.22	-	-	C	
DS001	8.60 (25.62)	5.11 (7.50)	8.60	ATH01	55	75	14	75	16	150	30	11	50							11	50	0.94	0.92	0.22	-	-	C	
DS001	9.30 (24.92)	4.16 (7.50)	9.30	ATH01	55	47	50			47	50											0.97	0.92		-	-	C	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No.	Test Depth (Reduced Level)	Water Depth (Casing)	Rod Length	SPT Hammer Ref.	Energy Ratio E_m	SEATING DRIVE						TEST DRIVE										Rod Length Corr. C_R	Energy Ratio Corr. C_E	Pen (mm)/Blow	SPT'N' Value	SPT'N' Value (Corr.) N_{60}	Shoe or Cone	Remarks
						Pen	Blows	Pen	Blows	Total Pen	Total Blows	Pen	Blows	Pen	Blows	Pen	Blows	Pen	Blows	Total Pen	Total Blows							
	m	m	m		%	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.	mm	No.						S/C	
DS002	2.20 (31.89)	Dry (2.20)	2.20	ATH01	55	68	50			68	50											0.69	0.92		-	-	S	
DS002	3.50 (30.59)	Dry (3.50)	3.50	ATH01	55	75	8	75	7	150	15	75	9	75	11	75	10	75	17	300	47	0.74	0.92	6.38	47	32	S	
DS002	5.40 (28.69)	4.70 (5.40)	5.40	ATH01	55	27	50			27	50											0.82	0.92		-	-	C	
DS002	6.40 (27.69)	5.75 (6.40)	6.40	ATH01	55	44	50			44	50											0.86	0.92		-	-	C	
DS002	7.40 (26.69)	6.50 (7.40)	7.40	ATH01	55	68	50			68	50											0.90	0.92		-	-	C	
DS002	8.40 (25.69)	7.30 (8.40)	8.40	ATH01	55	75	50	75	36	150	86	10	14							10	14	0.94	0.92	0.71	-	-	C	

NOTE: Please refer to calibration certificate for additional information and corresponding Exploratory Hole record for sampling details. Uncorrected and corrected SPT'N' values are presented on the attached graphical plot relative to each Exploratory Hole.

Contract Title :- ID Manchester Preliminary Ground Investigation		Client :- University of Manchester	AEG Contract No :- NW1588
Date of Issue :- 15/04/2020	Page No. :- 11 of 11	Checked By [redacted]	Certificate No. :- SPT/NW1588/11

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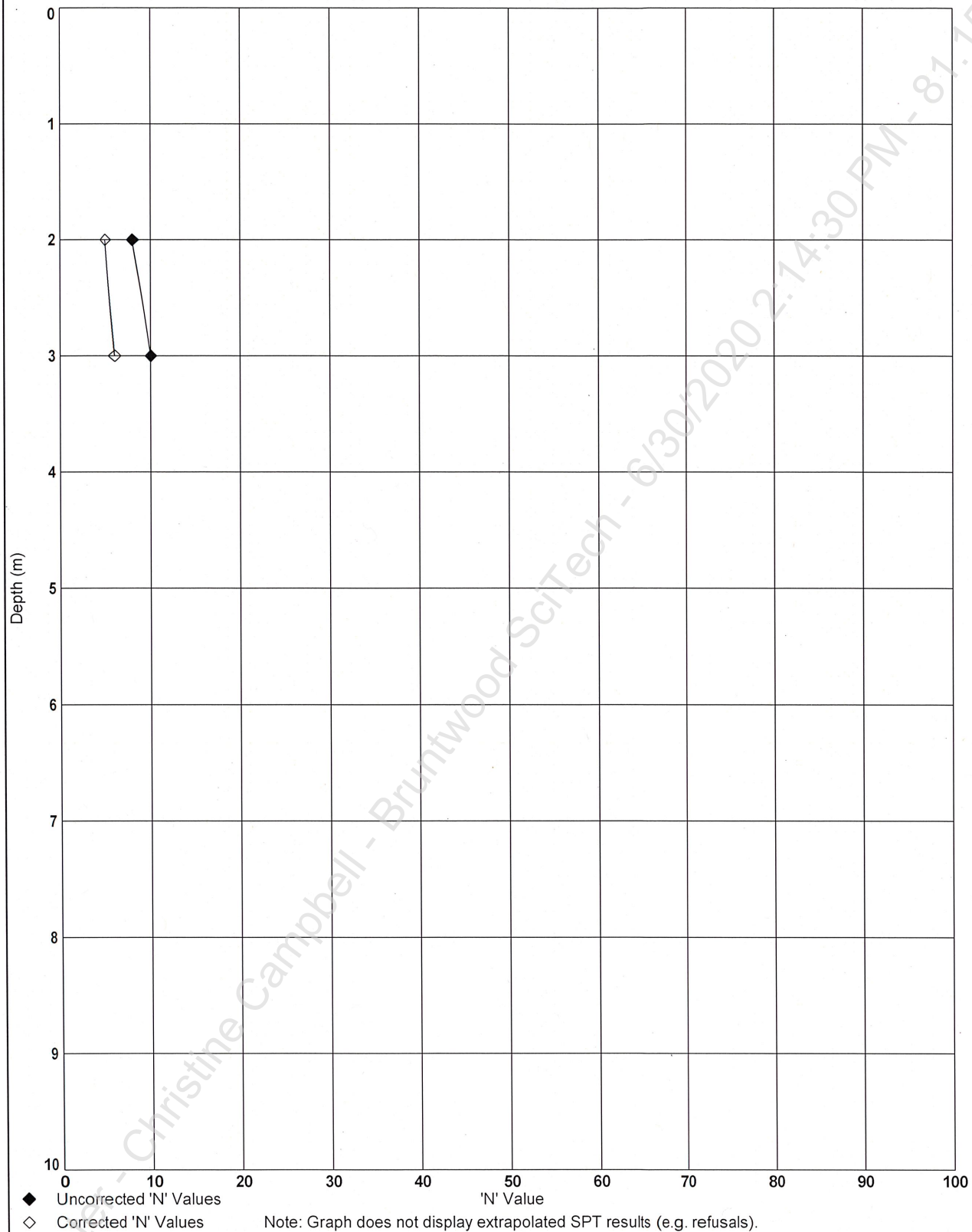
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH001



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/BH001	L. Selkirk
Check [redacted]		AEG Contract No. :- NW1588

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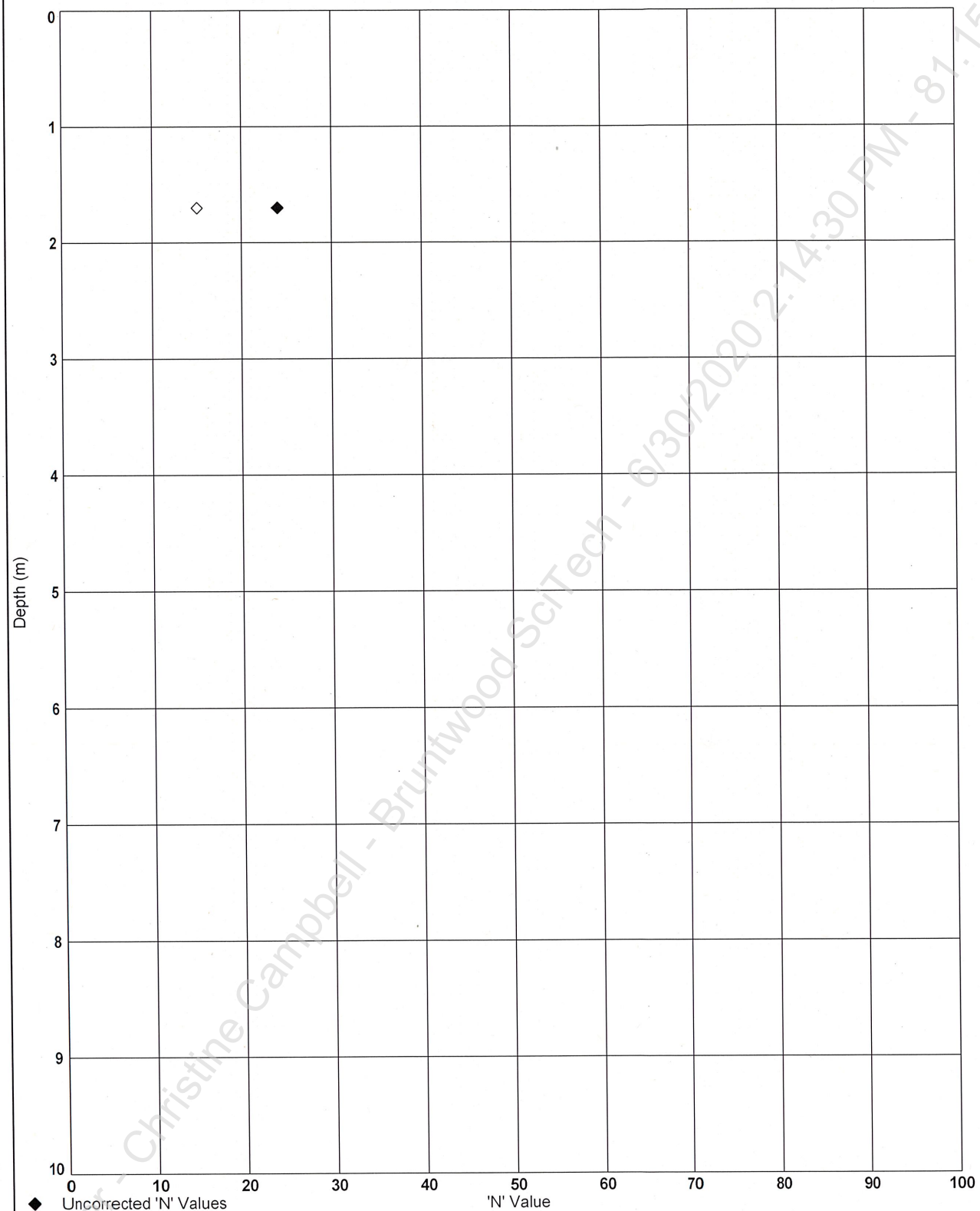
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

BH002



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH002
Operator :- M. Snaith	
Chec [redacted]	AEG Contract No. :- NW1588

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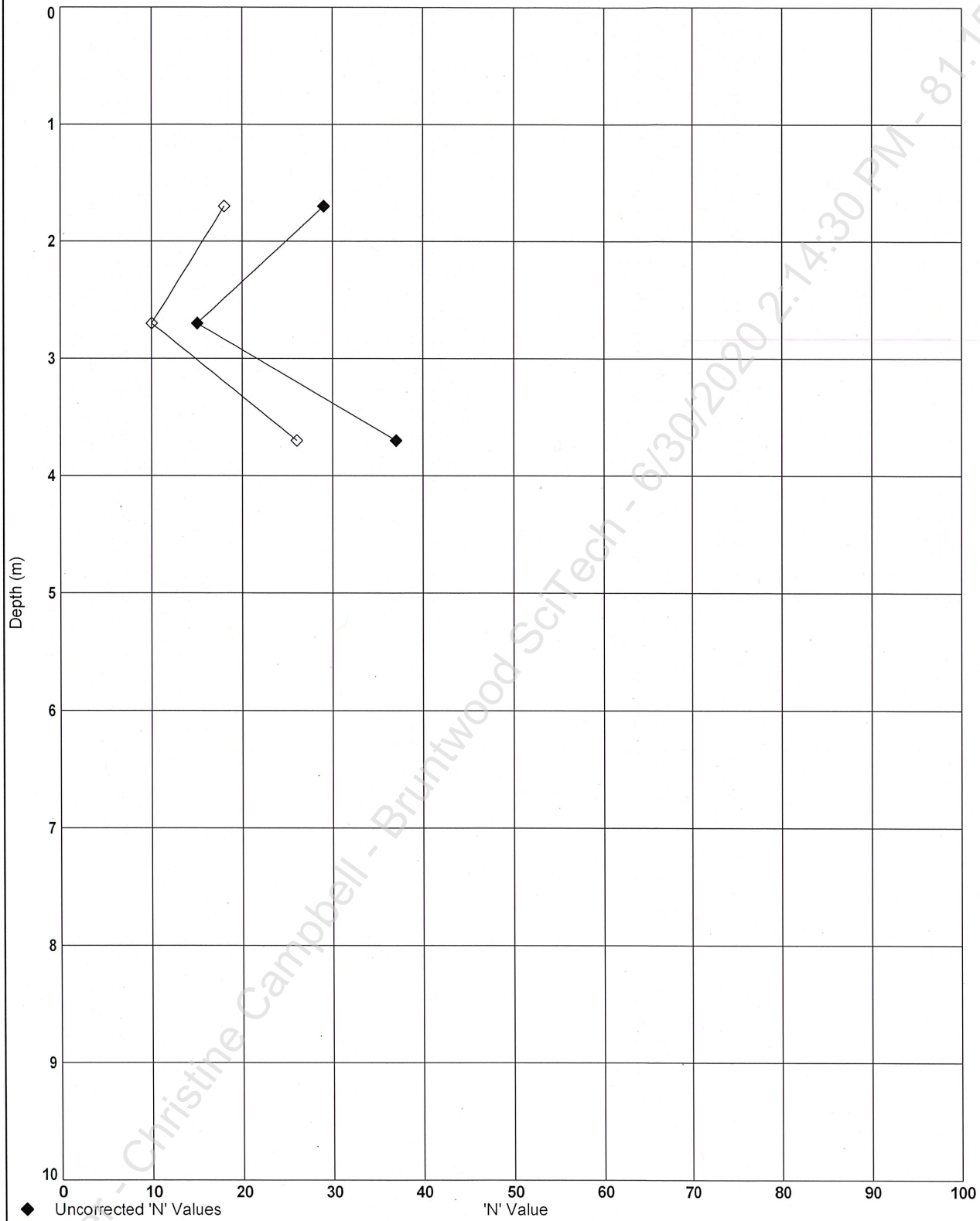
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH003



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH003
Operator :- M. Snaith	
Checked [redacted]	AEG Contract No. :- NW1588

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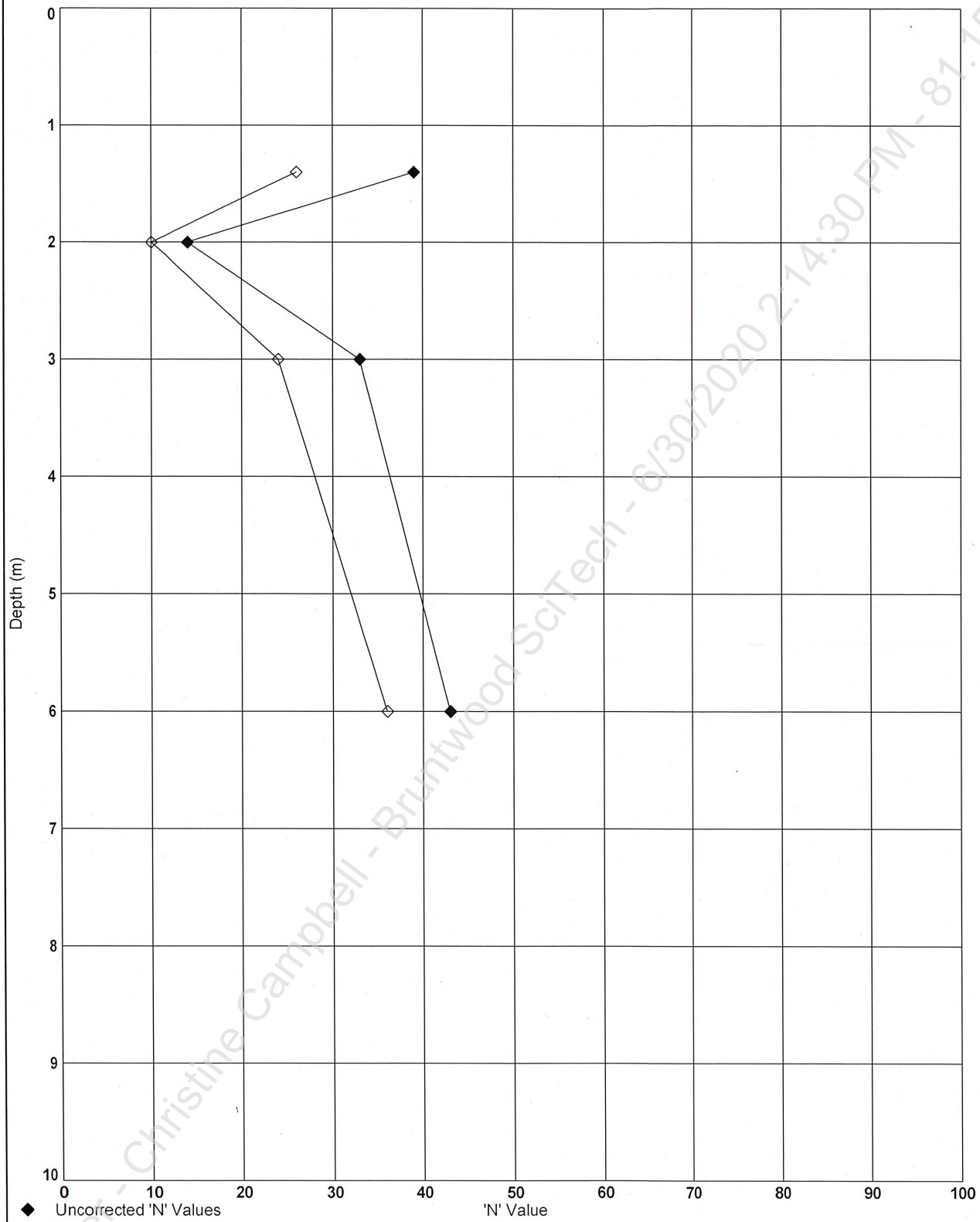
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH004



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/BH004	P.B/P.D
Checke [redacted]		AEG Contract No. :- NW1588

UKAS TESTING 1367

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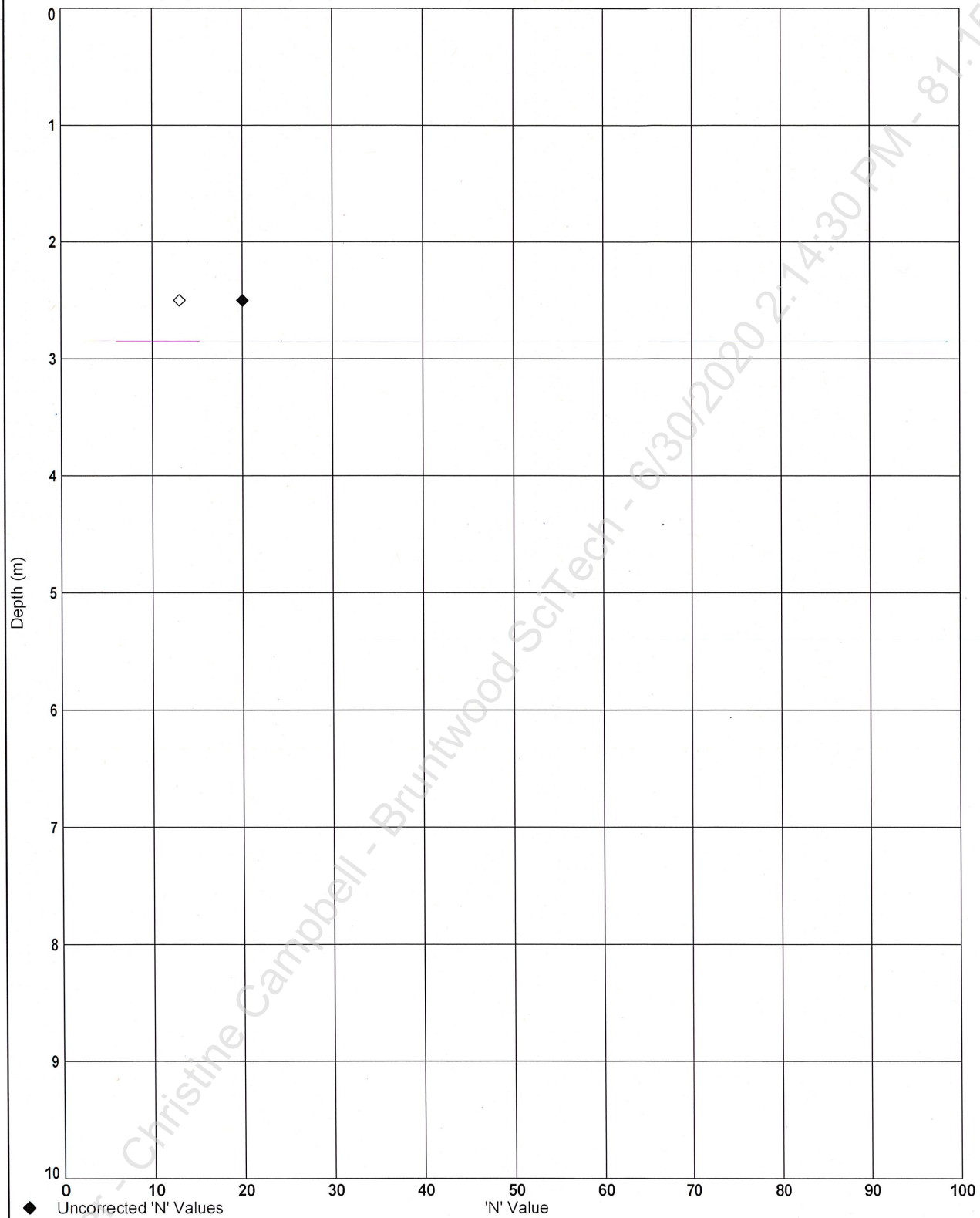
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STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

BH005



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH005
Operator :- K.R/P.D	
Checked [redacted]	AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

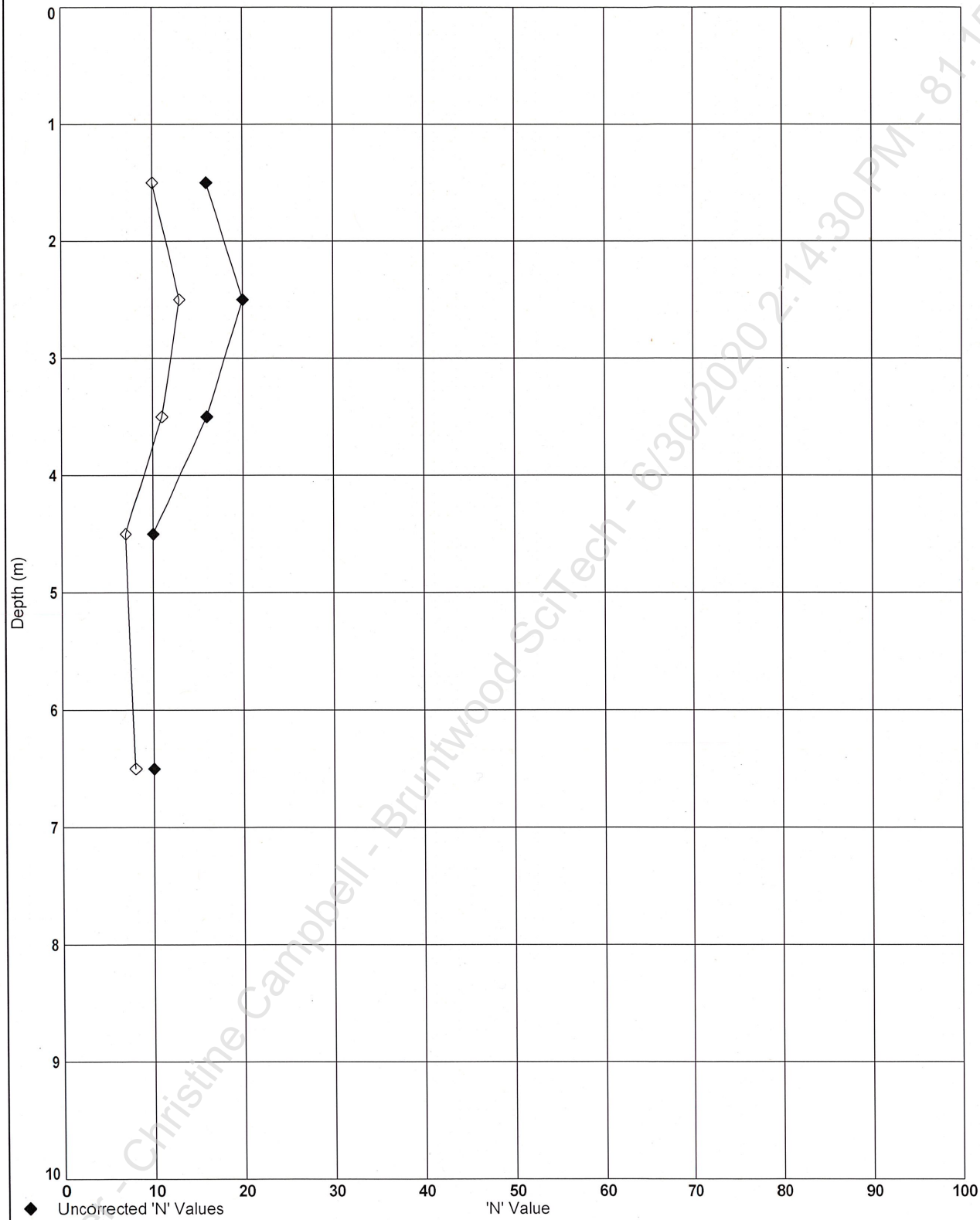
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 415

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH007



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/BH007	K. Rogerson
Checked By : [redacted]		AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

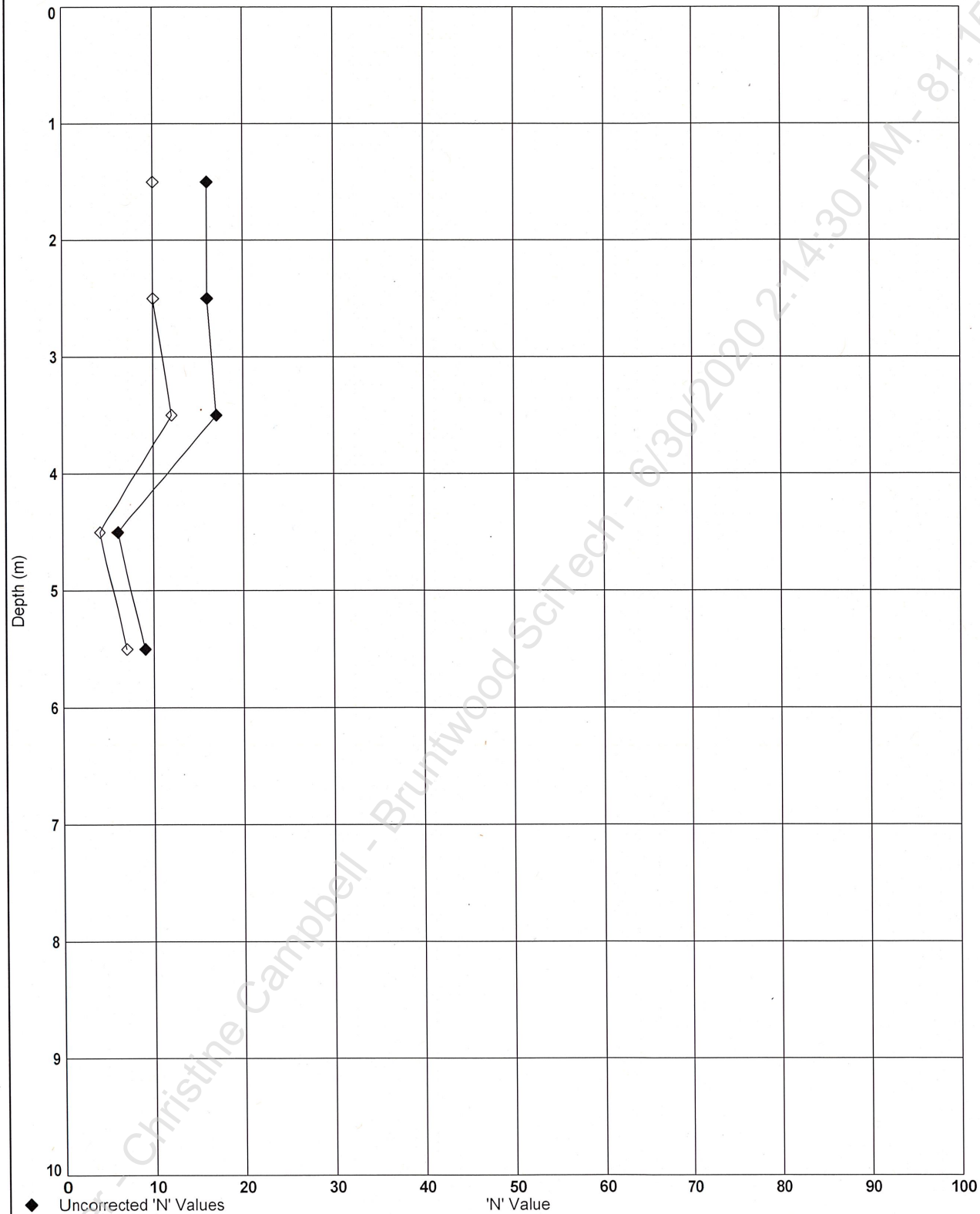
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 416

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH008



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH008
Operator :- K. Rogerson	
Checked [redacted]	AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 417

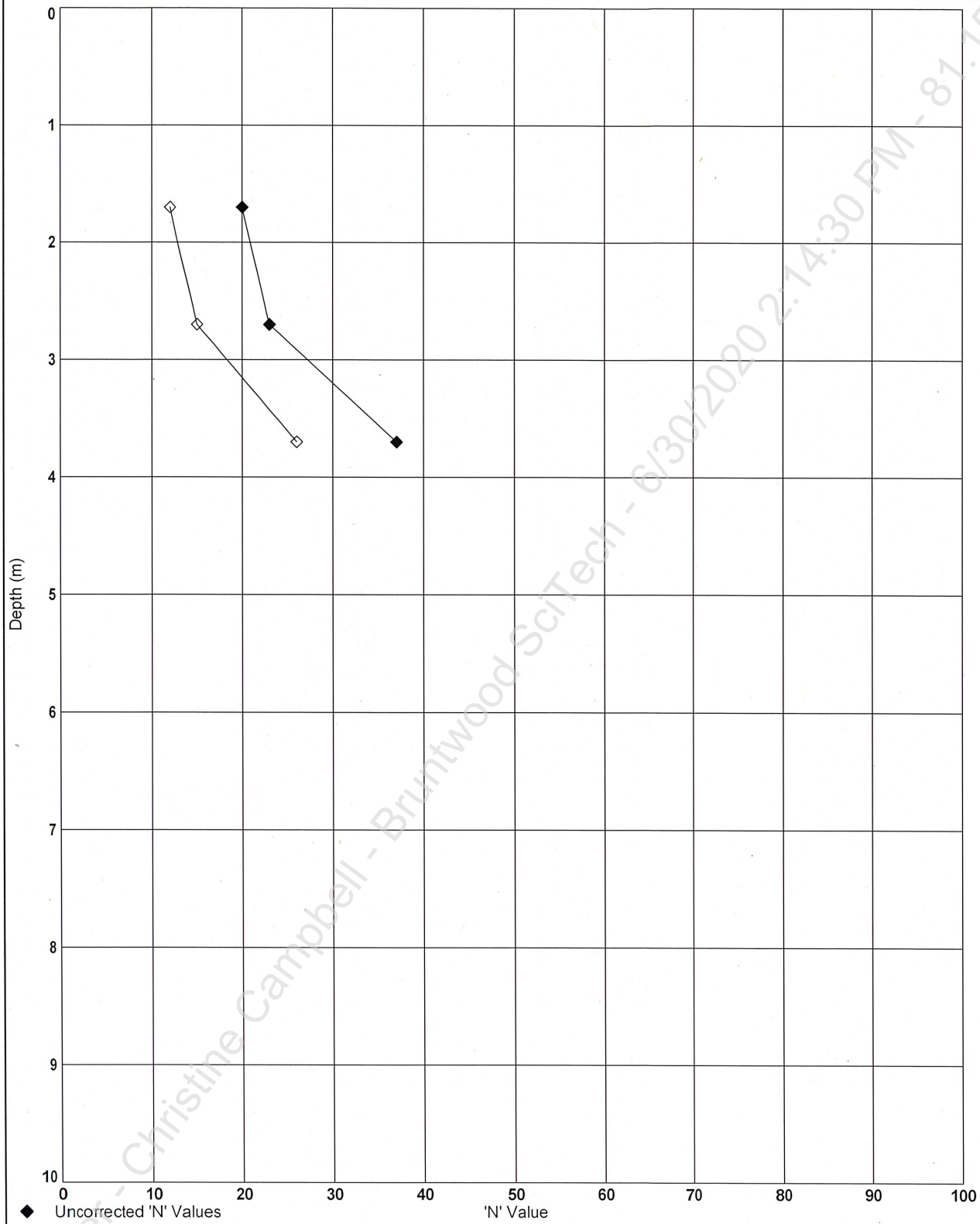
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

BH009



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/BH009	M. Snaith
Checked [redacted]		AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 418

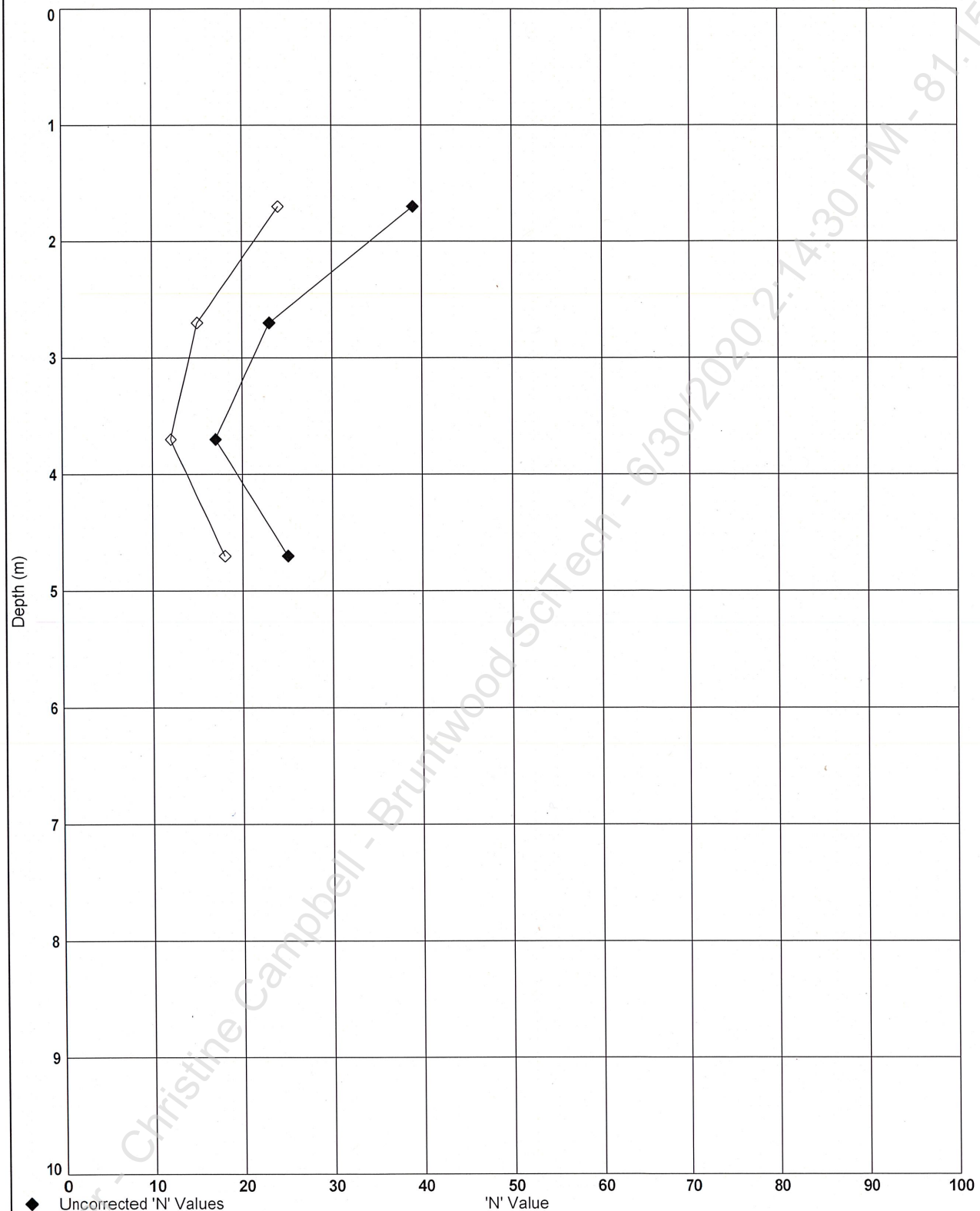
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

BH011



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH011
Operator :- M.S/J.M	
Checke [redacted]	AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72
CONFIDENTIAL

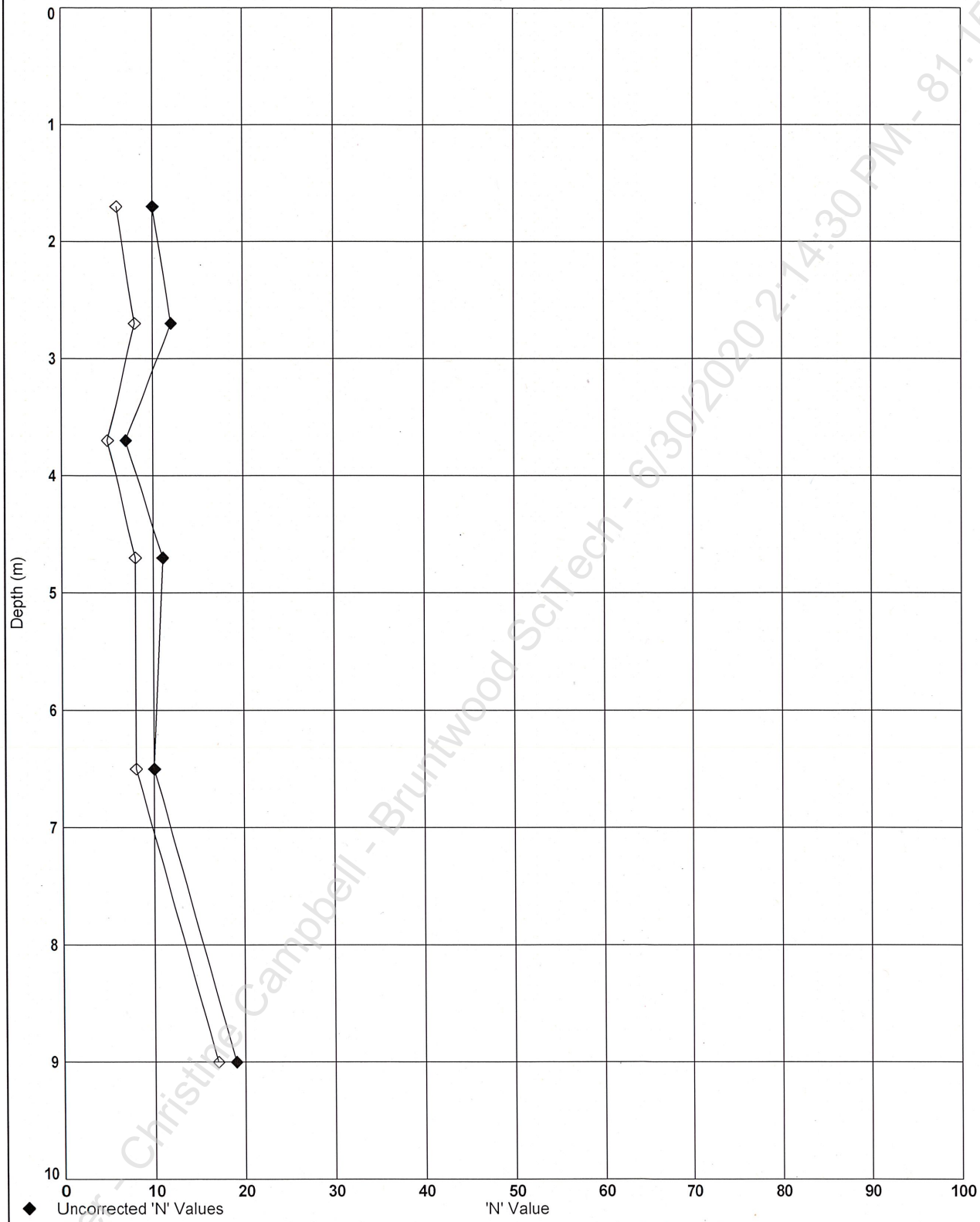
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 419

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH012A



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/BH012A	M. Snaith
Checked By : [redacted]	Approved By :	AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

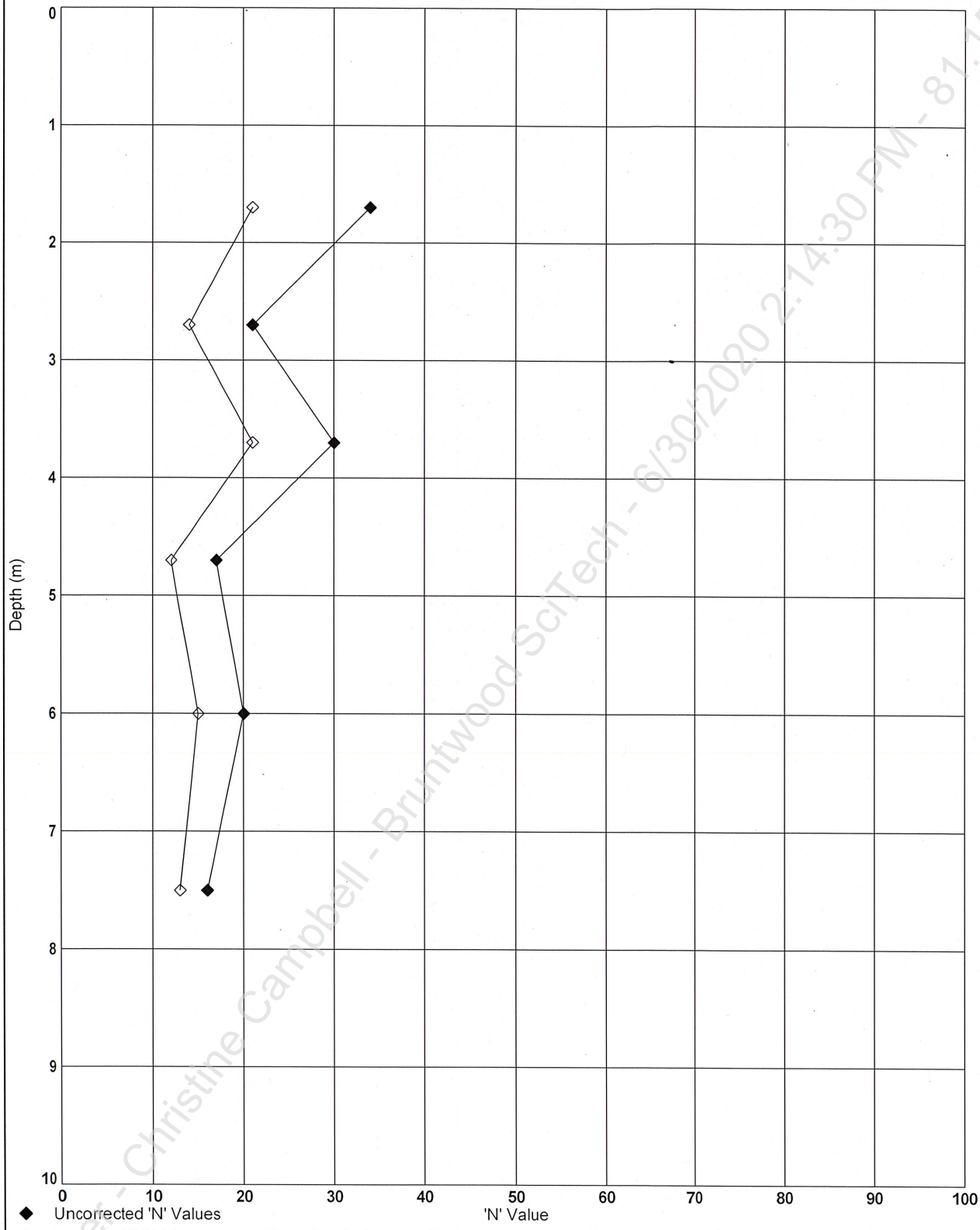
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 420

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH013



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH013
Operator :- M.S/P.D	
Checked By :- [redacted]	Approved By :-
AEG Contract No. :- NW1588	

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

CONFIDENTIAL

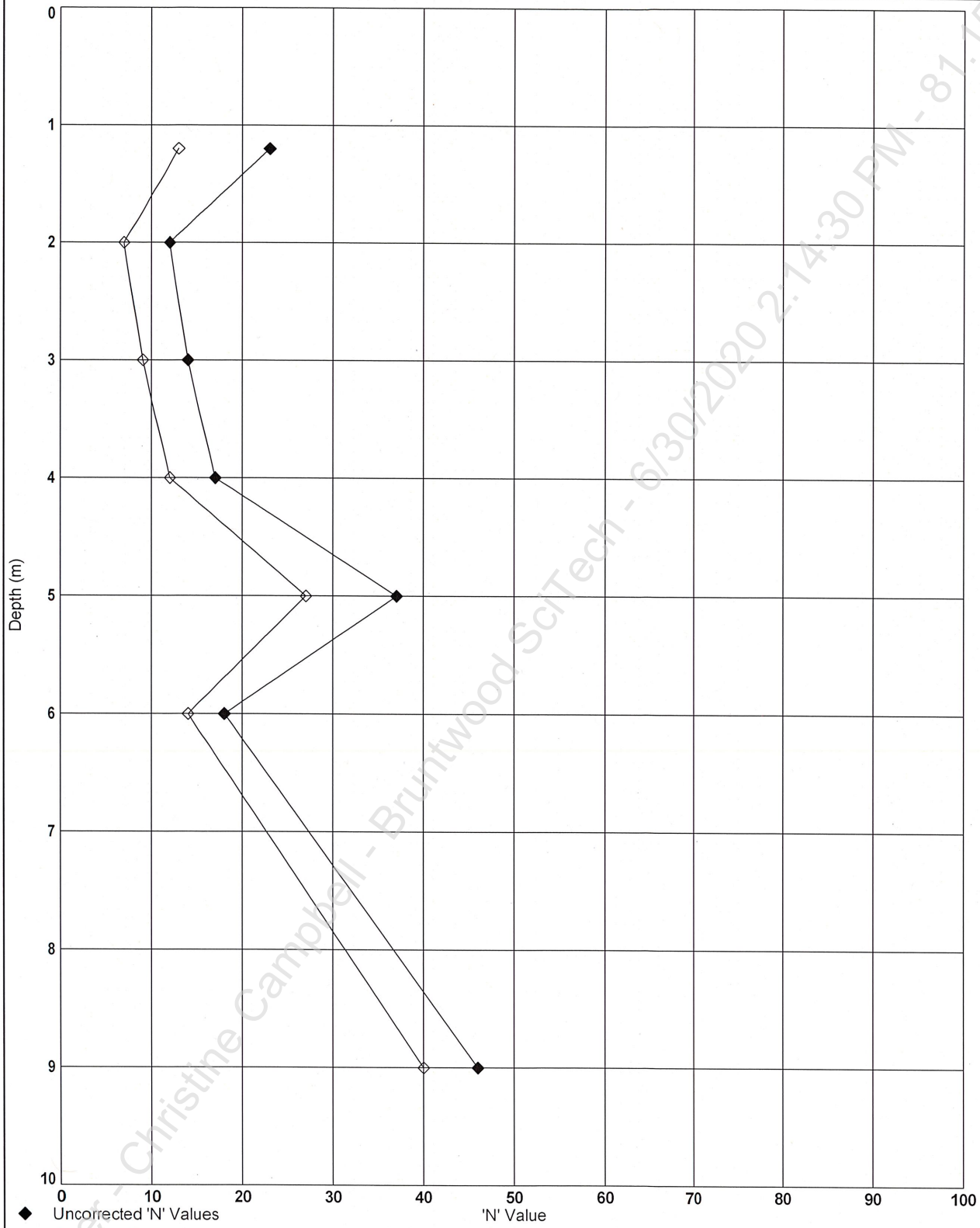
Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 421

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No
BH014



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Date of issue :- 15/04/2020	Certificate No :- SPT/NW1588/Graph/BH014
Operator :- L. Selkirk	
Checked [redacted]	AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 422

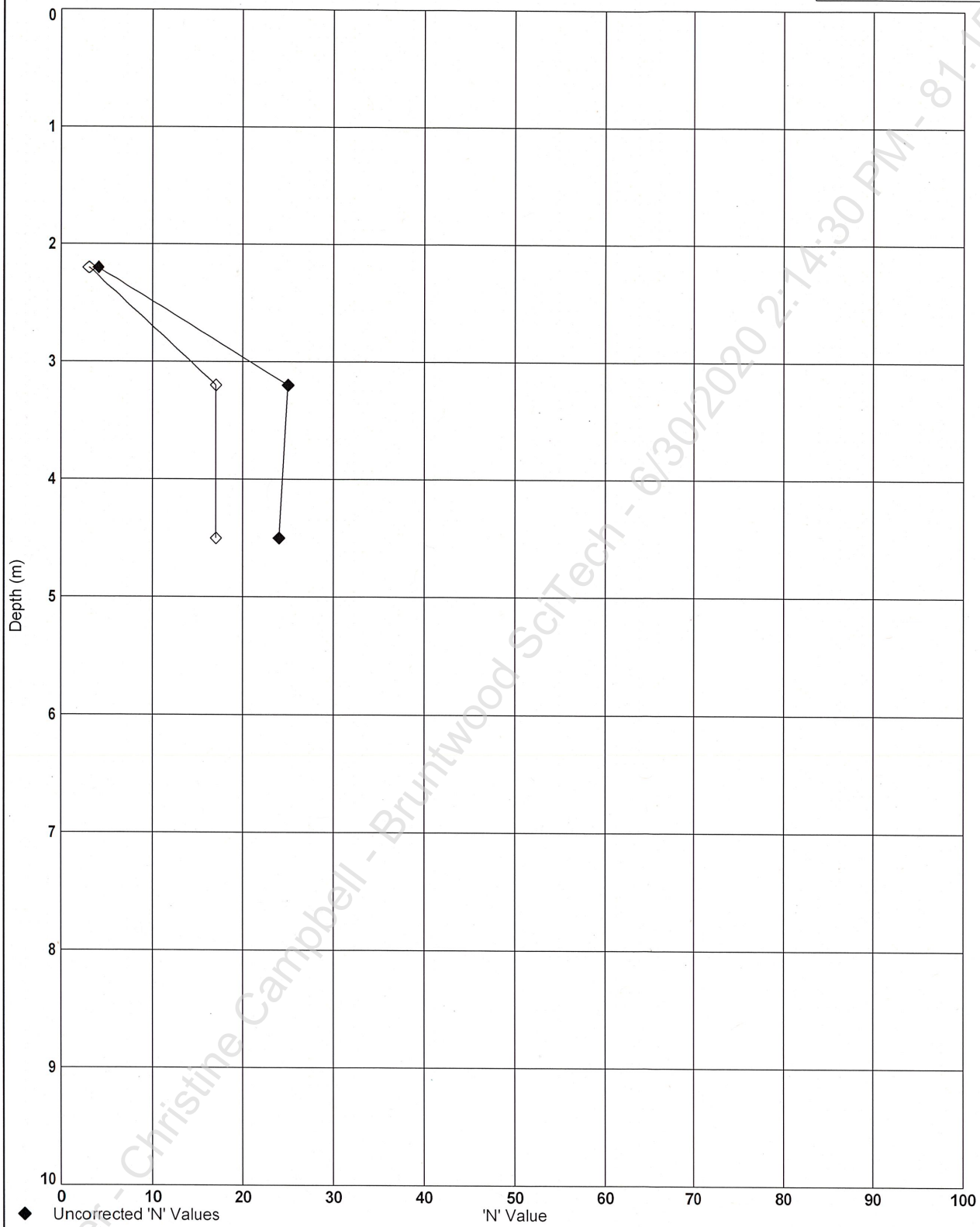
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

DS001



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/DS001	E. Bacon
Checke[redacted]		AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 423

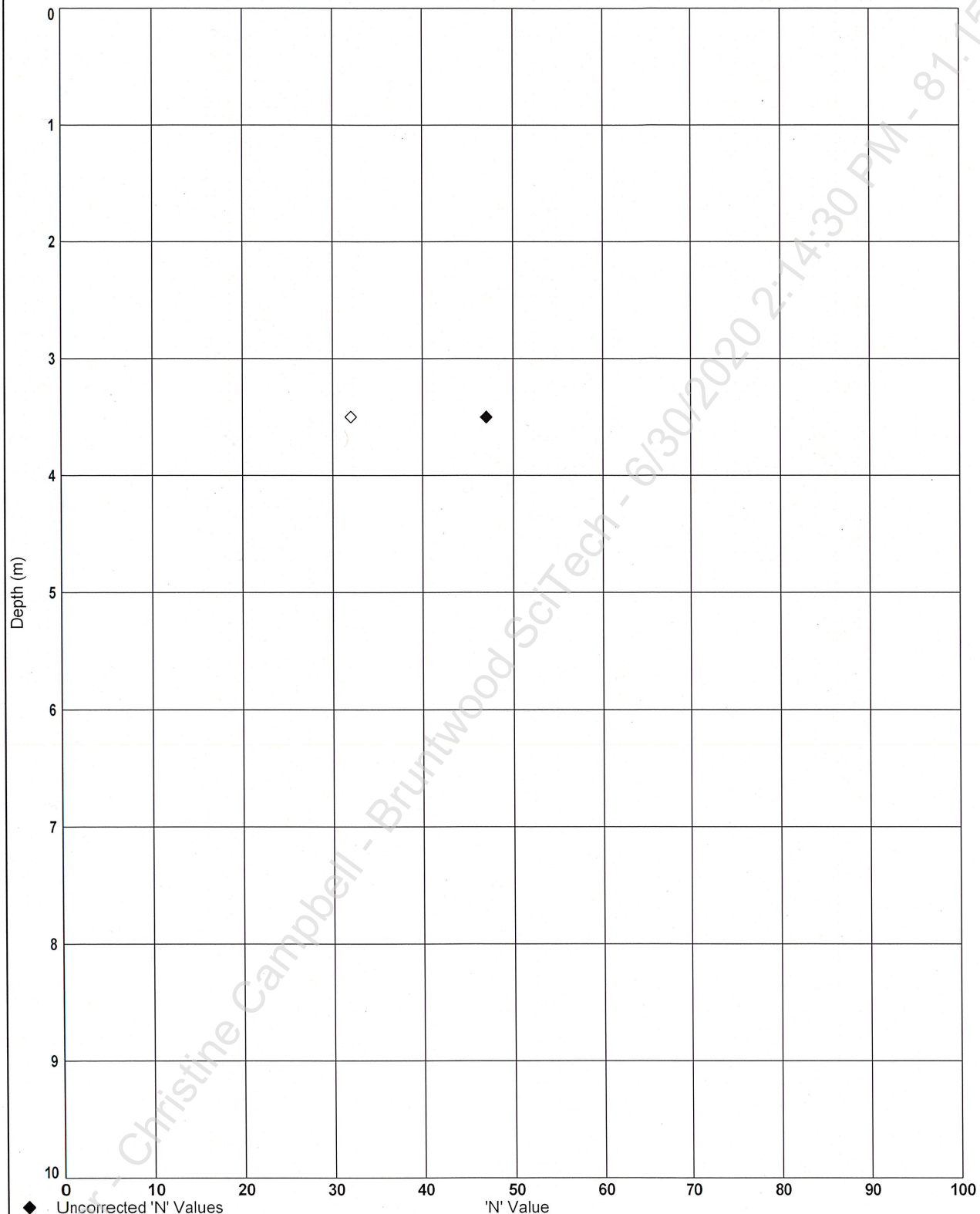
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

STANDARD PENETRATION TEST RESULTS
(BS EN ISO 22476-3: 2005)

Exploratory Hole No

DS002



Note: Graph does not display extrapolated SPT results (e.g. refusals).

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Date of issue :-	Certificate No :-	Operator :-
15/04/2020	SPT/NW1588/Graph/DS002	J. Moyle
Checke [redacted]		AEG Contract No. :- NW1588

UKAS TESTING 1367

ID Manchester - Christine Campbell - Brynwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Allied Exploration & Geotechnics Ltd.

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Unit 25 Stella Gill Industrial Esatate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Ref:	ATH01
Test Date:	02/08/2019
Report Date:	07/08/2019
File Name:	ATH01.spt
Test Operator:	BP

QUALITY CONTROL CHECKED
07 AUG 2019
[redacted]

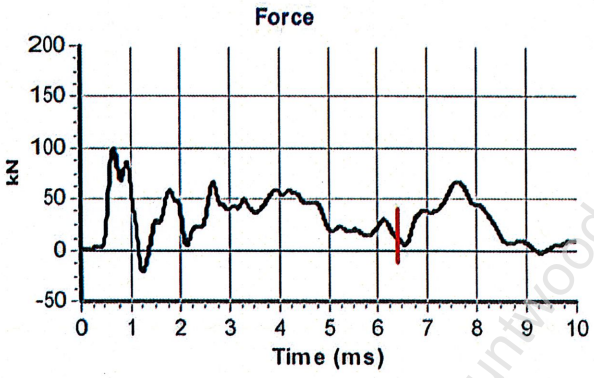
Instrumented Rod Data

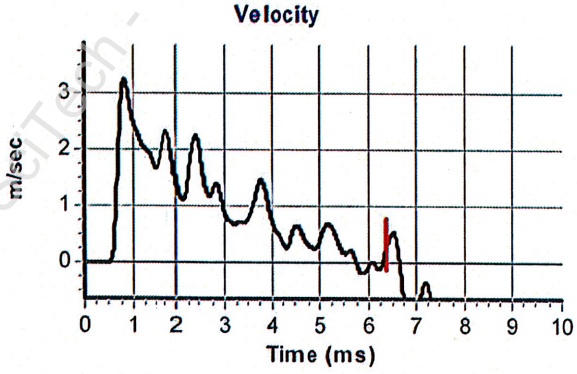
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.3
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5991
Accelerometer No.2:	5990

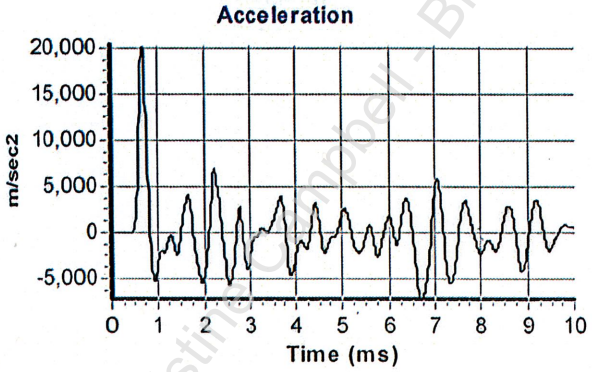
SPT Hammer Information

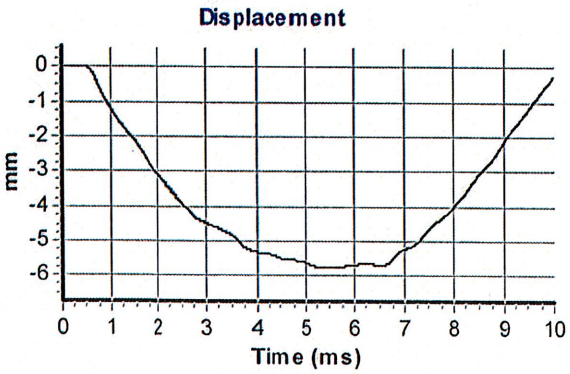
Hammer Mass m (kg):	63.8
Falling Height h (mm):	761
SPT String Length L (m):	14.1

Comments / Location









Calculations

Area of Rod A (mm2):	944
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	262

Energy Ratio E_r (%): 55

[redacted]

Signed: Brian Proctor
Title: Technician

The recommended calibration interval is 12 months

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Allied Exploration & Geotechnics Ltd.

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Unit 25 Stella Gill Industrial Esatate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Ref:	ATH02
Test Date:	27/06/2019
Report Date:	28/06/2019
File Name:	ATH02.spt
Test Operator:	BP

QUALITY CONTROL CHECKED
28 JUN 2019

[redacted]

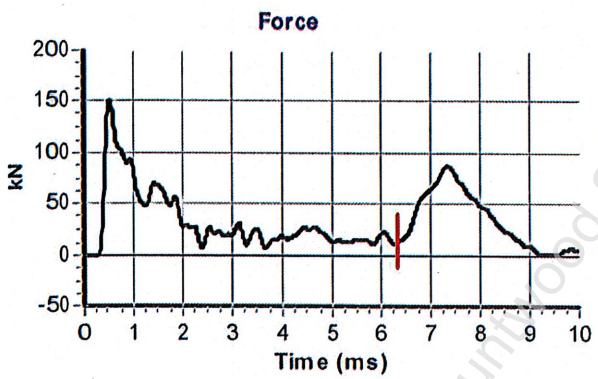
Instrumented Rod Data

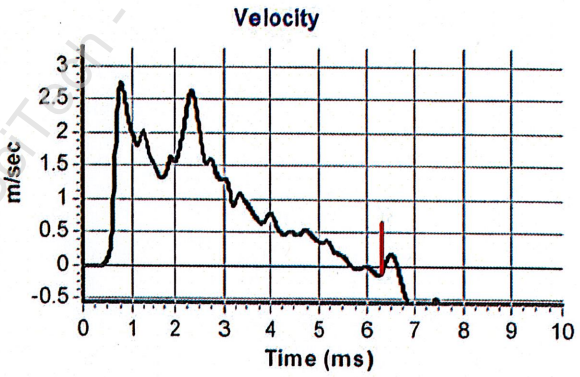
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.5
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5991
Accelerometer No.2:	5990

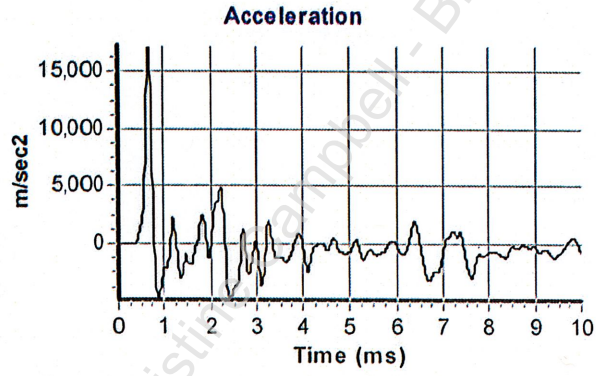
SPT Hammer Information

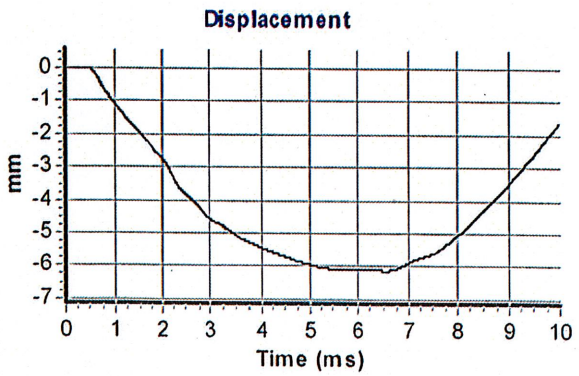
Hammer Mass m (kg):	63.7
Falling Height h (mm):	765
SPT String Length L (m):	14.1

Comments / Location









Calculations

Area of Rod A (mm2):	970
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	257

Energy Ratio E_r (%): **54**

[redacted]

Signed: Brian Proctor
Title: Technician

The recommended calibration interval is 12 months

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SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Unit 25 Stella Gill Industrial Esatate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Ref:	ATH05
Test Date:	07/08/2019
Report Date:	07/08/2019
File Name:	ATH05.spt
Test Operator:	BP

QUALITY CONTROL CHECKED
07 AUG 2019
[redacted]

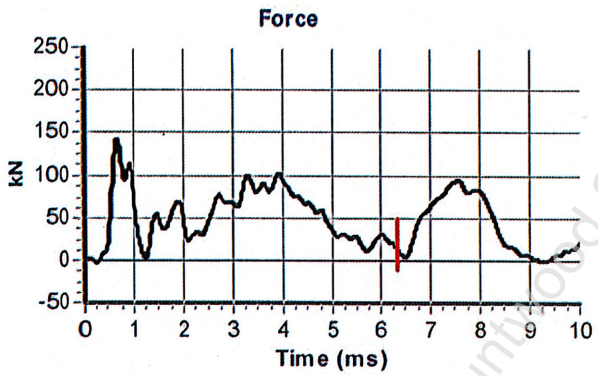
Instrumented Rod Data

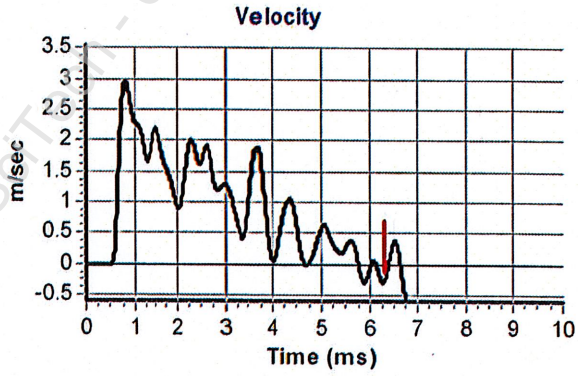
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.3
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5991
Accelerometer No.2:	5990

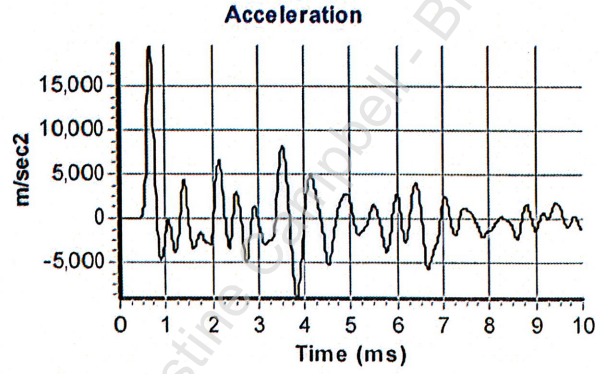
SPT Hammer Information

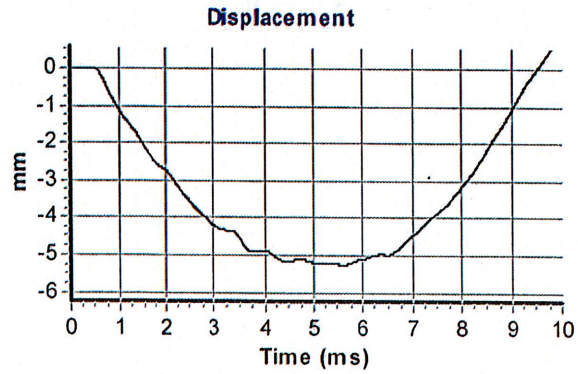
Hammer Mass m (kg):	63.5
Falling Height h (mm):	756
SPT String Length L (m):	14.1

Comments / Location









Calculations

Area of Rod A (mm2):	944
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	329

Energy Ratio E_r (%): **70**

[redacted]

Signed: Brian Proctor
Title: Technician

The recommended calibration interval is 12 months

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ID Manchester - Christina Campbell - Brunswood SciTech - 6/30/2020 2:14:30 PM 246.72

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Unit 25 Stella Gill Industrial Esatate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

QUALITY CONTROL CHECKED
13 FEB 2019
[redacted]

SPT Hammer Ref:	ATH07
Test Date:	12/02/2019
Report Date:	12/02/2019
File Name:	ATH07.spt
Test Operator:	BP

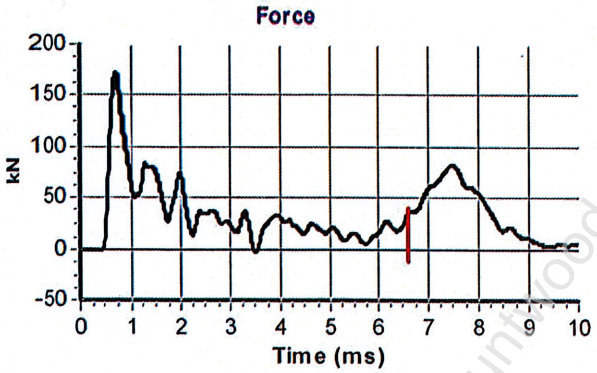
Instrumented Rod Data

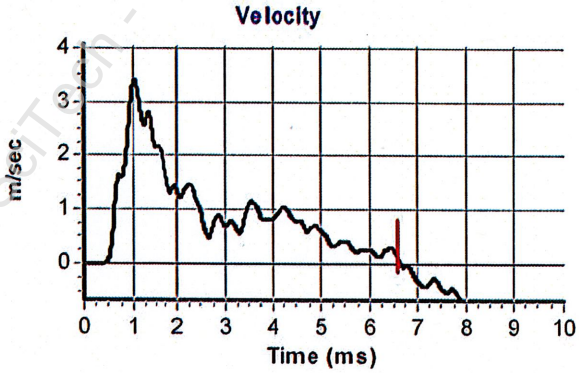
Diameter d_r (mm):	67
Wall Thickness t_r (mm):	8.7
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	6469
Accelerometer No.2:	11938

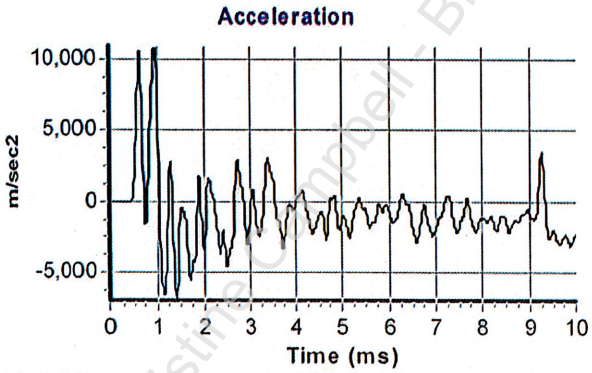
SPT Hammer Information

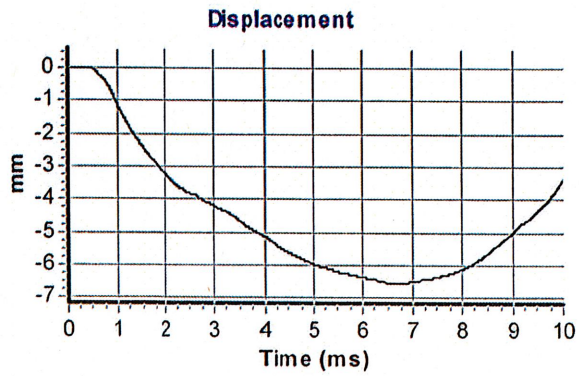
Hammer Mass m (kg):	63.2
Falling Height h (mm):	763
SPT String Length L (m):	14.1

Comments / Location









Calculations

Area of Rod A (mm2):	1593
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	283

Energy Ratio E_r (%): 60

[redacted]

Signed: Brian Proctor
Title: Technician

The recommended calibration interval is 12 months

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ID Manchester Christine Campbell - Brunswood SciTech - 6/30/2020 2:14:30

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LABORATORY TESTING ENCLOSURES

Laboratory Report Certificate

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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ALLIED EXPLORATION GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL. - Tel: 01772 735 300 Fax: 01772 735 999

IN-SITU WATER QUALITY PARAMETER MONITORING RESULTS

Date of Test:	15/01/2020	Operator:	A. Rees
Weather Condition (inc temperature) :	Fair (10°C)		

Monitoring Point	Time (hrs)	Temp (°C)	Electrical Conductivity (µs)	Total Dissolved Solids (ppm)	Redox Potential (mv)	Dissolved Oxygen (%)
BH013	15:00:00	9.06	1190.7	0.72	256.0	25.10
	15:03:00	11.52	1072.0	0.70	263.0	22.40
	15:06:00	11.88	1061.1	0.69	267.1	23.50
	15:09:00	11.94	1059.2	0.69	271.6	23.50
	15:12:00	11.94	1064.9	0.69	278.5	23.41
	15:15:00	11.96	1084.2	0.71	291.7	23.20

Remarks :	Suspected faulty pH probe - Readings not reported

Contract Title:		Client:	
ID Manchester Preliminary Ground Investigation		University of Manchester	
Checked: [redacted]		Approved By: [redacted]	
Date Issued: 22/01/2020	Page No. : 1 of 1	AEG Contract No. : NW1588	

ID Manchester Preliminary Ground Investigation 81.154.246.72 - 22/01/2020 2:44:30 PM

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IN-SITU WATER QUALITY PARAMETER MONITORING RESULTS

Date of Test:	16/01/2020	Operator:	A. Rees
Weather Condition (inc temperature) :	Rain (10°C)		

Monitoring Point	Time (hrs)	Temp (°C)	Electrical Conductivity (µs)	Total Dissolved Solids (ppm)	Redox Potential (mv)	Dissolved Oxygen (%)
BH001	15:49:00	12.81	859.7	0.56	173.7	74.83
	15:52:00	13.21	860.9	0.56	192.9	63.28
	15:55:00	13.35	860.1	0.56	215.2	63.21
	15:58:00	13.42	859.4	0.56	225.5	62.96
	16:01:00	13.51	858.2	0.56	230.8	61.84
	16:05:00	13.61	855.0	0.56	247.7	61.02

Remarks :	Suspected faulty pH probe - Readings not reported

Contract Title:	Client:
ID Manchester Preliminary Ground Investigation	University of Manchester

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Date Issued: 22/01/2020	Page No. : 1 of 1	AEG Contract No. : NW1588

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IN-SITU WATER QUALITY PARAMETER MONITORING RESULTS

Date of Test:	17/01/2020	Operator:	A. Rees
Weather Condition (inc temperature) :	Rain (10°C)		

Monitoring Point	Time (hrs)	Temp (°C)	Electrical Conductivity (µs)	Total Dissolved Solids (ppm)	Redox Potential (mv)	Dissolved Oxygen (%)
BH004	09:02:00	12.00	1167.1	0.78	127.2	15.68
	09:05:00	16.69	1097.0	0.71	94.5	2.15
	09:08:00	16.93	1076.9	0.70	88.2	1.58
	09:13:00	16:94	1089.9	0.71	96.5	1.79
	09:16:00	16.96	1098.4	0.71	106.9	1.93
	09:19:00	16.94	1099.3	0.71	124.1	1.90
BH007	11:29:00	14.62	679.4	0.44	105.8	4.58
	11:32:00	15.73	688.9	0.45	226.6	1.94
	11:38:00	15.71	686.6	0.45	252.5	1.76
	11:43:00	15.68	688.4	0.45	282.5	1.66
	11:46:00	15.69	682.5	0.44	296.3	2.02
	11:49:00	15.75	685.4	0.44	306.7	1.68
BH011	13:01:00	10.19	1187.5	0.79	-52.3	11.86
	13:04:00	12.23	1329.2	0.86	89.7	2.85
	13:07:00	12.76	1337.6	0.90	142.7	1.94
	13:09:00	12.73	1368.6	0.89	168.3	1.89
	13:11:00	12.75	1371.1	0.89	180.6	1.95

Remarks :	Suspected faulty pH probe - Readings not reported

Contract Title:	Client:
ID Manchester Preliminary Ground Investigation	University of Manchester

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Date Issued: 22/01/2020	Page No. : 1 of 1	AEG Contract No. : NW1588

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IN-SITU WATER QUALITY PARAMETER MONITORING RESULTS

Date of Test:	17/01/2020	Operator:	A. Rees
Weather Condition (inc temperature) :	Rain (10°C)		

Monitoring Point	Time (hrs)	Temp (°C)	Electrical Conductivity (µs)	Total Dissolved Solids (ppm)	Redox Potential (mv)	Dissolved Oxygen (%)
BH005	13:46:00	14.34	257.3	0.17	352.3	1.55
	13:49:00	14.54	256.3	0.17	256.3	1.28
	13:59:00	13.56	187.5	0.12	453.1	1.70
	14:02:00	14.49	182.9	0.12	445.7	1.19
	14:05:00	14.67	178.5	0.12	445.9	1.22
	14:08:00	14.67	172.4	0.11	451.1	1.18
	14:11:00	14.67	167.6	0.11	455.2	1.39

Remarks :	Suspected faulty pH probe - Readings not reported

Contract Title:		Client:	
ID Manchester Prelimin[redacted]ion		University of Manchester	
Checked B[redacted]		Approved B[redacted]	
Date Issue[redacted]	1 of 1	AEG Contr[redacted]	NW1588
22/01/2020			

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In-situ Water Quality Parameter Test Results

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LABORATORY REPORT CERTIFICATE

UKAS TESTING 1367

Contract Title: ID Manchester Preliminary Ground Investigation

AEG Reference: NW1588

Client Address: University of Manchester

We certify that Laboratory testing was carried out on samples from the above contract in accordance with techniques outlined in BS 1377: 1990, BS EN ISO 17892 or other appropriate standards as quoted. The samples were received from October 2019 and the following results, given on the attached enclosures, were obtained.

The tests carried out are indicated in the attached table showing the enclosure number and the total number of pages.

For and on behalf of Allied Exploration & Geotechnics Limited

- ☐ Nick Vater (Managing Director)
- ☐ Kevin Warriner (HSE & Quality Director)
- ☑ Michelle Selkirk (Laboratory Manager)

Signed [redacted] Date: 22 January 2020

Tests marked not UKAS accredited in this certificate are not included in the UKAS accreditation schedule for our laboratory. Any opinions and interpretations expressed herein are outside the scope of the laboratory's UKAS accreditation.

Please note the material was derived from samples taken outside the control of the laboratory.

ID Manchester - Chisnall - Brantwood Scitech - 3/30/2020 2:14:30 PM - 31.154.246.72

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LABORATORY REPORT CERTIFICATE

ENCLOSURES

Enclosure Number	Description	UKAS Accredited	Reference	No. of Pages
0	Laboratory Report Certificate	N/A		3
1	Sample Description Sheets	N/A		4
2	Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)	2
2	Plasticity Index and Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)	2
3	Particle Size Distribution Sieving	Yes	BS 1377 Part 2 1990	39
3	Particle Size Distribution Sedimentation	No	BS 1377 Part 2 1990	17
4	Determination of Total Sulphur, Sulphate and pH (Tested externally)	No	See DETS certificates	12
5	Determination of Dry Density/Moisture Content Relationship	Yes	BS 1377 Part 4 1990	4
6	Determination of One Dimensional Consolidation Properties	Yes	BS 1377 Part 5 1990	2
7	Consolidated Undrained Shear Strength in Triaxial Cell with Measurement of Pore Pressure	No	BS 1377 Part 8 1990	4
8	Moisture Content of Rock	Yes	ISRM 1981	1
9	Determination of Point Load Index (Some tested externally)	Yes	ISRM 1985	12
10	Determination of Unconfined Compressive Strength (Tested externally)	No	ISRM 1985	1

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LABORATORY REPORT CERTIFICATE

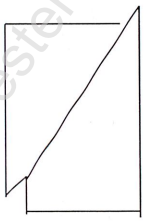
ABBREVIATIONS

All the abbreviations used on the laboratory certificates are given below:

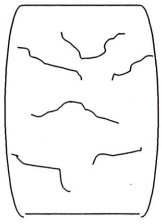
Br	Brittle	**PSD**	Particle Size Distribution by sieve analysis
C	Compound	**SB**	Shear Box
CBR	California Bearing Ratio	**SED**	Sedimentation Analysis
CDT	Consolidated Drained Triaxial	**SO4**	Sulphate (total, water extract, groundwater)
CL	Chloride content (water or soil)	**CP2**	Dry Density/Moisture Content 2.5kg rammer
US	Unsuitable sample for test	**CP4**	As above using 4.5kg rammer
UUT	Undrained Unconsolidated Triaxial	**CPV**	As above using vibrating hammer
HSV	Vane Test	**CUT**	Consolidated Undrained Triaxial
IS	Insufficient sample for test	**R**	Remoulded
LOI	Loss On Ignition	**U**	Undisturbed
M	Multi-stage testing	**MC**	Moisture Content
MCV	Moisture Content Value	**PL**	Point Load
NAT	Natural preparation method	**NMC**	Natural (or as received) moisture content
P	Plastic	**PFH**	Permeability Falling Head Method
OED	Oedometer	**PTXL**	Permeability in Triaxial Cell
OMC	Optimum Moisture Content	**ORG**	Organic content
B	Large disturbed (bulk) sample	**PD**	Particle Density (SG)
J	Small disturbed (jar) sample	**PI**	Liquid limit, plastic limit and plasticity index

Typical Mode of Failure for Triaxial Testing

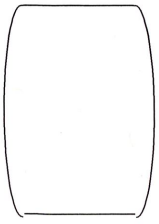
Brittle



Compound



Plastic



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LABORATORY TESTING ENCLOSURE 1

Sample Description Sheets

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LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
BH001	0.50	B6	MADE GROUND (Brown slightly sandy slightly gravelly clay of intermediate plasticity. Gravel includes brick fragments).	MC PI PSD SED
BH001	1.20	U10	MADE GROUND (Soft and firm brown slightly sandy slightly gravelly clay with pockets of gravelly sand with a low cobble content. Cobble of brick).	CUT US for OED
BH001	1.65	J11	MADE GROUND (Brown slightly sandy slightly gravelly clay. Gravel includes brick fragments).	BRE
BH001	2.00	J13	MADE GROUND (Brown slightly sandy gravelly clay of intermediate plasticity).	MC PI
BH001	3.00	B17	MADE GROUND (Brown sandy slightly gravelly clay of low plasticity. Gravel includes brick and ceramic fragments).	MC PI PSD SED
BH001	4.30	J22	MADE GROUND (Brown slightly sandy slightly gravelly clay of intermediate plasticity. Gravel includes brick fragments).	MC PI
BH001	5.00	B24	Red brown clayey slightly gravelly SAND with clay pockets.	MC PSD SED
BH001	5.50	J25	Red brown SAND with clay pockets.	BRE
BH001	12.50	J28	Red brown slightly gravelly SAND.	BRE
BH002	0.50	B3	MADE GROUND (Brown slightly clayey sandy gravel with a medium cobble content. Gravel includes brick fragments).	US for CP2
BH002	1.20	B5	MADE GROUND (Red brown clayey very sandy gravel with a medium cobble content. Gravel includes brick fragments).	MC PSD BRE
BH002	3.70	B13	Brown clayey gravelly SAND.	MC PSD SED
BH003	1.20	B5	MADE GROUND (Brown clayey slightly gravelly sand. Gravel includes brick fragments).	BRE
BH003	1.70	B6	Brown clayey very gravelly SAND with a high cobble content.	MC PSD
BH003	4.70	J15	Brown SAND.	BRE
BH003	4.70	B16	Red brown clayey gravelly SAND.	MC PSD
BH004	0.80	B5	MADE GROUND (Red brown slightly clayey gravelly sand with clay pockets).	BRE
BH004	1.40	B6	MADE GROUND (Brown very clayey gravelly sand. Gravel includes brick fragments. (Clay of low plasticity)).	MC PI PSD SED
BH004	2.00	B8	MADE GROUND (Black brown slightly sandy gravelly clay. Gravel includes brick fragments).	CP2
BH004	5.00	B16	MADE GROUND (Brown cobbles with much sandy gravelly clay of low plasticity. Gravel includes brick fragments).	MC PI PSD SED
BH004	6.00	B18	MADE GROUND (Brown slightly clayey gravelly sand. Gravel includes brick fragments).	BRE

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Signe [redacted]	Name :- M. SELKIRK
Date of issue :- 22/01/2020	Certificate No :- SD/NW1588/1
AEG Contract No. :- NW1588	

UKAS TESTING 1367

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LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
BH004	7.50	B22	MADE GROUND (Brown clayey very gravelly sand with a medium cobble content. Gravel includes tile, wood and brick fragments).	MC PSD
BH005	0.50	J3	MADE GROUND (Brown slightly sandy gravelly clay. Gravel includes brick fragments).	BRE
BH005	0.80	B4	MADE GROUND (Brown very clayey very sandy gravel including brick fragments).	MC PSD SED
BH005	1.50	B7	Brown slightly clayey sandy GRAVEL.	MC CP2
BH005	2.40	B10	Brown clayey very sandy GRAVEL.	MC PSD
BH006	0.40	B3	MADE GROUND (Brown slightly clayey sandy gravel including tile and brick fragments).	US for CP2
BH006	1.40	B5	MADE GROUND (Brown clayey slightly sandy gravel including tarmac and brick fragments).	US for PSD and SED
BH006A	0.50	J3	MADE GROUND (Brown slightly clayey slightly sandy gravel including brick fragments).	BRE
BH006A	0.80	B4	MADE GROUND (Brown clayey sand and gravel with a high cobble content. Gravel includes tile and brick fragments).	MC PSD SED
BH006B	0.40	B3	MADE GROUND (Red brown clayey very sandy gravel with a medium cobble content).	MC PI(NP) PSD
BH007	0.60	B4	MADE GROUND (Brown clayey sandy gravel with a high cobble content. Gravel includes tile and brick fragments).	MC PSD
BH007	1.20	J6	MADE GROUND (Brown slightly clayey sandy gravel including brick fragments).	BRE
BH007	2.50	B11	MADE GROUND (Brown clayey very sandy gravel including metal and brick fragments). (Clay of low plasticity).	MC PI PSD SED
BH007	4.50	J18	MADE GROUND (Brown clayey slightly gravelly sand. Gravel includes brick fragments).	BRE
BH007	6.50	B20	Brown clayey very gravelly SAND.	MC PSD
BH007	7.20	J22	Red brown slightly clayey SAND.	BRE
BH008	0.60	B3	MADE GROUND (Brown cobbles with much clayey sandy gravel including brick fragments).	MC PSD
BH008	2.10	J6	MADE GROUND (Brown sandy slightly gravelly clay).	BRE
BH008	2.50	B8	MADE GROUND (Brown clayey sand and gravel with a high cobble content. Gravel includes brick fragments).	MC PSD
BH008	4.50	J14	MADE GROUND (Brown sandy slightly gravelly clay).	MC PI(IS for LL)
BH008	4.50	B15	MADE GROUND (Brown clayey very sandy gravel with a medium cobble content. Gravel includes brick fragments).	PSD

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Signed [redacted]	Name :- M. SELKIRK	Page 2 of 4	
Date of issue : 22/01/2020	Certificate No :- SD/NW1588/2	AEG Contract No. :- NW1588	UKAS TESTING 1367

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LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
BH008	5.50	J18	Brown sandy slightly gravelly CLAY.	BRE
BH009	0.80	J3	MADE GROUND (Brown slightly clayey gravelly sand).	BRE
BH009	1.00	B4	MADE GROUND (Brown clayey very sandy gravel including brick fragments).	MC PSD
BH009	3.70	B14	Red brown clayey gravelly SAND.	MC PSD
BH011	0.80	B3	MADE GROUND (Brown sandy gravel including concrete and metal fragments).	CP2
BH011	1.20	J5	MADE GROUND (Brown slightly clayey gravelly sand. Gravel includes brick fragments).	BRE
BH011	2.70	B9	MADE GROUND (Brown clayey very sandy gravel with a medium cobble content).	MC PSD
BH011	4.70	B17	Red brown very clayey slightly gravelly SAND.	MC PSD SED
BH011	5.50	J19	Red brown slightly gravelly SAND.	BRE
BH012A	1.70	B8	MADE GROUND (Brown slightly clayey gravelly sand. Gravel includes brick fragments).	BRE
BH012A	6.50	J21	MADE GROUND (Brown slightly sandy slightly gravelly clay of low to intermediate plasticity. Gravel includes brick fragments).	MC PI
BH012A	6.50	B22	MADE GROUND (Brown very clayey very sandy gravel including tile and brick fragments). (Clay of low plasticity).	MC PI PSD SED
BH012A	8.50	U25	MADE GROUND (Brown sand becoming at 8.80m brown silty sand).	OED US for CUT
BH012A	9.00	B28	MADE GROUND (Brown very clayey slightly gravelly sand).	MC PSD SED
BH012A	10.00	B30	MADE GROUND (Brown slightly clayey slightly gravelly sand. Gravel includes coal fragments).	BRE
BH013	0.80	B3	MADE GROUND (Brown slightly clayey sandy gravel with a high cobble content. Gravel includes brick fragments).	US for CP2
BH013	1.50	B5	MADE GROUND (Brown sandy gravel including brick fragments).	BRE
BH013	1.70	B6	MADE GROUND (Brown clayey very sandy gravel with a high cobble content. Gravel includes slag, wood ,glass, ceramic, brick fragments).	MC PSD
BH013	6.00	B16	Brown clayey very gravelly SAND.	MC PSD
BH013	8.00	J20	Brown SAND.	BRE
BH014	0.70	B6	MADE GROUND (Brown gravelly sand).	BRE

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Signe [redacted]	Name :- M. SELKIRK	Page 3 of 4	
Date of issue :- 22/01/2020	Certificate No :- SD/NW1588/3	AEG Contract No. :- NW1588	UKAS TESTING 1367

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LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
BH014	1.20	B8	MADE GROUND (Brown clayey sandy gravel).	MC PSD
BH014	3.00	B14	MADE GROUND (Black brown clayey very sandy gravel including ash and clinker).	MC PI(NP) PSD
BH014	6.00	B24	Brown clayey slightly gravelly SAND.	MC PSD SED
DS001	0.40	J4	MADE GROUND (Brown clayey sandy gravel including brick fragments).	MC PI(IS for LL)
DS001	0.70	B6	MADE GROUND (Brown clayey very sandy gravel with a high cobble content. Gravel includes brick fragments).	PSD SED BRE
DS002	0.40	B2	MADE GROUND (Brown slightly clayey gravelly sand with occasional pockets of clay of low plasticity).	MC PI
DS002	0.80	B4	MADE GROUND (Brown clayey very sandy gravel including brick and tile fragments).	PSD SED
DS002	1.20	U5	MADE GROUND (Brown slightly clayey sandy gravel including brick fragments).	BRE
TP001	0.80	B4	MADE GROUND (Brown clayey very gravelly sand. Gravel includes brick fragments).	MC PSD SED
TP001	0.80	J5	Brown gravelly SAND.	BRE
TP001	1.50	B7	Brown clayey very gravelly SAND.	PSD CP2
TP002	1.00	B4	MADE GROUND (Red brown clayey very gravelly sand).	MC PSD
TP002	1.50	J8	MADE GROUND (Brown red gravelly sand).	BRE
TP002	2.50	B10	MADE GROUND (Brown clayey very gravelly sand. Gravel includes slag, glass and brick fragments).	MC PSD
TP003	1.00	B7	Red brown clayey gravelly SAND.	MC PSD
TP003	3.00	B12	Red brown clayey gravelly SAND.	MC PSD SED

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester

Signe [redacted]	Name :- M SELKIRK	Page 4 of 4	UKAS TESTING 1367
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LABORATORY TESTING ENCLOSURE 2

Moisture Content/Plasticity Index and Moisture Content

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MOISTURE CONTENT CERTIFICATE

BS 1377 : Part 2 : Clause 3.2

Exploratory Hole No.	Sample Depth (m)	Sample ID	Specific Depth (m)	Moisture Content (%)	Date Tested	Remarks
BH001	5.00	B24	5.00	9.9	22/11/2019	
BH002	1.20	B5	1.20	18.4	22/11/2019	
BH002	3.70	B13	3.70	29.2	26/11/2019	
BH003	1.70	B6	1.70	17.5	22/11/2019	
BH003	4.70	B16	4.70	19.4	26/11/2019	
BH004	7.50	B22	7.50	18.5	28/11/2019	
BH005	0.80	B4	0.80	16.2	02/12/2019	
BH005	1.50	B7	1.50	13.4	29/11/2019	
BH005	2.40	B10	2.40	7.5	29/11/2019	
BH006A	0.80	B4	0.80	15.5	02/12/2019	
BH007	0.60	B4	0.60	14.9	27/11/2019	
BH007	6.50	B20	6.50	17.6	27/11/2019	
BH008	0.60	B3	0.60	16.3	27/11/2019	
BH008	2.50	B8	2.50	19.1	27/11/2019	
BH009	1.00	B4	1.00	12.0	27/11/2019	
BH009	3.70	B14	3.70	15.0	27/11/2019	
BH011	2.70	B9	2.70	18.0	26/11/2019	
BH011	4.70	B17	4.70	14.5	26/11/2019	
BH012A	9.00	B28	9.00	16.3	22/11/2019	
BH013	1.70	B6	1.70	23.3	25/11/2019	

For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- ID Manchester Preliminary Ground Investigation

Client :- University of Manchester

Signe [redacted]

Name :- M. SELKIRK

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Certificate No :- MC/NW1588/1

AEG Contract No. :- NW1588

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MOISTURE CONTENT CERTIFICATE

BS 1377 : Part 2 : Clause 3.2

Exploratory Hole No.	Sample Depth (m)	Sample ID	Specific Depth (m)	Moisture Content (%)	Date Tested	Remarks
BH013	6.00	B16	6.00	14.0	25/11/2019	
BH014	1.20	B8	1.20	8.3	25/11/2019	
BH014	6.00	B24	6.00	18.6	25/11/2019	
TP001	0.80	B4	0.80	16.4	26/11/2019	
TP002	1.00	B4	1.00	10.2	25/11/2019	
TP002	2.50	B10	2.50	16.2	22/11/2019	
TP003	1.00	B7	1.00	12.7	25/11/2019	
TP003	3.00	B12	3.00	17.1	25/11/2019	

For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- ID Manchester Preliminary Ground Investigation

Client :- University of Manchester

S[redacted] Name :- M. SELKIRK Page 2 of 2

D 22/01/2020 Certificate No :- MC/NW1588/2 AEG Contract No. :- NW1588

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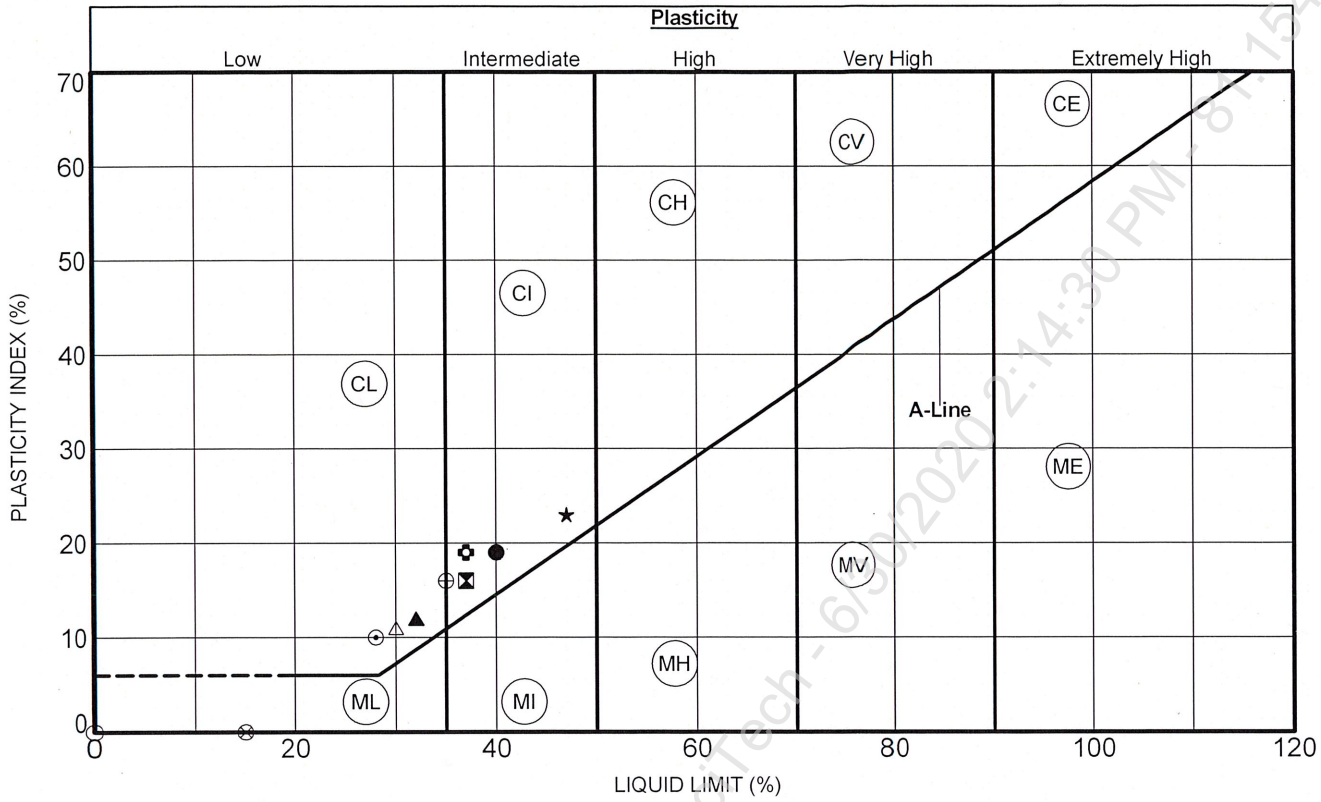
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ATTERBERG LIMITS & NATURAL MOISTURE CONTENT

Test Method :- BS 1377 : Part 2 : Clause 3.2, 4.1 to 4.4 & 5 : 1990



Exploratory Hole No.	Depth (m)	Sample Type/Ref.	Specific Depth (m)	LL	PL	PI	I_L	Preparation Method	<0.425mm (%)	m/c (%)	Date Tested	
● BH001	0.50	B6	0.50	40	21	19	0.16	Natural	73.0	24.1	22/11/2019	
⊠ BH001	2.00	J13	2.00	37	21	16	0.46	Air Dried	54.0	28.3	27/11/2019	#
▲ BH001	3.00	B17	3.00	32	20	12	0.44	Air Dried	75.0	25.3	22/11/2019	#
★ BH001	4.30	J22	4.30	47	24	23	0.17	Natural		27.9	22/11/2019	
⊙ BH004	1.40	B6	1.40	28	18	10	0.33	Natural	73.0	21.3	27/11/2019	
✿ BH004	5.00	B16	5.00	37	18	19	0.35	Air Dried	28.0	24.6	27/11/2019	#
○ BH006B	0.40	B3	0.40	NP	NP	NP		Air Dried	27.0	12.6	02/12/2019	
△ BH007	2.50	B11	2.50	30	19	11	0.23	Natural	45.0	21.5	26/11/2019	#
⊗ BH008	4.50	J14	4.50		15			Natural		17.6	26/11/2019	
⊕ BH012A	6.50	J21	6.50	35	19	16	0.11	Natural		20.8	22/11/2019	#

For description of sample please refer to the Laboratory Sample Description Sheet. # = Insufficient for 4 point PI
If sample is prepared in the natural state we are unable to determine % retained on the 0.425mm test sieve.

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Signe [redacted]	Name :- M. SELKIRK		Page 1 of 2
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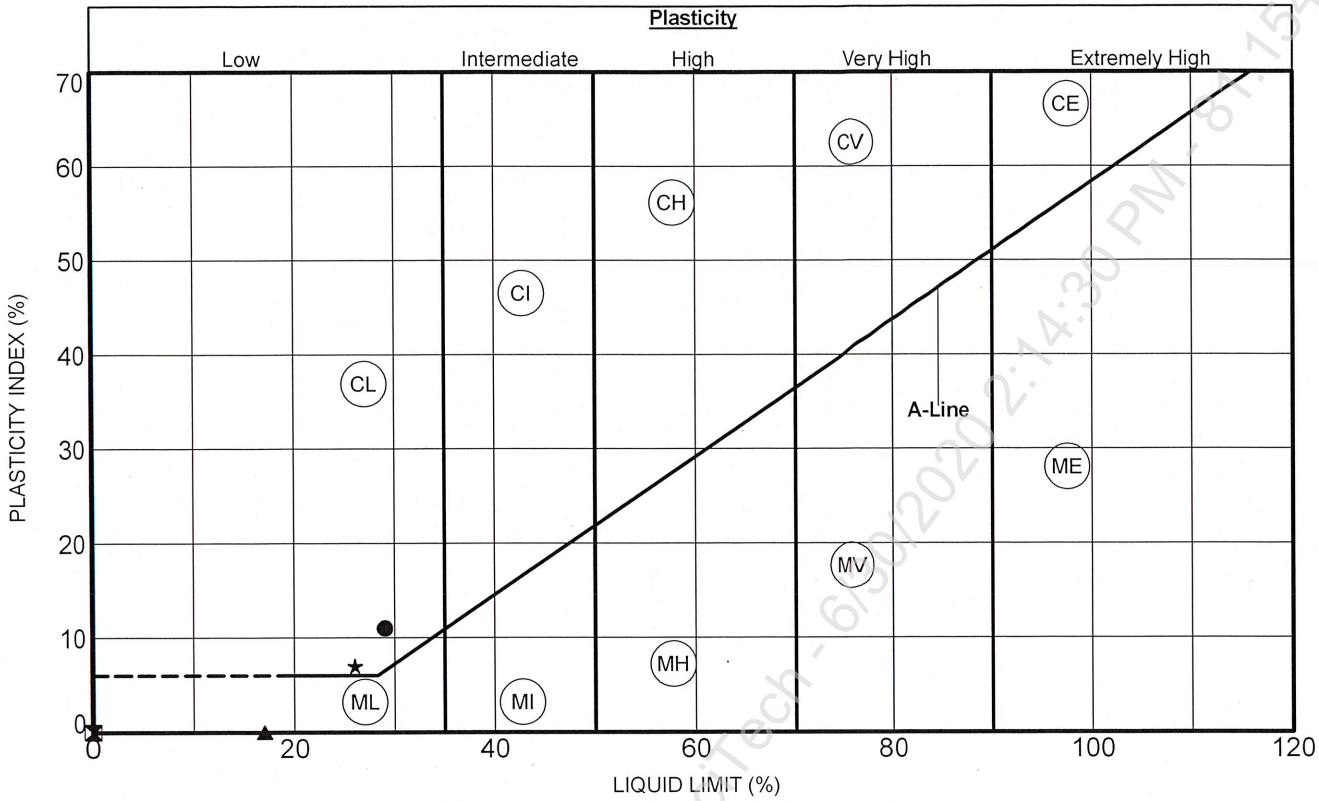
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ATTERBERG LIMITS & NATURAL MOISTURE CONTENT

Test Method :- BS 1377 : Part 2 : Clause 3.2, 4.1 to 4.4 & 5 : 1990



Exploratory Hole No.	Depth (m)	Sample Type/Ref.	Specific Depth (m)	LL	PL	PI	I_L	Preparation Method	<0.425mm (%)	m/c (%)	Date Tested	
● BH012A	6.50	B22	6.50	29	18	11	0.35	Air Dried	49.0	21.8	25/11/2019	#
⊠ BH014	3.00	B14	3.00	NP	NP	NP		Natural	28.0	25.7	22/11/2019	
▲ DS001	0.40	J4	0.40		17			Air Dried	56.0	16.9	09/12/2019	
★ DS002	0.40	B2	0.40	26	19	7	-0.77	Natural		13.6	09/12/2019	

For description of sample please refer to the Laboratory Sample Description Sheet. # = Insufficient for 4 point PI
If sample is prepared in the natural state we are unable to determine % retained on the 0.425mm test sieve.

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester

Sign [redacted]	Name :- M. SELKIRK	Page 2 of 2	UKAS TESTING 1367
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LABORATORY TESTING ENCLOSURE 3

Particle Size Distribution Sieving and Sedimentation

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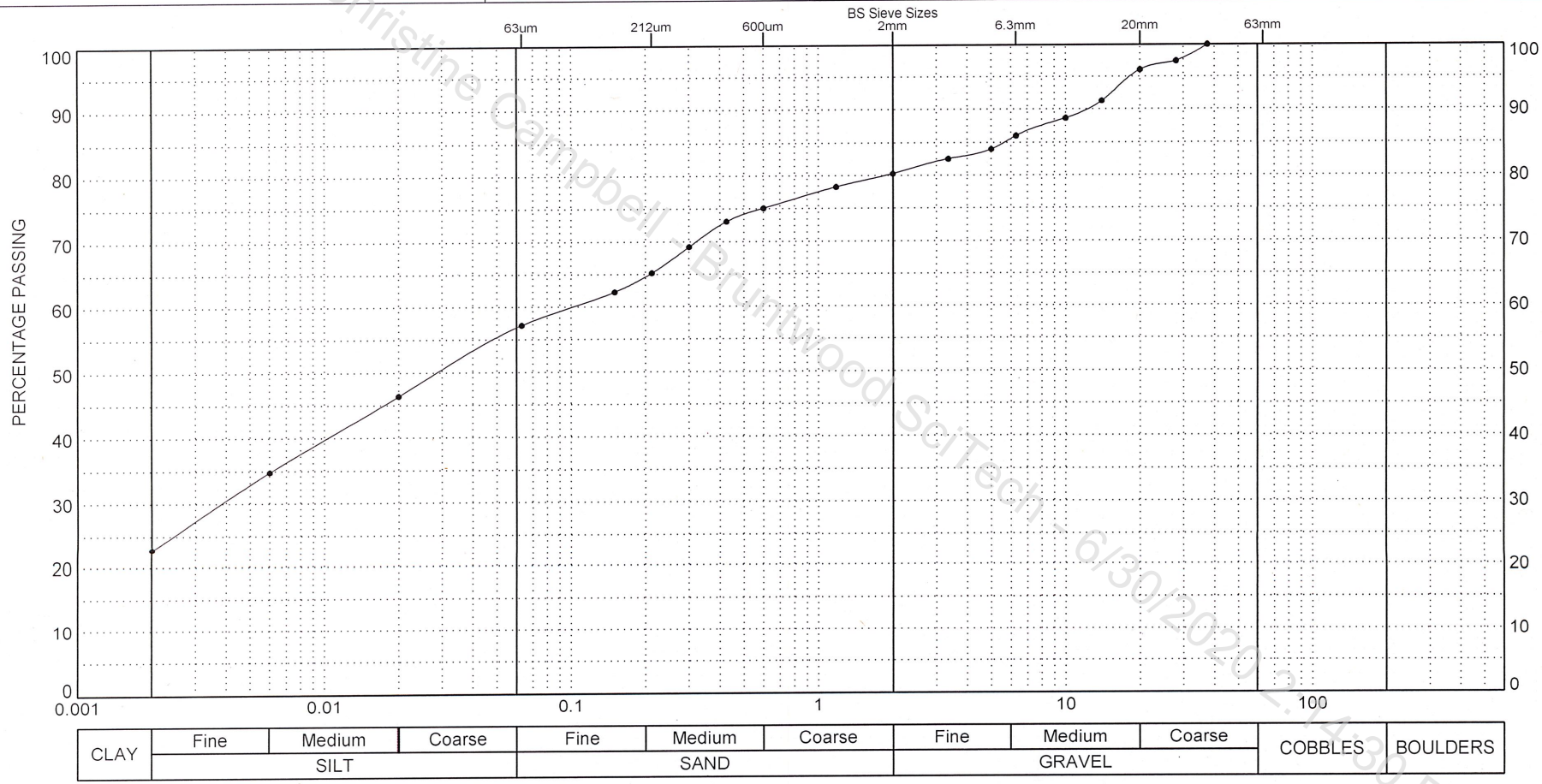
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH001**	Depth (m) :- **0.50**	Sample Type & No :- **B6**	Specific Depth (m) :- **0.50**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
37.5	100.0
28	97.4
20	96.1
14	91.3
10	88.7
6.3	86.0
5	84.0
3.35	82.5
2	80.3
1.18	78.3
0.6	75.1
0.425	73.1
0.3	69.2
0.212	65.2
0.15	62.3
0.063	57.2
0.02	46.4
0.006	34.8
0.002	22.8

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH001/B6/0.50	[redacted]	M. SELKIRK	

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University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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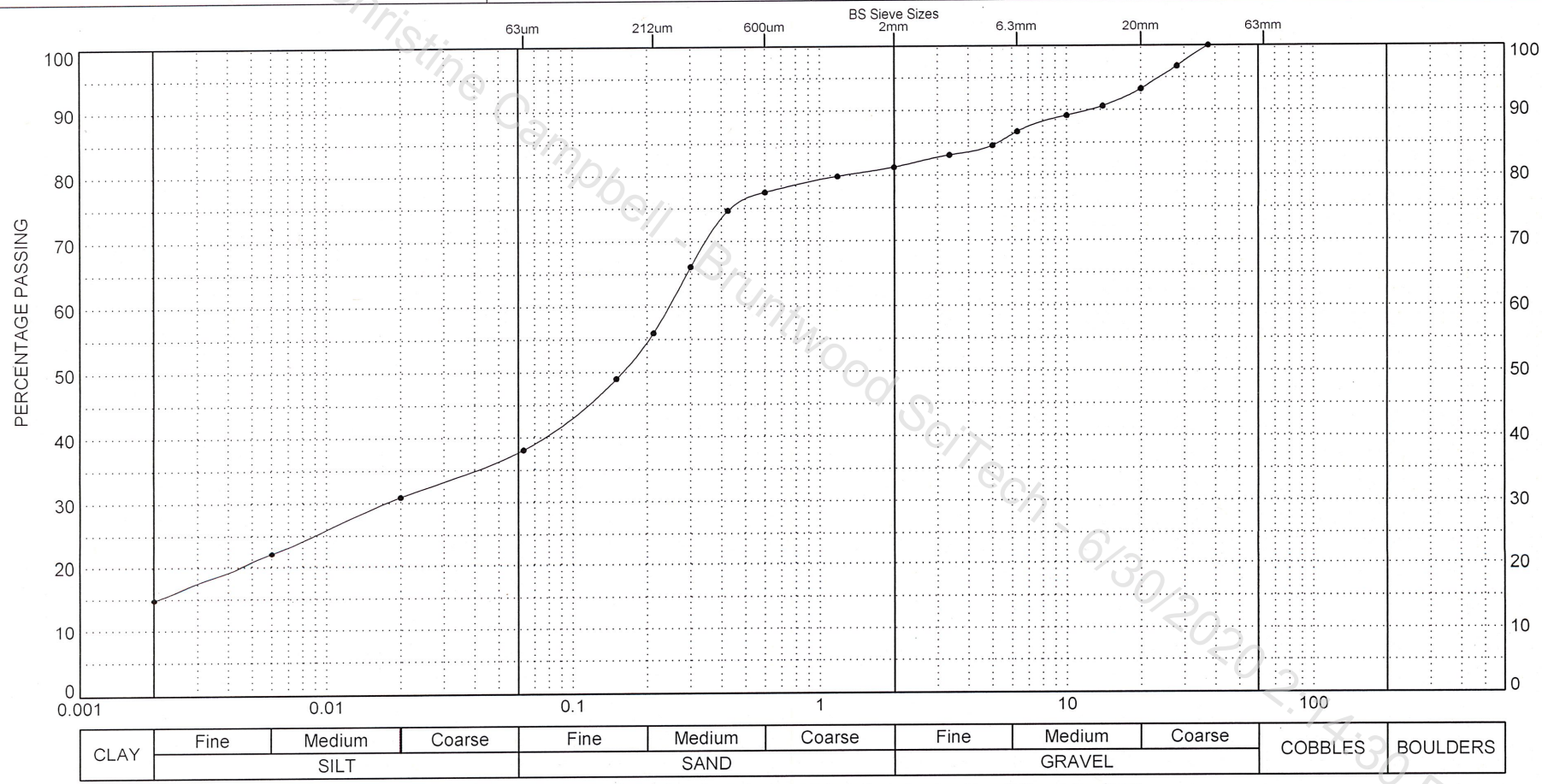
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH001**	Depth (m) :- **3.00**	Sample Type & No :- **B17**	Specific Depth (m) :- **3.00**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
37.5	100.0
28	96.8
20	93.3
14	90.6
10	89.2
6.3	86.7
5	84.6
3.35	83.1
2	81.3
1.18	79.9
0.6	77.5
0.425	74.7
0.3	66.1
0.212	56.0
0.15	49.0
0.063	38.1
0.02	30.9
0.006	22.0
0.002	14.8

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH001/B17/3.00	[redacted]	M. SELKIRK	

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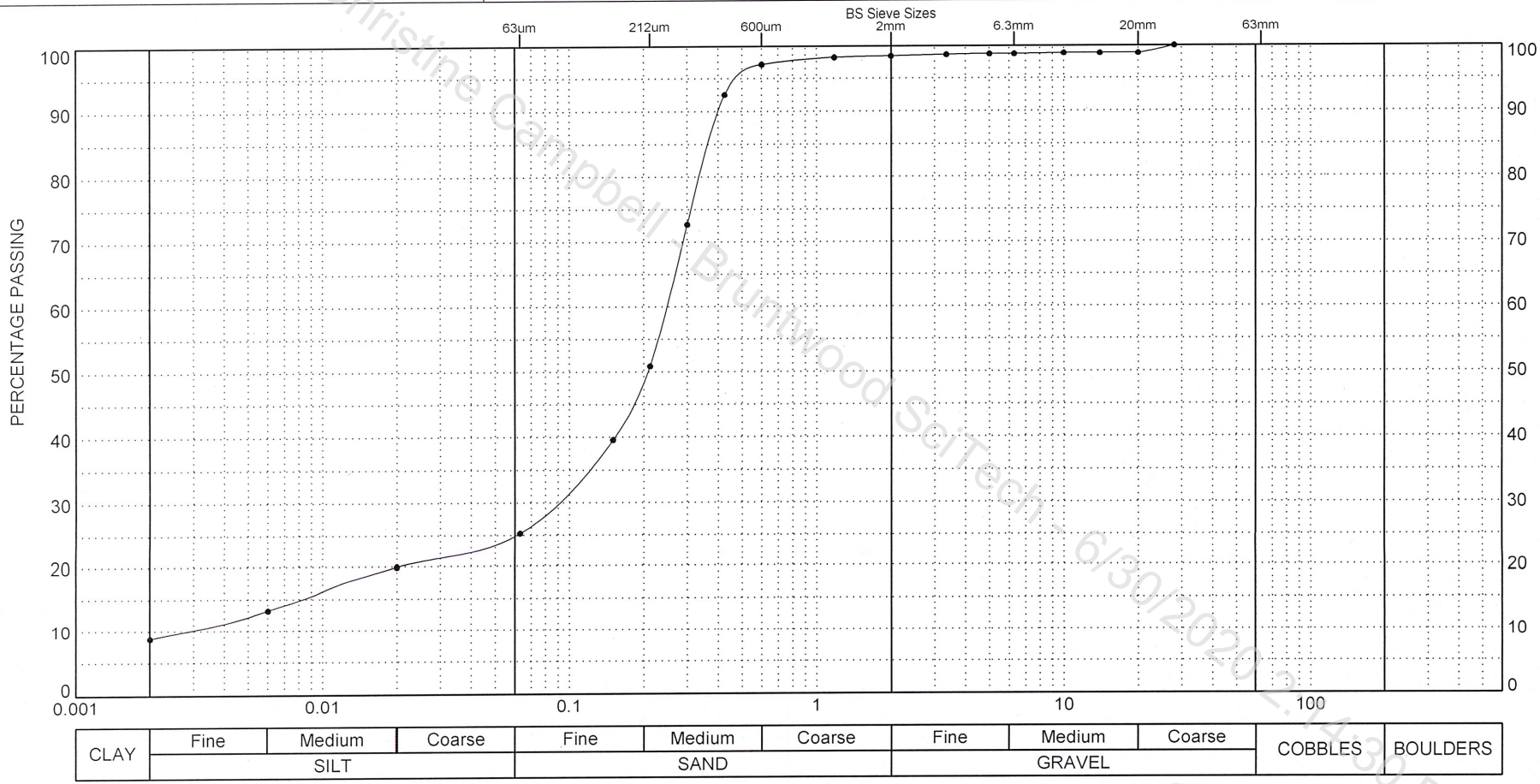
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH001**	Depth (m) :- **5.00**	Sample Type & No :- **B24**	Specific Depth (m) :- **5.00**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
28	100.0
20	98.8
14	98.8
10	98.8
6.3	98.7
5	98.7
3.35	98.6
2	98.4
1.18	98.2
0.6	97.2
0.425	92.6
0.3	72.7
0.212	50.9
0.15	39.6
0.063	25.3
0.02	19.9
0.006	13.1
0.002	8.8

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH001/B24/5.00	[redacted]	M. SELKIRK	

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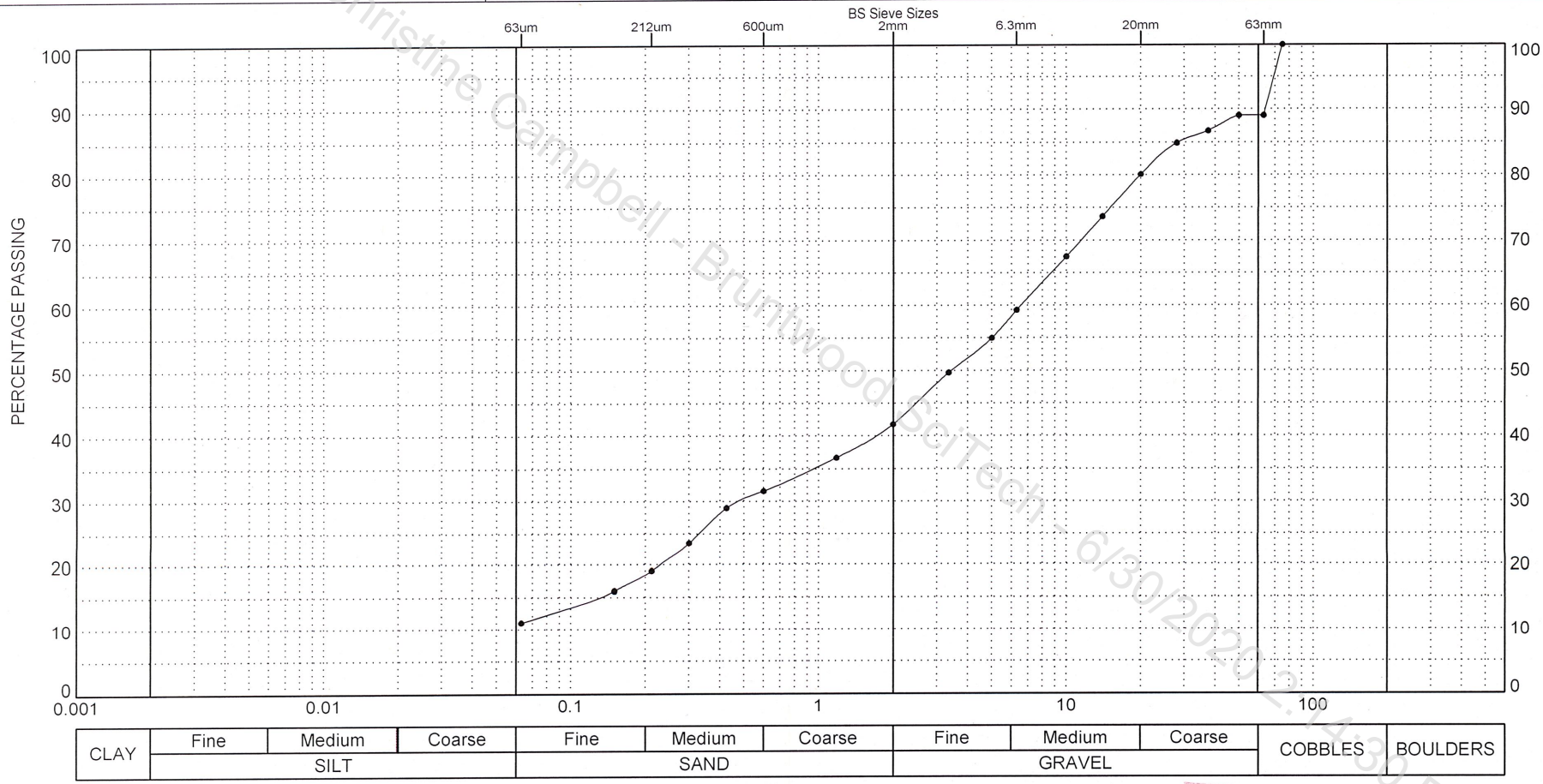
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH002**	Depth (m) :- **1.20**	Sample Type & No :- **B5**	Specific Depth (m) :- **1.20**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	89.1
50	89.1
37.5	86.7
28	84.9
20	80.1
14	73.7
10	67.5
6.3	59.3
5	55.0
3.35	49.7
2	41.8
1.18	36.7
0.6	31.6
0.425	29.0
0.3	23.6
0.212	19.1
0.15	15.9
0.063	11.1

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH002/B5/1.20	[redacted]	M. SELKIRK	

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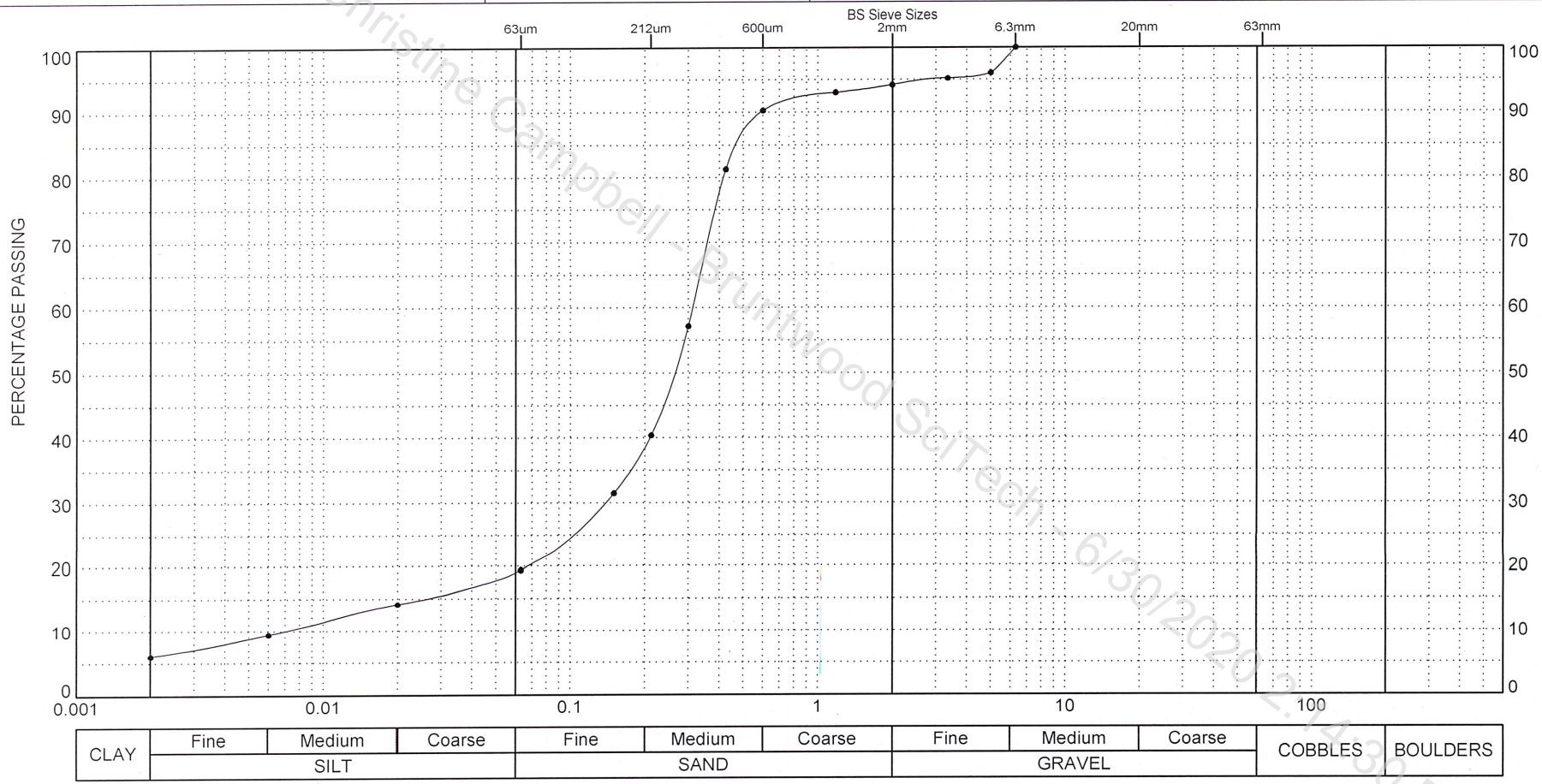
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH002**	Depth (m) :- **3.70**	Sample Type & No :- **B13**	Specific Depth (m) :- **3.70**	Date Tested :- **06/12/2019**



Sieve Size (mm)	Passing (%)
6.3	100.0
5	96.1
3.35	95.2
2	94.2
1.18	93.1
0.6	90.3
0.425	81.3
0.3	57.2
0.212	40.4
0.15	31.5
0.063	19.4
0.02	14.1
0.006	9.4
0.002	6.1

For description of sample please refer to the Laboratory Sample Description Sheet

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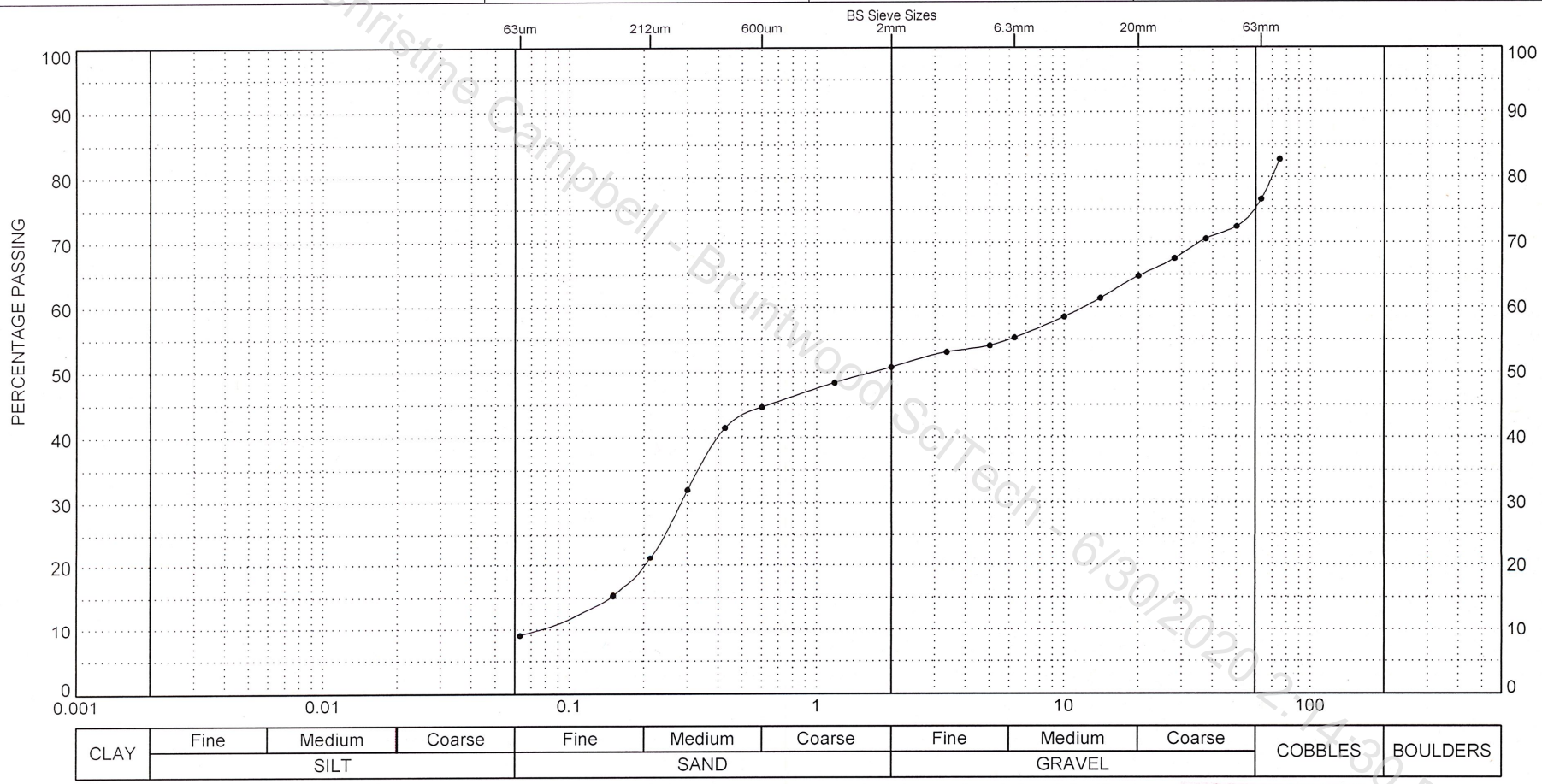
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH003**	Depth (m) :- **1.70**	Sample Type & No :- **B6**	Specific Depth (m) :- **1.70**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
75	82.7
63	76.6
50	72.4
37.5	70.5
28	67.5
20	64.8
14	61.4
10	58.5
6.3	55.3
5	54.1
3.35	53.1
2	50.8
1.18	48.4
0.6	44.7
0.425	41.5
0.3	32.0
0.212	21.2
0.15	15.3
0.063	9.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH003/B6/1.70	[redacted]	M. SELKIRK	

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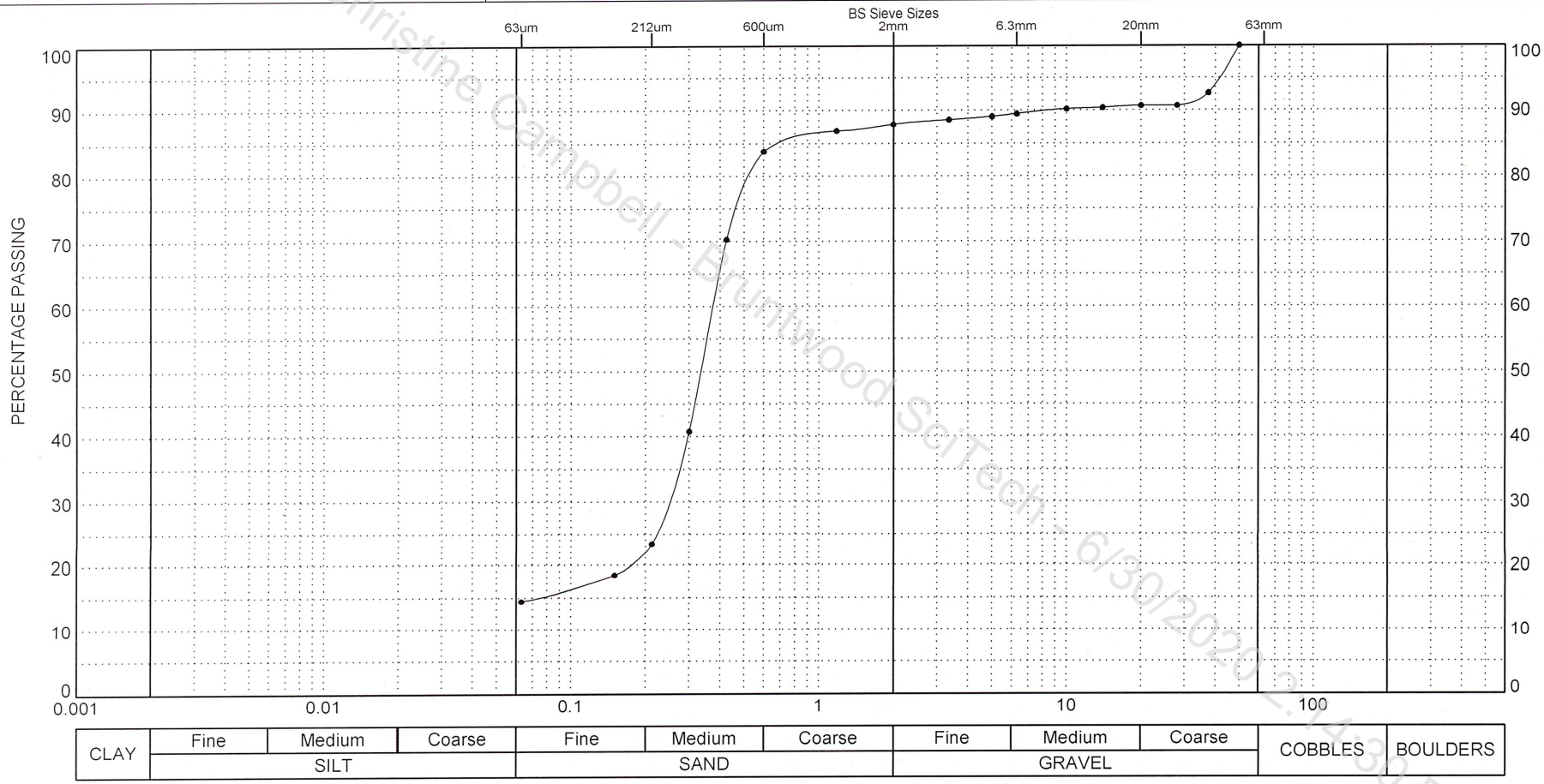
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH003**	Depth (m) :- **4.70**	Sample Type & No :- **B16**	Specific Depth (m) :- **4.70**	Date Tested :- **26/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	92.7
28	90.7
20	90.7
14	90.4
10	90.2
6.3	89.5
5	89.1
3.35	88.6
2	87.9
1.18	86.9
0.6	83.8
0.425	70.3
0.3	40.8
0.212	23.5
0.15	18.5
0.063	14.4

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Sign	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH003/B16/4.70	[redacted]	M. SELKIRK	

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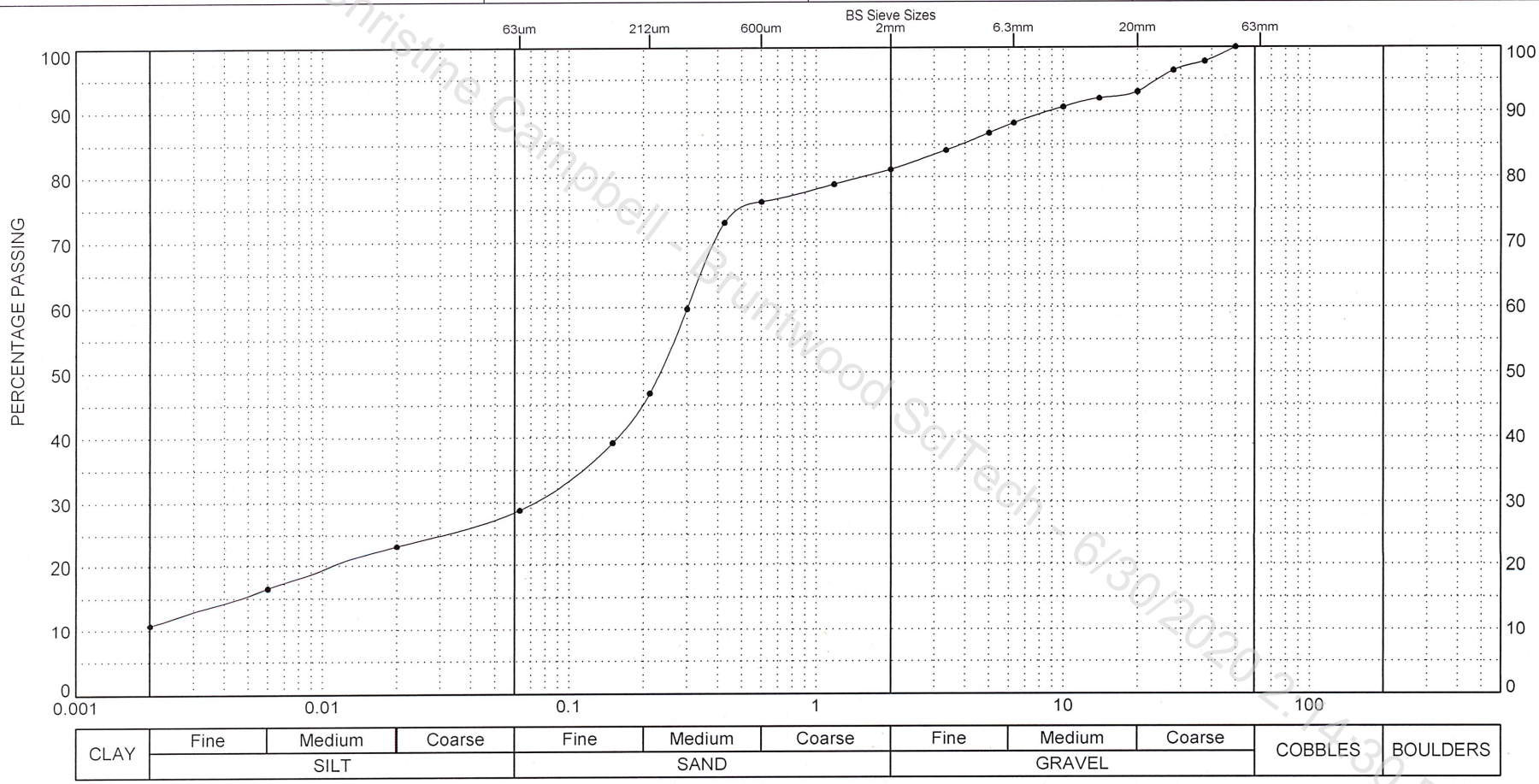
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH004**	Depth (m) :- **1.40**	Sample Type & No :- **B6**	Specific Depth (m) :- **1.40**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	97.7
28	96.4
20	93.1
14	92.1
10	90.7
6.3	88.3
5	86.7
3.35	84.1
2	81.2
1.18	78.9
0.6	76.2
0.425	73.0
0.3	59.8
0.212	46.8
0.15	39.2
0.063	28.8
0.02	23.2
0.006	16.4
0.002	10.8

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signe	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH004/B6/1.40	[redacted]	M. SELKIRK	

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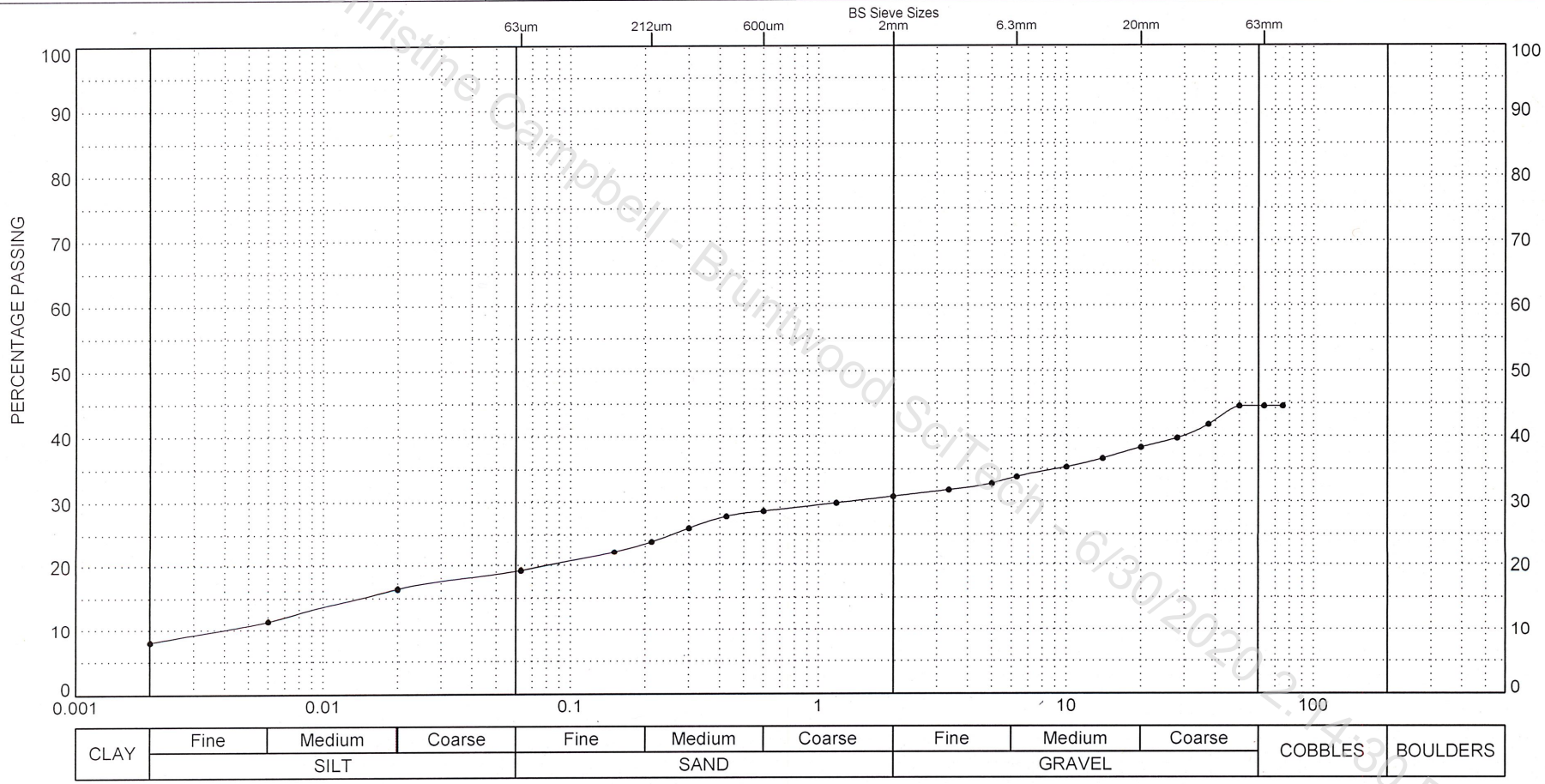
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH004**	Depth (m) :- **5.00**	Sample Type & No :- **B16**	Specific Depth (m) :- **5.00**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
75	44.6
63	44.6
50	44.6
37.5	41.8
28	39.7
20	38.3
14	36.6
10	35.3
6.3	33.8
5	32.8
3.35	31.8
2	30.8
1.18	29.8
0.6	28.6
0.425	27.8
0.3	26.0
0.212	23.9
0.15	22.2
0.063	19.3
0.02	16.3
0.006	11.4
0.002	8.1

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH004/B16/5.00	[redacted]	M. SELKIRK	

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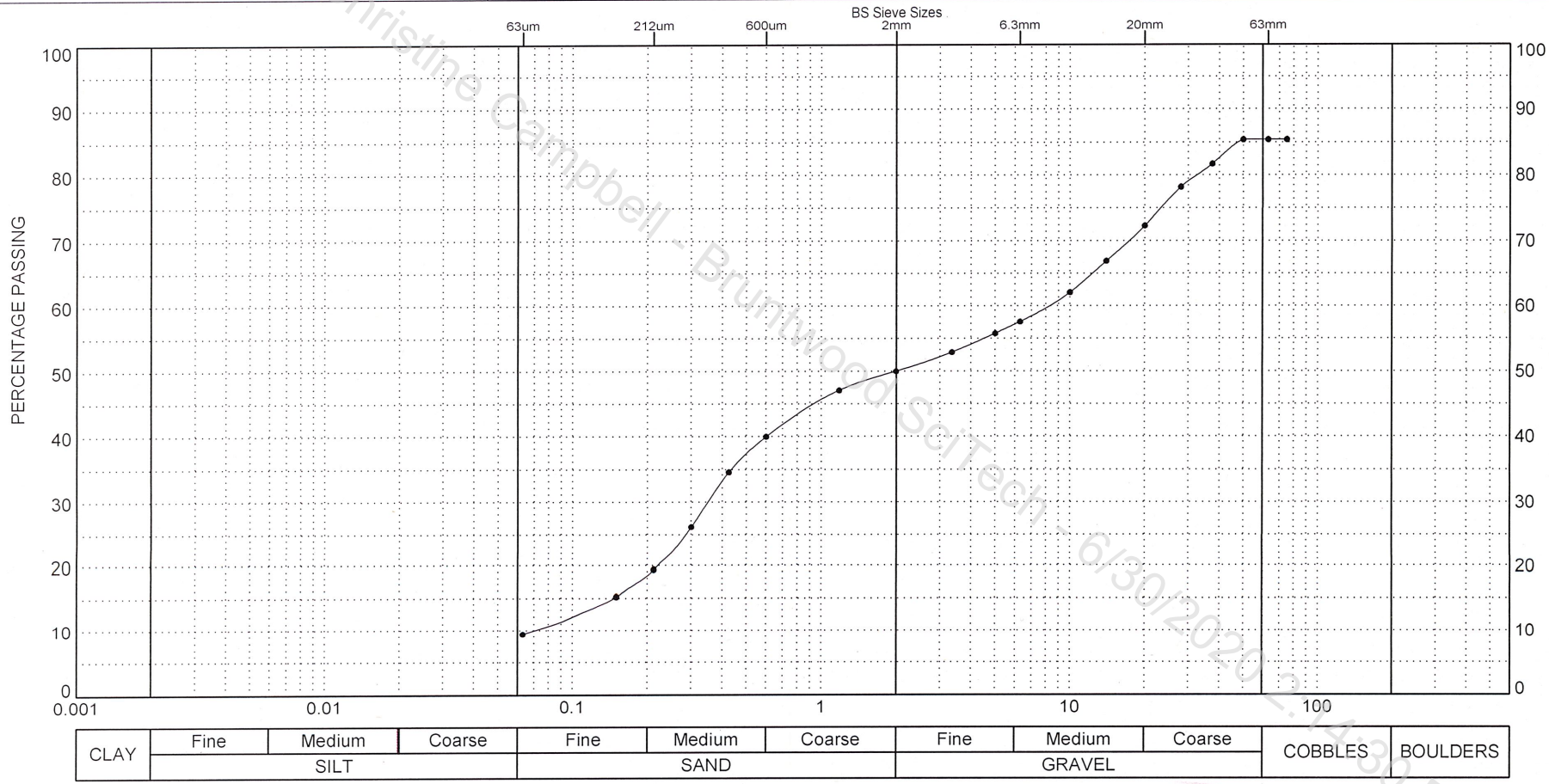
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH004**	Depth (m) :- **7.50**	Sample Type & No :- **B22**	Specific Depth (m) :- **7.50**	Date Tested :- **28/11/2019**



Sieve Size (mm)	Passing (%)
75	85.4
63	85.4
50	85.4
37.5	81.7
28	78.2
20	72.3
14	66.9
10	62.1
6.3	57.6
5	55.8
3.35	52.9
2	50.0
1.18	47.1
0.6	40.0
0.425	34.6
0.3	26.2
0.212	19.4
0.15	15.2
0.063	9.4

For description of sample please refer to the Laboratory Sample Description Sheet

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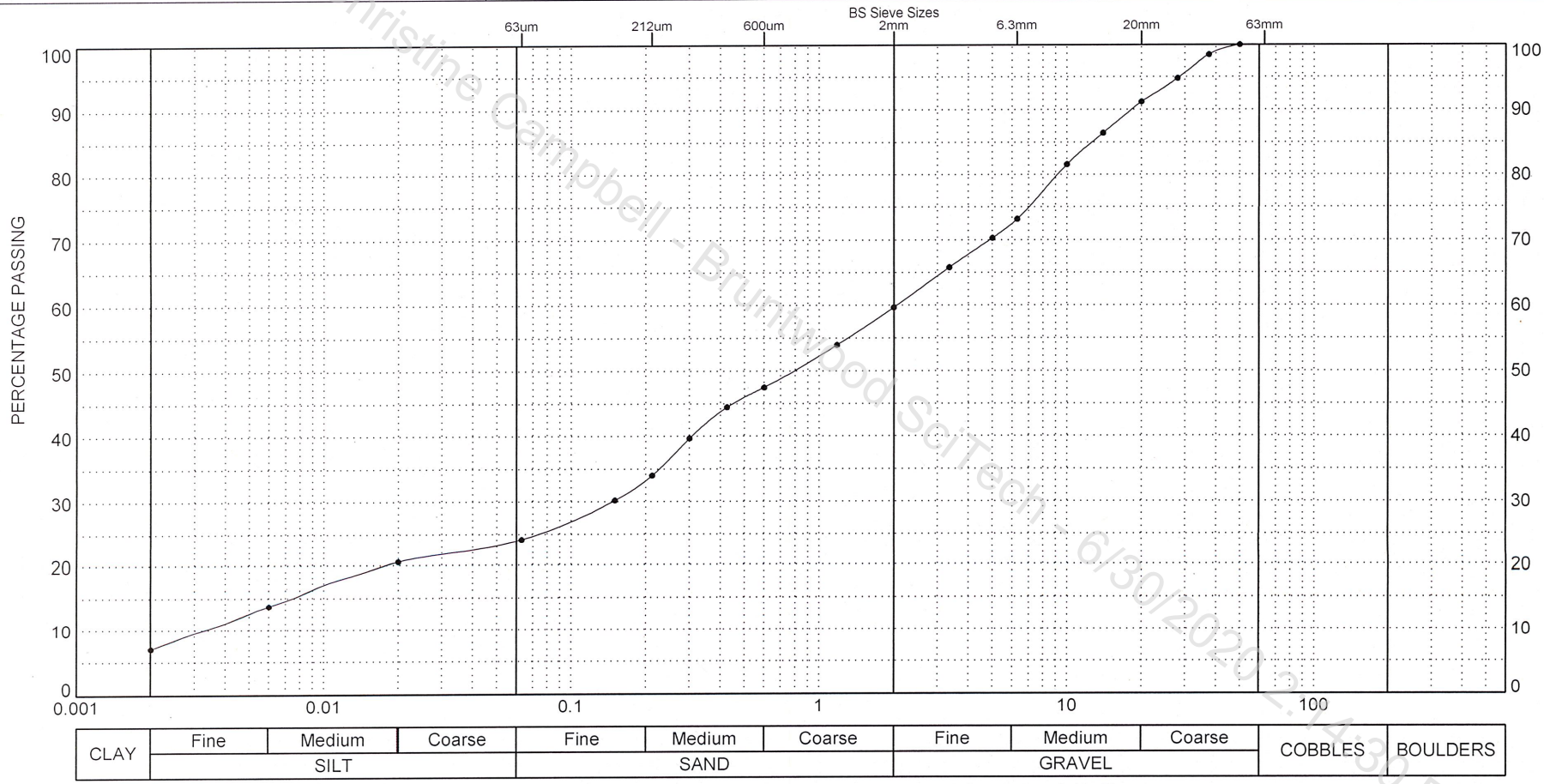
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH005**	Depth (m) :- **0.80**	Sample Type & No :- **B4**	Specific Depth (m) :- **0.80**	Date Tested :- **02/12/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	98.4
28	94.8
20	91.2
14	86.4
10	81.6
6.3	73.2
5	70.3
3.35	65.8
2	59.7
1.18	54.0
0.6	47.5
0.425	44.5
0.3	39.7
0.212	34.0
0.15	30.2
0.063	24.2
0.02	20.5
0.006	13.6
0.002	7.2

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH005/B4/0.80	[redacted]	M. SELKIRK	

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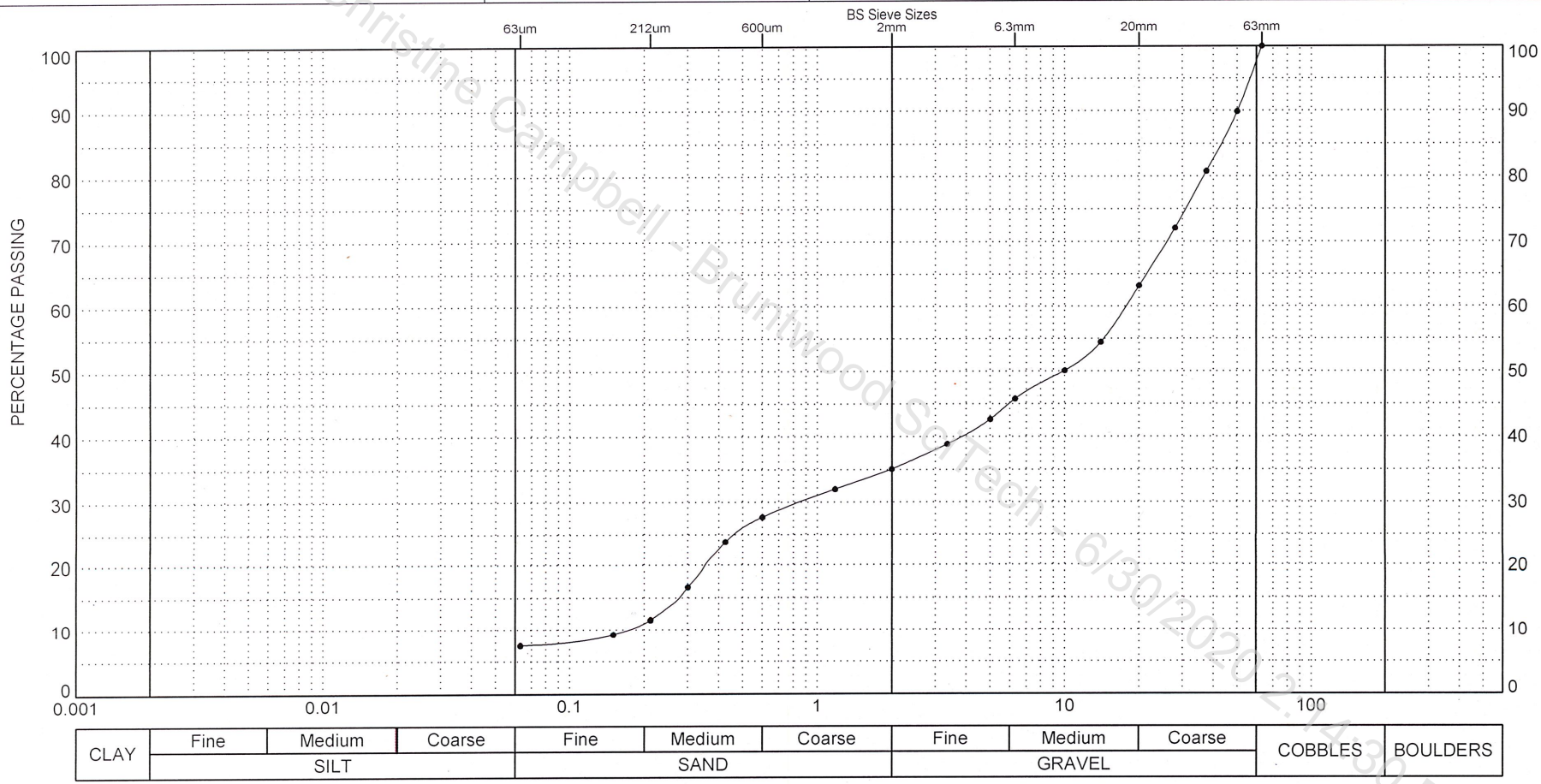
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH005**	Depth (m) :- **2.40**	Sample Type & No :- **B10**	Specific Depth (m) :- **2.40**	Date Tested :- **29/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	89.9
37.5	80.8
28	72.1
20	63.2
14	54.5
10	50.1
6.3	45.8
5	42.7
3.35	38.9
2	35.1
1.18	32.0
0.6	27.7
0.425	23.9
0.3	16.5
0.212	11.5
0.15	9.2
0.063	7.6

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signe	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH005/B10/2.40	[redacted]	M. SELKIRK	

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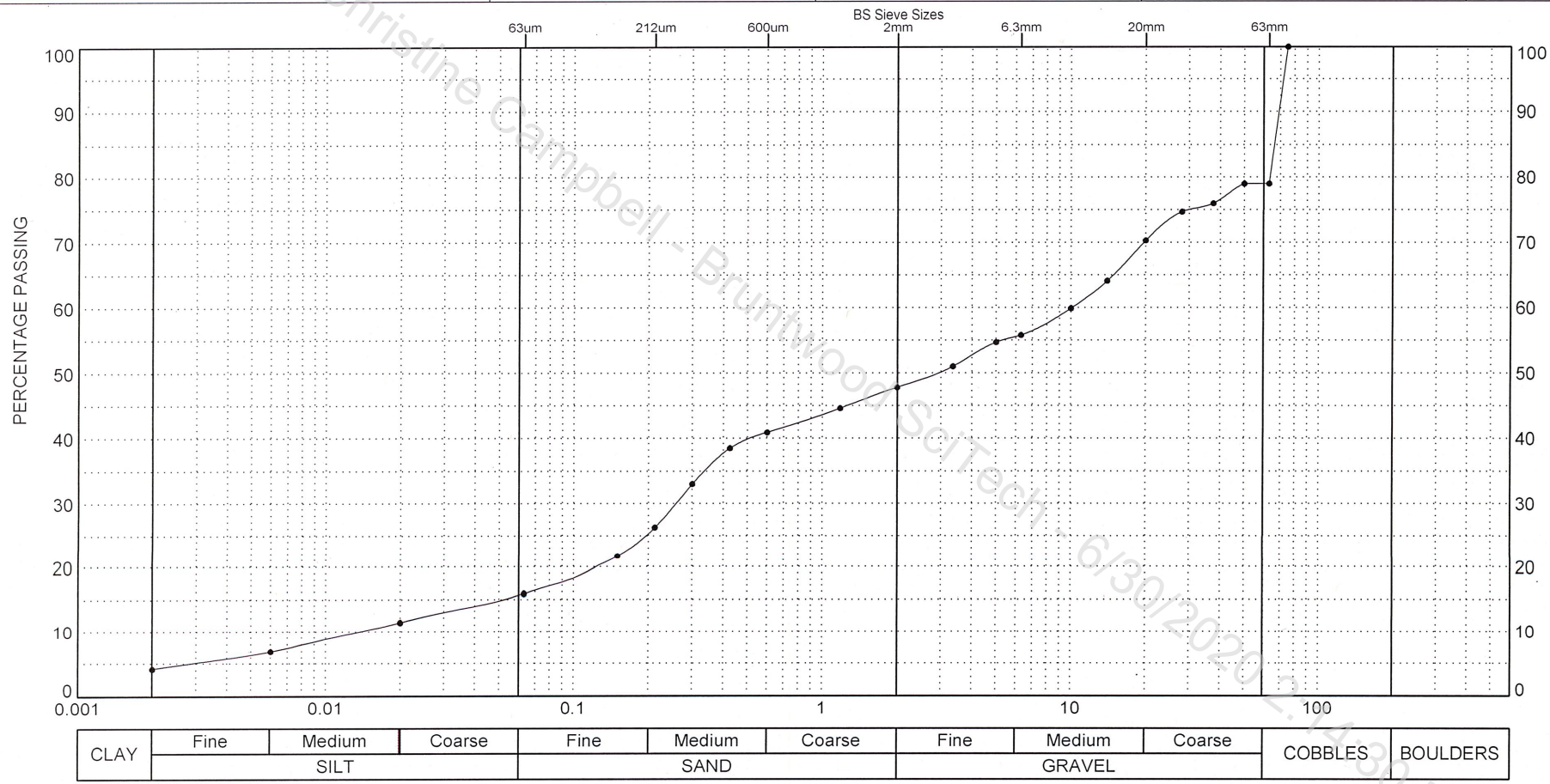
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH006A**	Depth (m) :- **0.80**	Sample Type & No :- **B4**	Specific Depth (m) :- **0.80**	Date Tested :- **02/12/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	79.0
50	79.0
37.5	76.0
28	74.7
20	70.3
14	64.1
10	59.9
6.3	55.8
5	54.7
3.35	51.0
2	47.8
1.18	44.6
0.6	40.9
0.425	38.5
0.3	33.0
0.212	26.3
0.15	21.8
0.063	15.8
0.02	11.4
0.006	7.0
0.002	4.2

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signe[redacted]	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH006A/B4/0.80		M. SELKIRK	

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University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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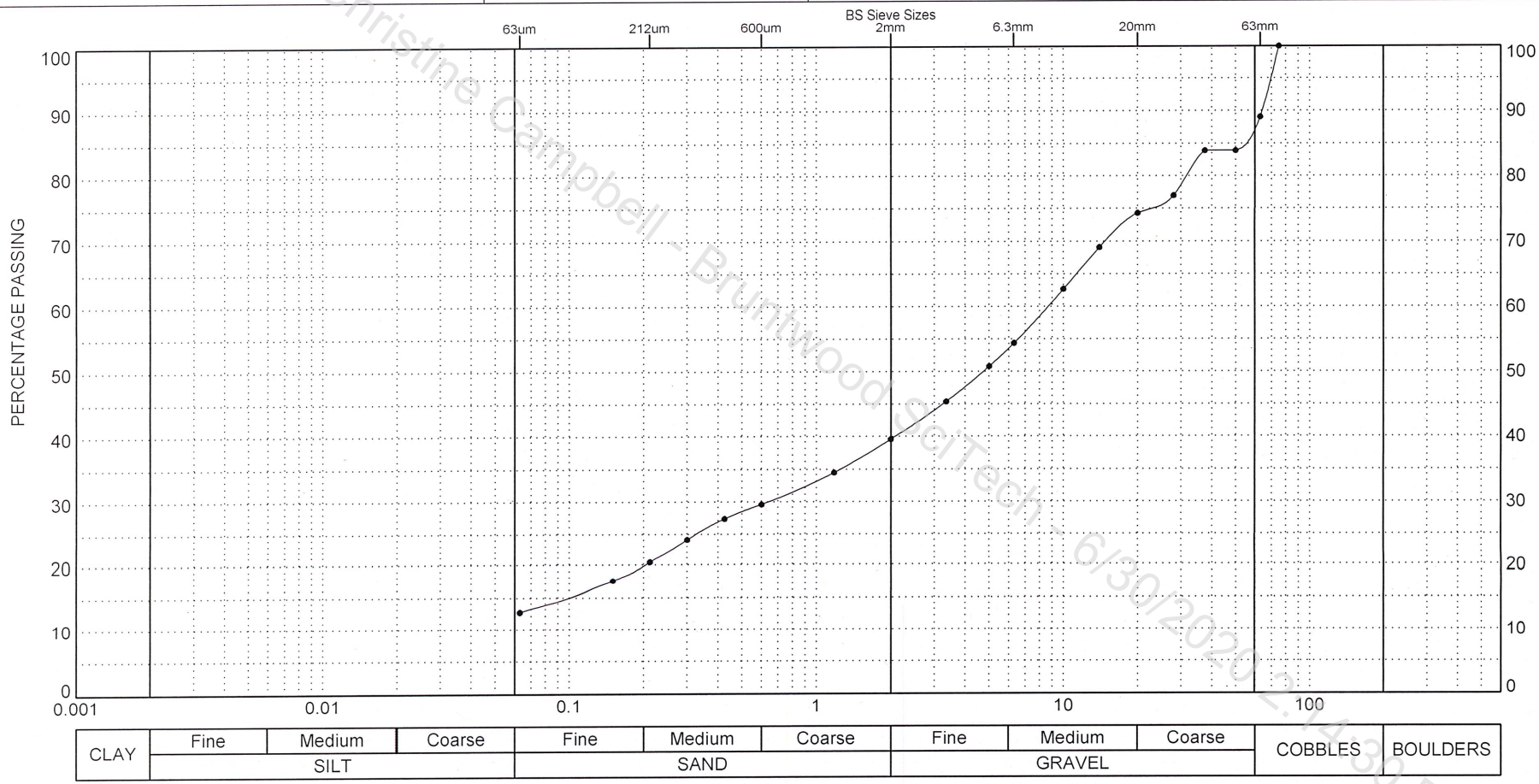
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH006B**	Depth (m) :- **0.40**	Sample Type & No :- **B3**	Specific Depth (m) :- **0.40**	Date Tested :- **02/12/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	89.1
50	83.9
37.5	83.9
28	77.0
20	74.3
14	69.1
10	62.7
6.3	54.4
5	50.8
3.35	45.4
2	39.6
1.18	34.5
0.6	29.6
0.425	27.4
0.3	24.2
0.212	20.4
0.15	17.5
0.063	12.6

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH006B/B3/0.40	[redacted]	M. SELKIRK	

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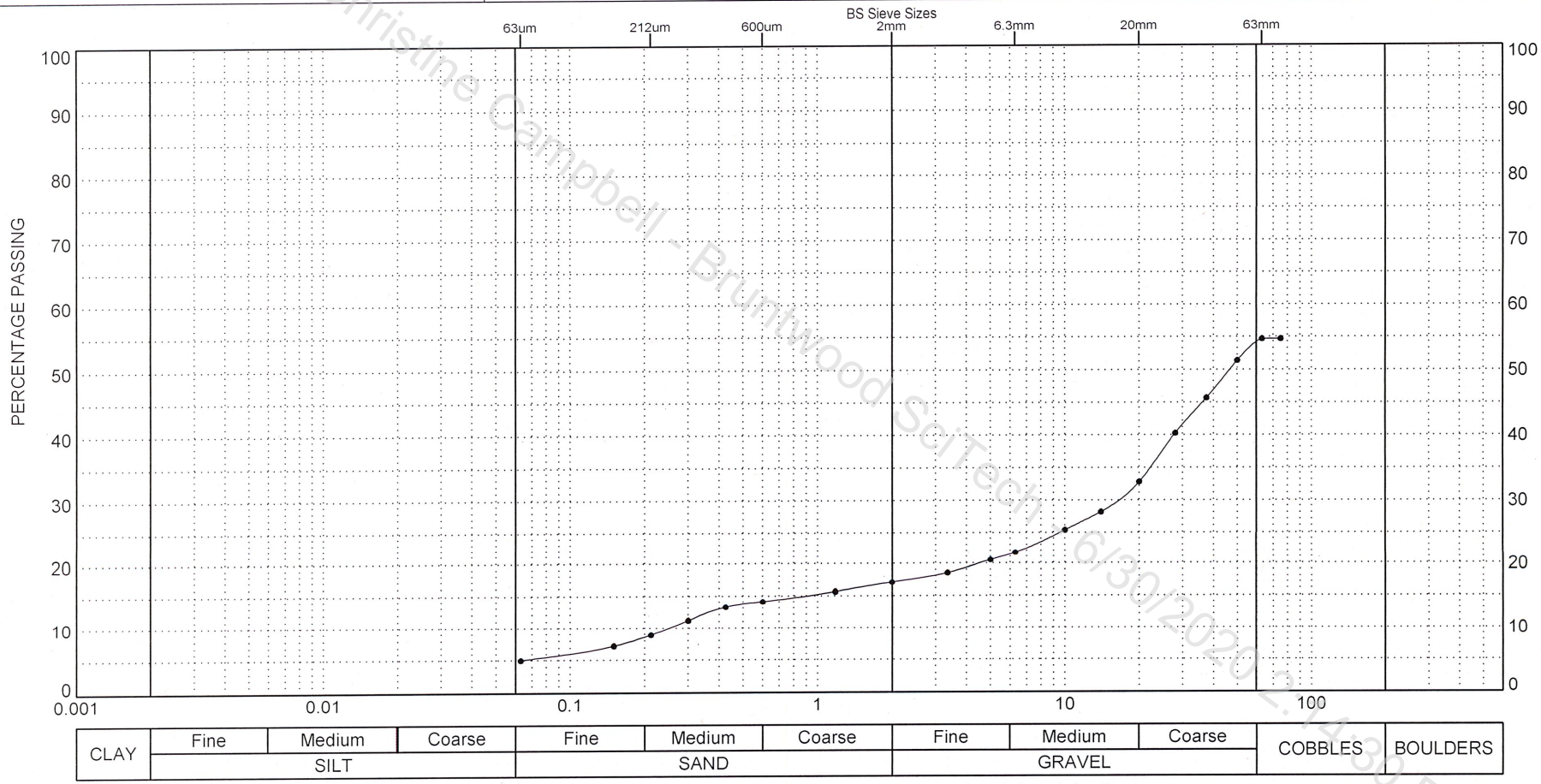
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH007**	Depth (m) :- **0.60**	Sample Type & No :- **B4**	Specific Depth (m) :- **0.60**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
75	54.7
63	54.7
50	51.4
37.5	45.7
28	40.3
20	32.8
14	28.2
10	25.4
6.3	21.8
5	20.5
3.35	18.6
2	17.0
1.18	15.6
0.6	14.1
0.425	13.2
0.3	11.2
0.212	8.9
0.15	7.3
0.063	5.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH007/B4/0.60	[redacted]	M. SELKIRK	

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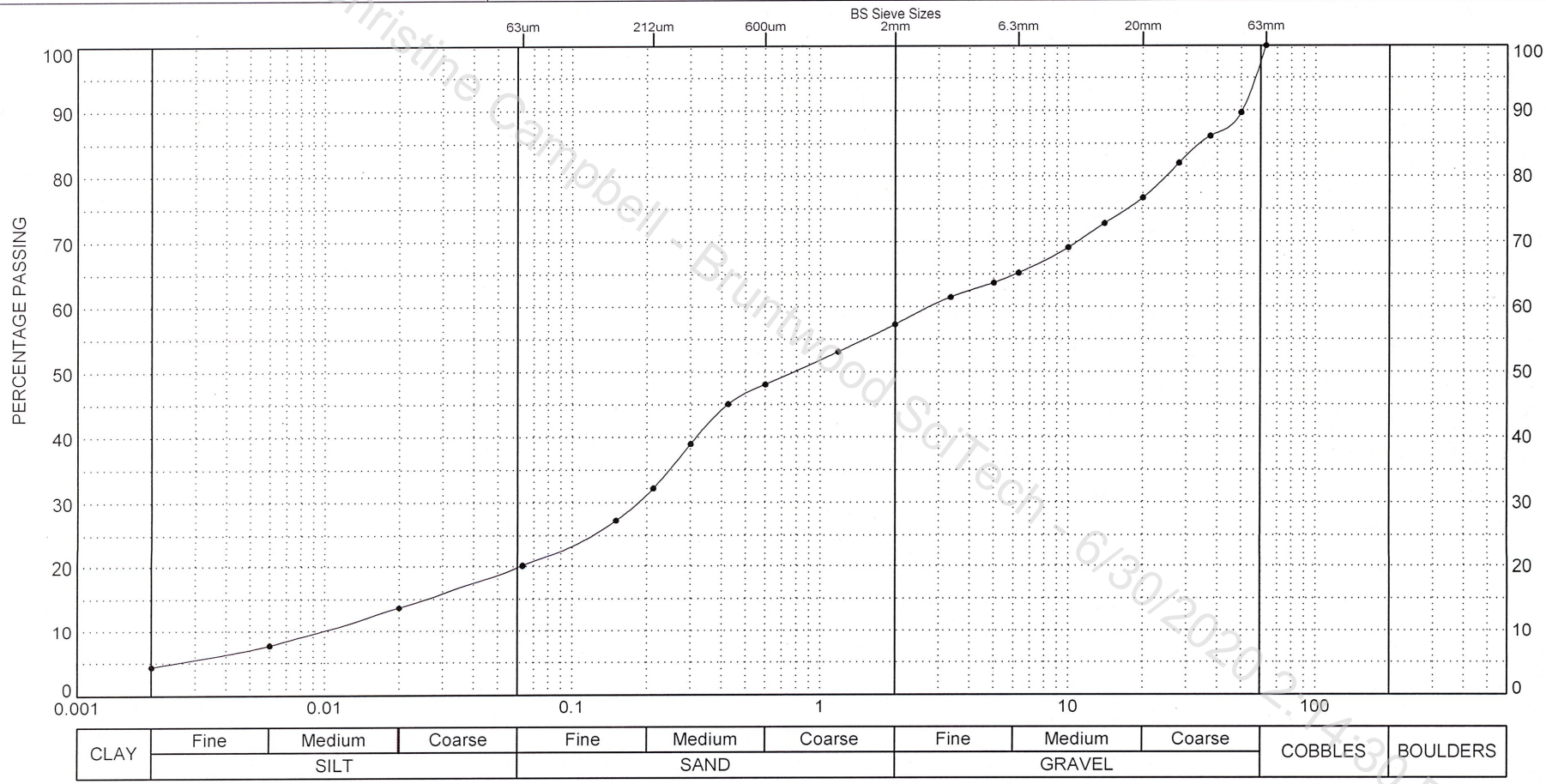
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH007**	Depth (m) :- **2.50**	Sample Type & No :- **B11**	Specific Depth (m) :- **2.50**	Date Tested :- **26/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	89.7
37.5	86.1
28	82.0
20	76.7
14	72.8
10	69.1
6.3	65.2
5	63.7
3.35	61.5
2	57.3
1.18	53.1
0.6	48.1
0.425	45.1
0.3	39.0
0.212	32.2
0.15	27.3
0.063	20.1
0.02	13.6
0.006	7.8
0.002	4.4

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH007/B11/2.50	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
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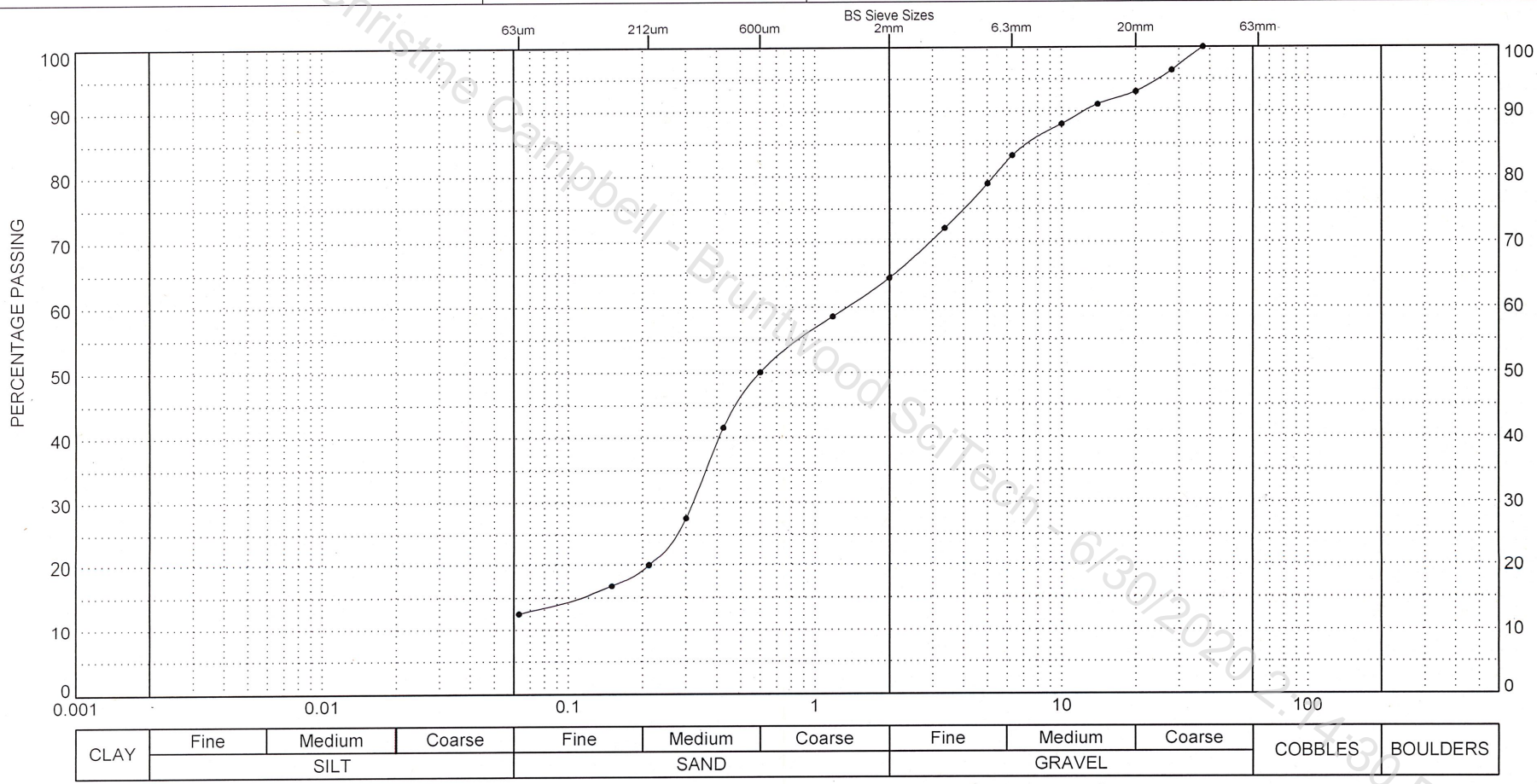
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH007**	Depth (m) :- **6.50**	Sample Type & No :- **B20**	Specific Depth (m) :- **6.50**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
37.5	100.0
28	96.4
20	93.1
14	91.1
10	88.1
6.3	83.2
5	78.9
3.35	72.1
2	64.5
1.18	58.6
0.6	50.1
0.425	41.6
0.3	27.6
0.212	20.0
0.15	16.7
0.063	12.4

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH007/B20/6.50	[redacted]	M. SELKIRK	

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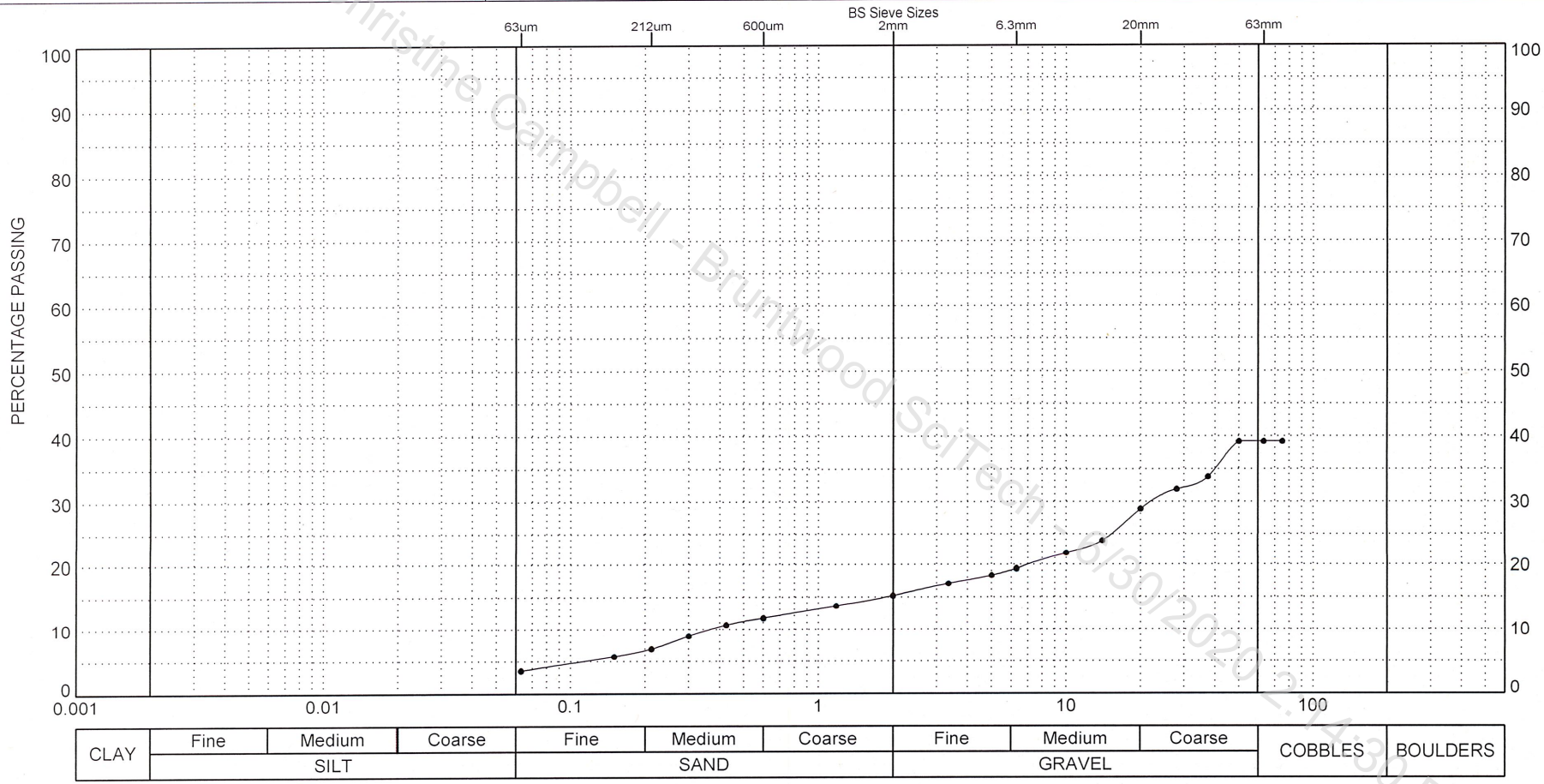
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH008**	Depth (m) :- **0.60**	Sample Type & No :- **B3**	Specific Depth (m) :- **0.60**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
75	39.2
63	39.2
50	39.2
37.5	33.8
28	31.9
20	28.9
14	24.0
10	22.0
6.3	19.4
5	18.4
3.35	17.0
2	15.2
1.18	13.6
0.6	11.7
0.425	10.7
0.3	8.9
0.212	7.0
0.15	5.8
0.063	3.6

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH008/B3/0.60	[redacted]	M. SELKIRK	

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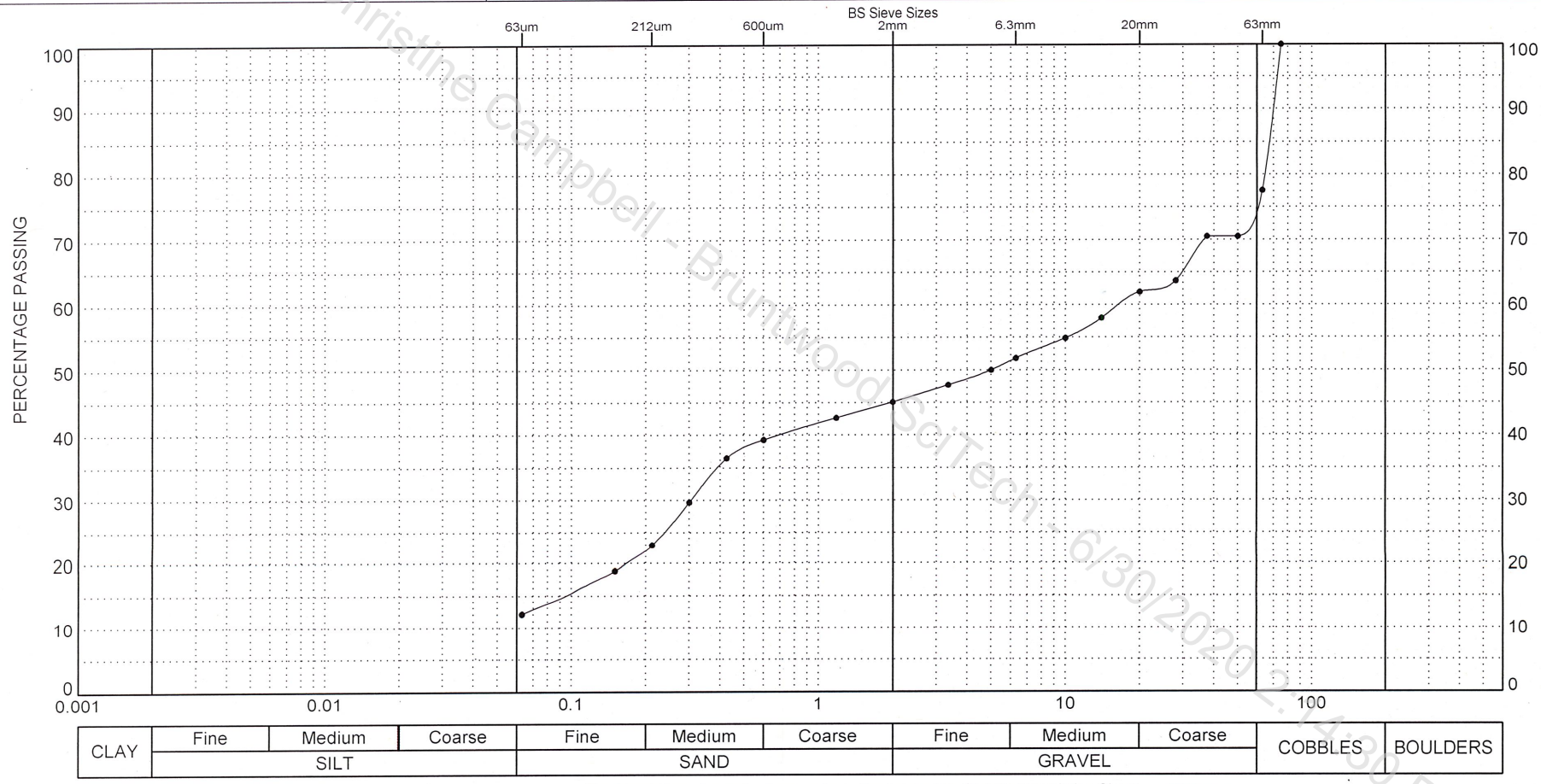
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH008**	Depth (m) :- **2.50**	Sample Type & No :- **B8**	Specific Depth (m) :- **2.50**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	77.6
50	70.5
37.5	70.5
28	63.7
20	62.0
14	58.0
10	54.9
6.3	51.8
5	50.0
3.35	47.7
2	45.1
1.18	42.7
0.6	39.3
0.425	36.5
0.3	29.7
0.212	23.1
0.15	18.9
0.063	12.1

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signe[redacted]	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH008/B8/2.50		M. SELKIRK	

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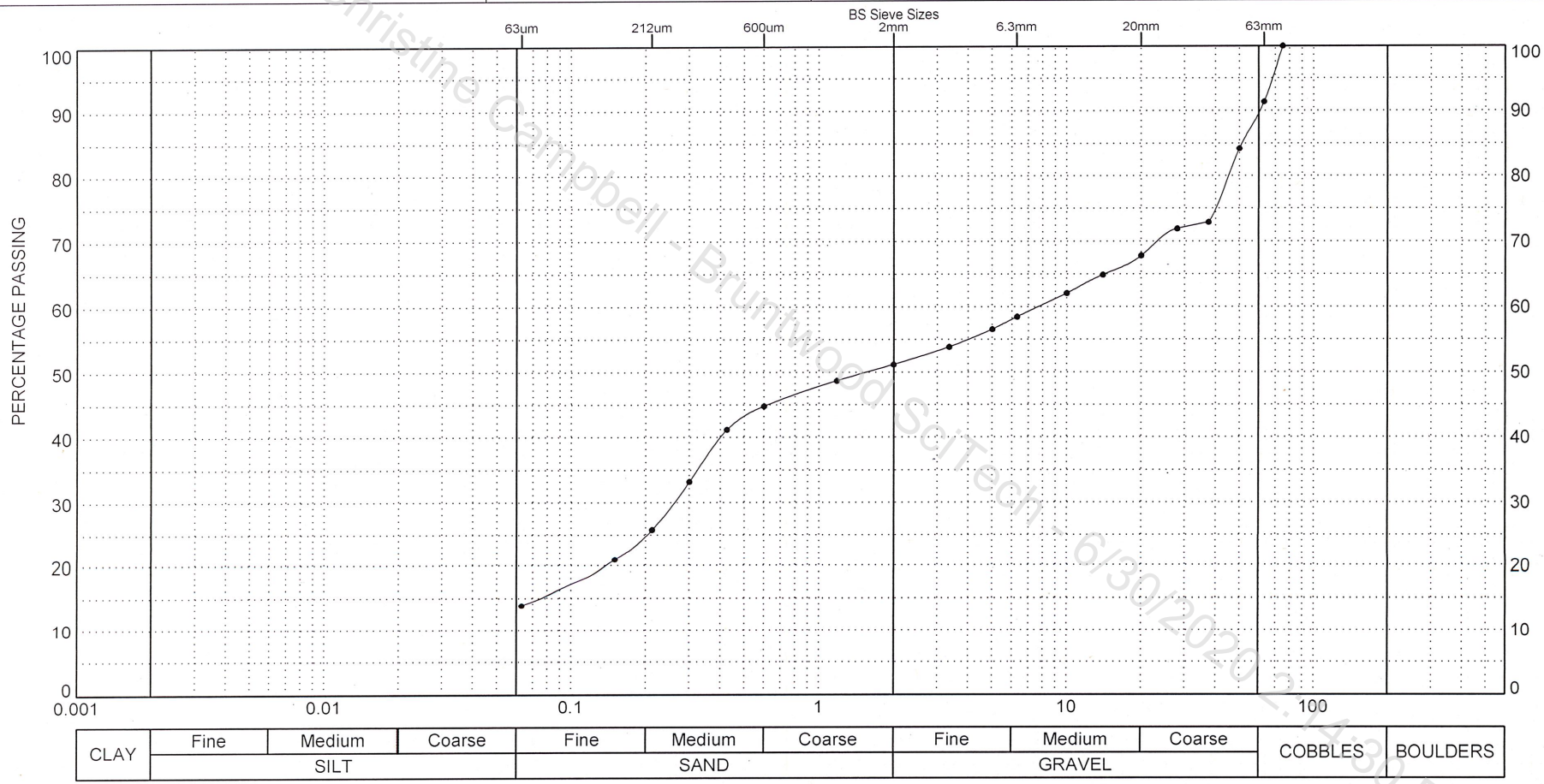
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH008**	Depth (m) :- **4.50**	Sample Type & No :- **B15**	Specific Depth (m) :- **4.50**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	91.4
50	84.2
37.5	72.9
28	71.9
20	67.8
14	64.9
10	62.1
6.3	58.5
5	56.6
3.35	53.9
2	51.2
1.18	48.7
0.6	44.8
0.425	41.2
0.3	33.2
0.212	25.8
0.15	20.9
0.063	13.8

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH008/B15/4.50	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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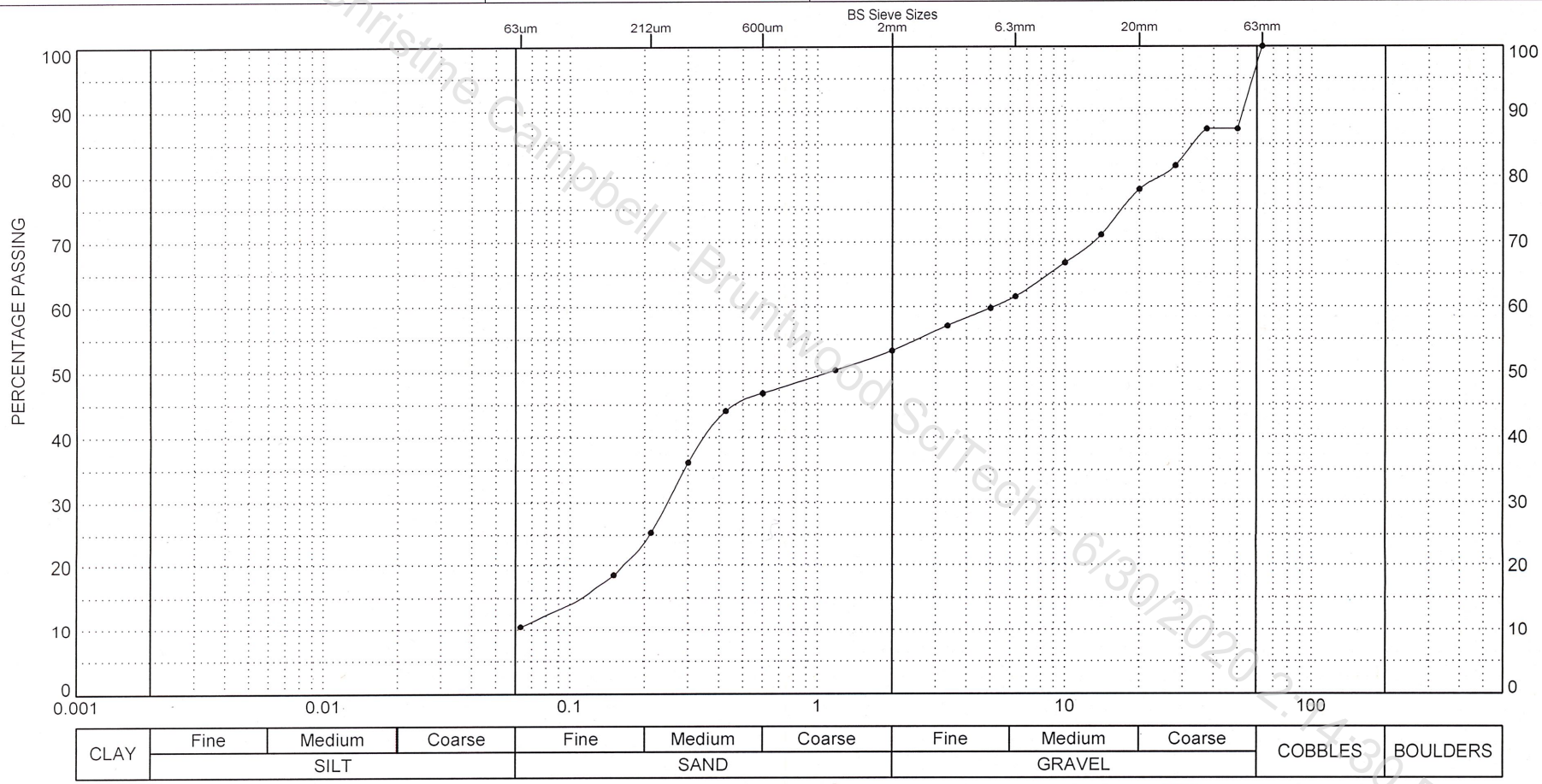
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH009**	Depth (m) :- **1.00**	Sample Type & No :- **B4**	Specific Depth (m) :- **1.00**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	87.3
37.5	87.3
28	81.7
20	78.1
14	71.1
10	66.8
6.3	61.6
5	59.8
3.35	57.1
2	53.3
1.18	50.3
0.6	46.8
0.425	44.1
0.3	36.2
0.212	25.4
0.15	18.6
0.063	10.5

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH009/B4/1.00	[redacted]		

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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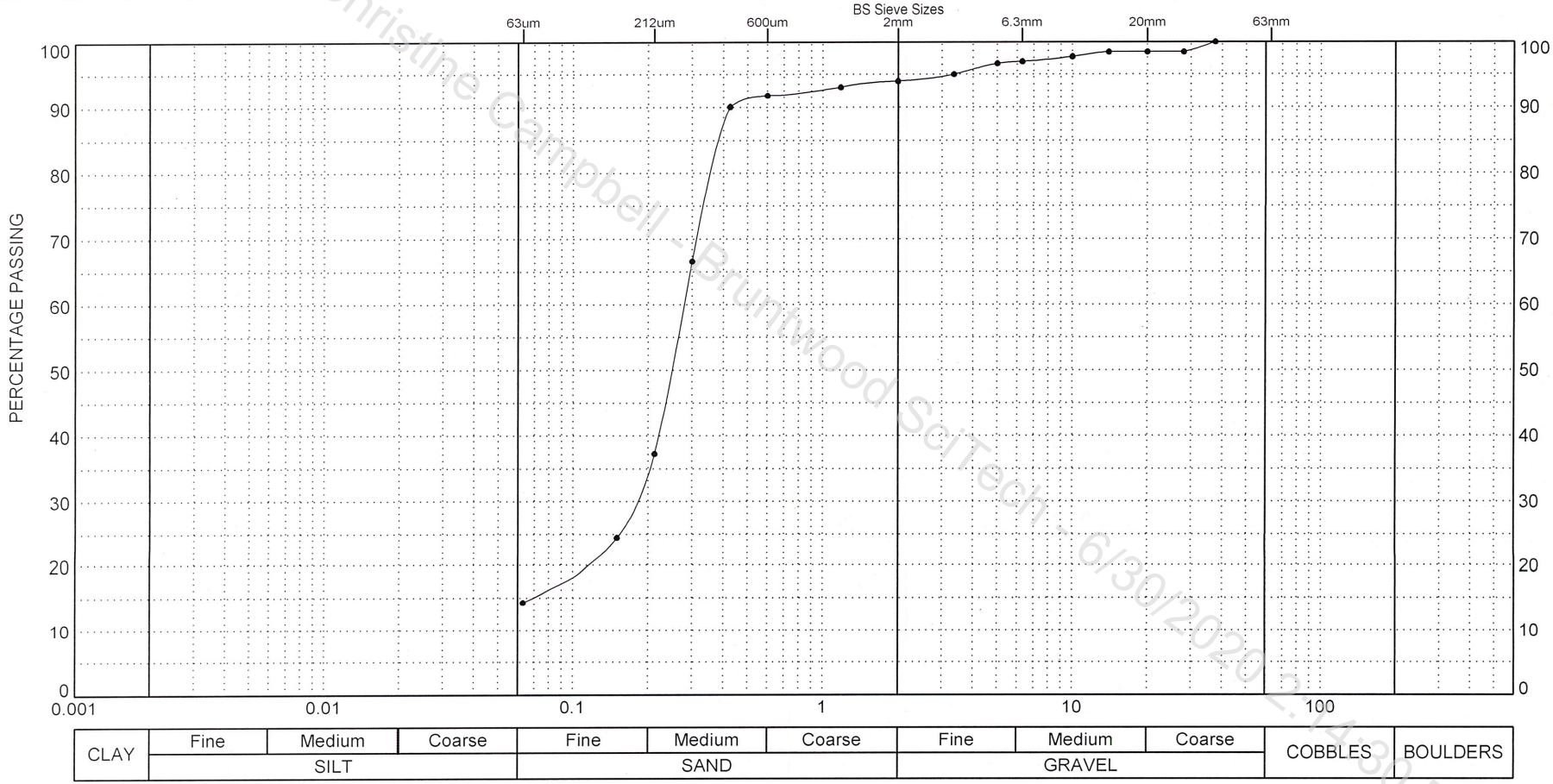
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH009**	Depth (m) :- **3.70**	Sample Type & No :- **B14**	Specific Depth (m) :- **3.70**	Date Tested :- **27/11/2019**



Sieve Size (mm)	Passing (%)
37.5	100.0
28	98.4
20	98.4
14	98.4
10	97.7
6.3	97.0
5	96.7
3.35	95.0
2	94.0
1.18	93.1
0.6	91.8
0.425	90.1
0.3	66.6
0.212	37.3
0.15	24.5
0.063	14.3

For description of sample please refer to the Laboratory Sample Description Sheet

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22/01/2020	PSD/NW1588/BH009/B14/3.70		M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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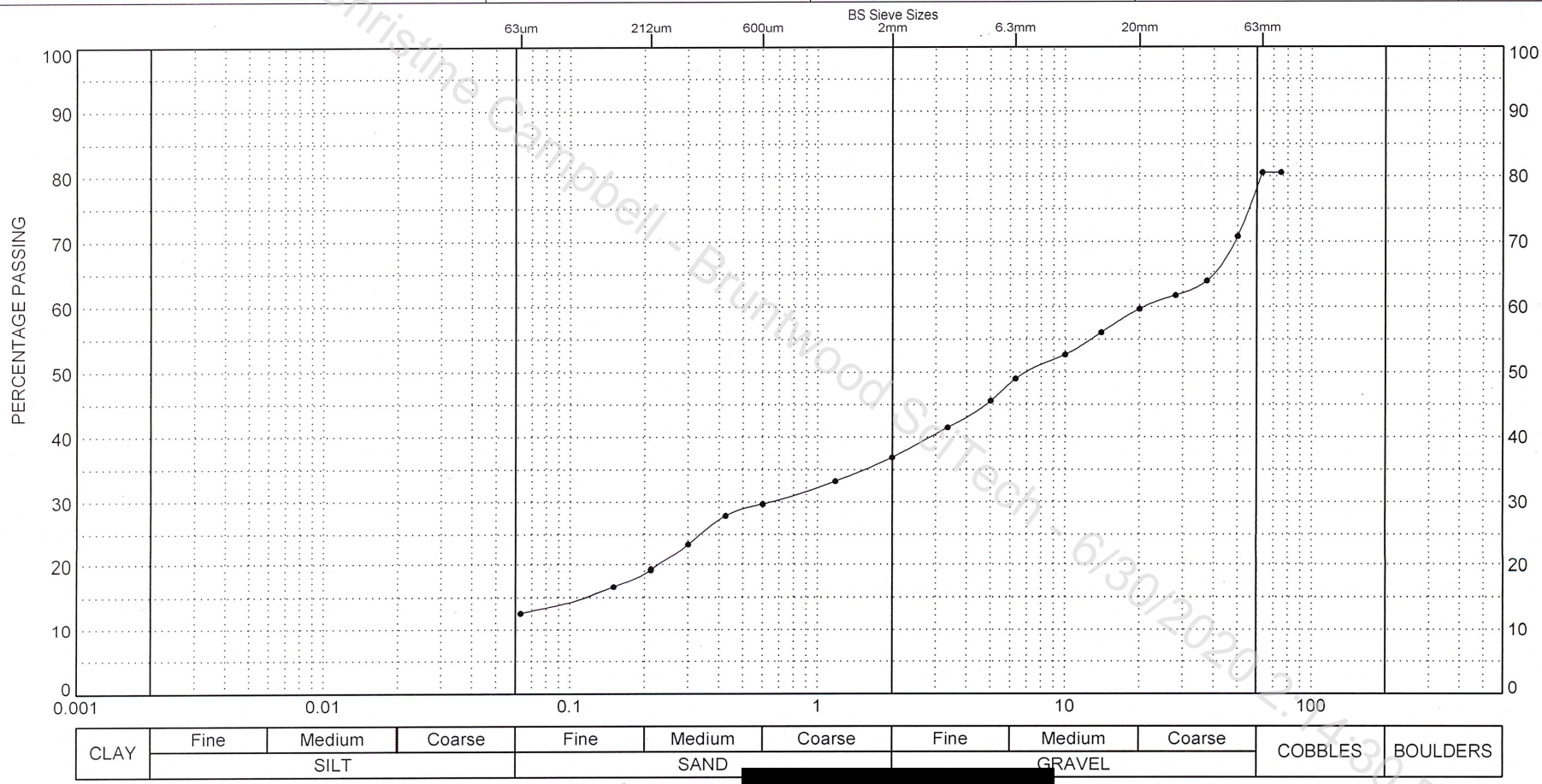
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH011**	Depth (m) :- **2.70**	Sample Type & No :- **B9**	Specific Depth (m) :- **2.70**	Date Tested :- **26/11/2019**



Sieve Size (mm)	Passing (%)
75	80.6
63	80.6
50	70.8
37.5	64.0
28	61.8
20	59.7
14	56.1
10	52.7
6.3	49.0
5	45.6
3.35	41.5
2	36.9
1.18	33.2
0.6	29.7
0.425	27.9
0.3	23.5
0.212	19.3
0.15	16.5
0.063	12.4

For description of samp[redacted]ription Sheet

Date of issue :-	Certificate No :-	S[redacted]	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH011/B9/2.70		M. SELKIRK	

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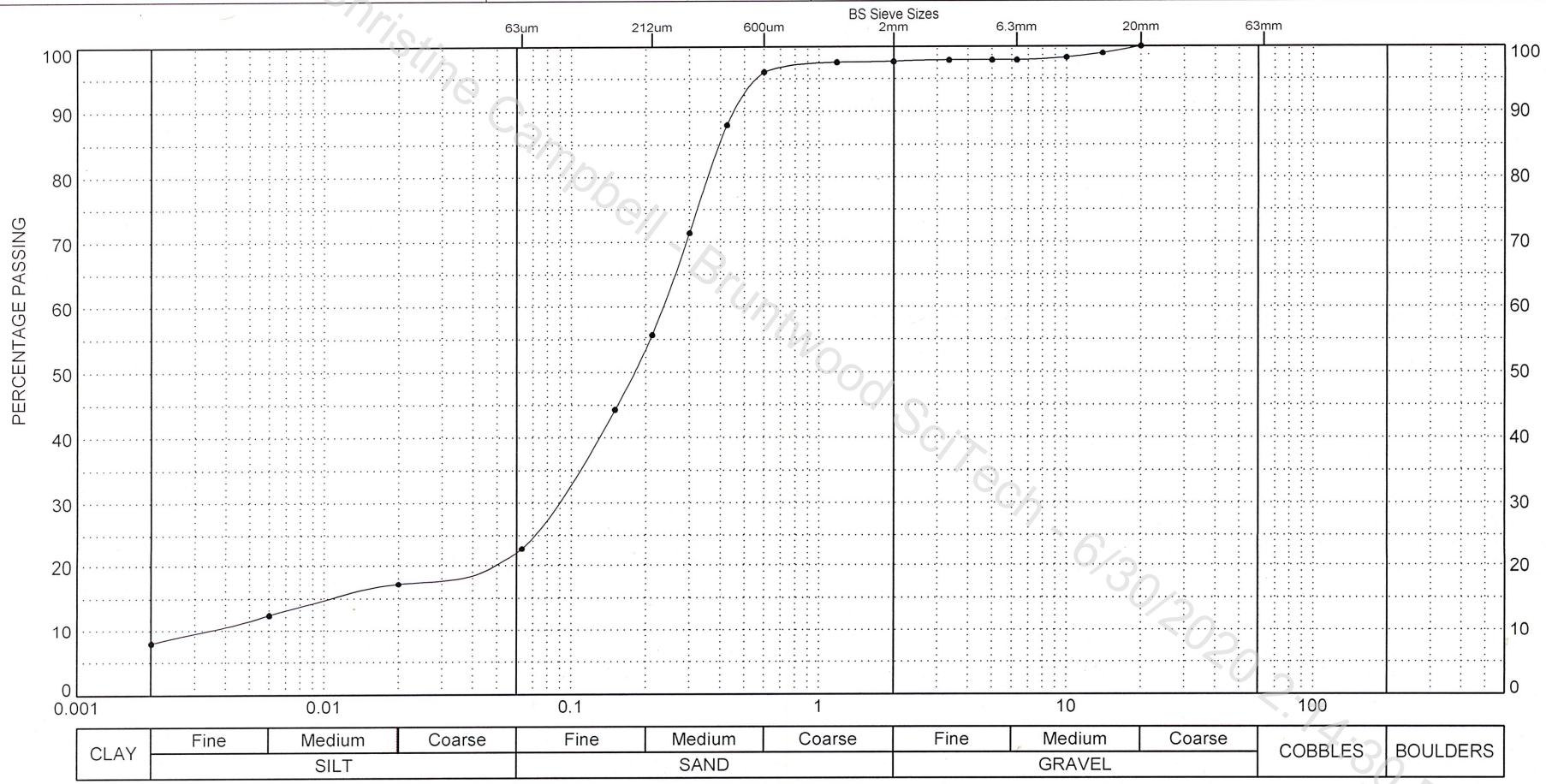
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH011**	Depth (m) :- **4.70**	Sample Type & No :- **B17**	Specific Depth (m) :- **4.70**	Date Tested :- **26/11/2019**



Sieve Size (mm)	Passing (%)
20	100.0
14	98.9
10	98.2
6.3	97.8
5	97.8
3.35	97.8
2	97.6
1.18	97.5
0.6	96.1
0.425	88.0
0.3	71.4
0.212	55.7
0.15	44.3
0.063	22.9
0.02	17.1
0.006	12.3
0.002	8.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signe[redacted]	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH011/B17/4.70		M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
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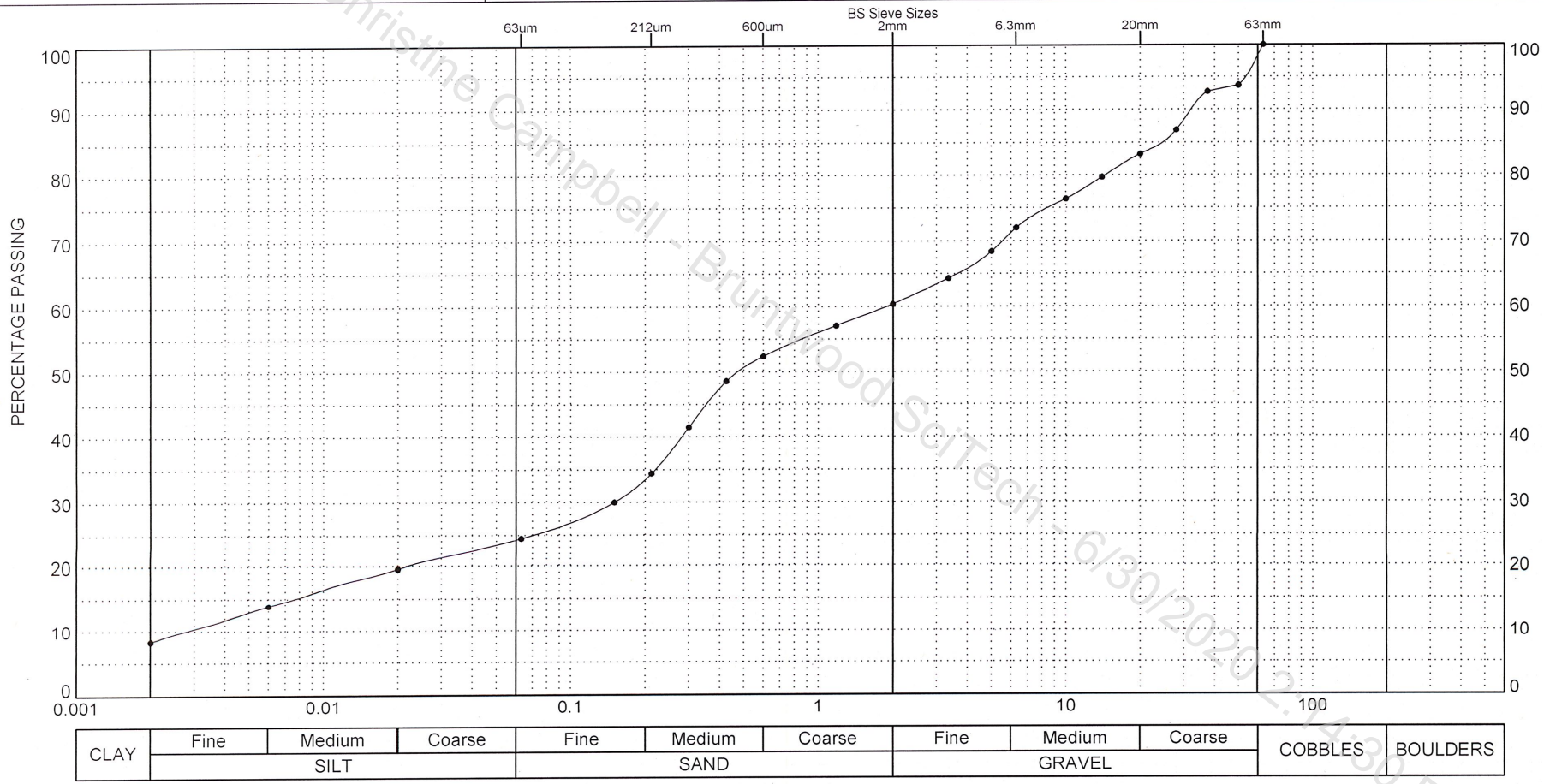
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH012A**	Depth (m) :- **6.50**	Sample Type & No :- **B22**	Specific Depth (m) :- **6.50**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	93.7
37.5	92.8
28	86.9
20	83.2
14	79.7
10	76.4
6.3	72.0
5	68.4
3.35	64.3
2	60.4
1.18	57.1
0.6	52.4
0.425	48.6
0.3	41.5
0.212	34.4
0.15	30.0
0.063	24.5
0.02	19.6
0.006	13.8
0.002	8.4

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :- 22/01/2020	Certificate No :- PSD/NW1588/BH012A/B22/6.50	Sign [redacted]	Name :- M. SELKIRK	Page 1 of 1
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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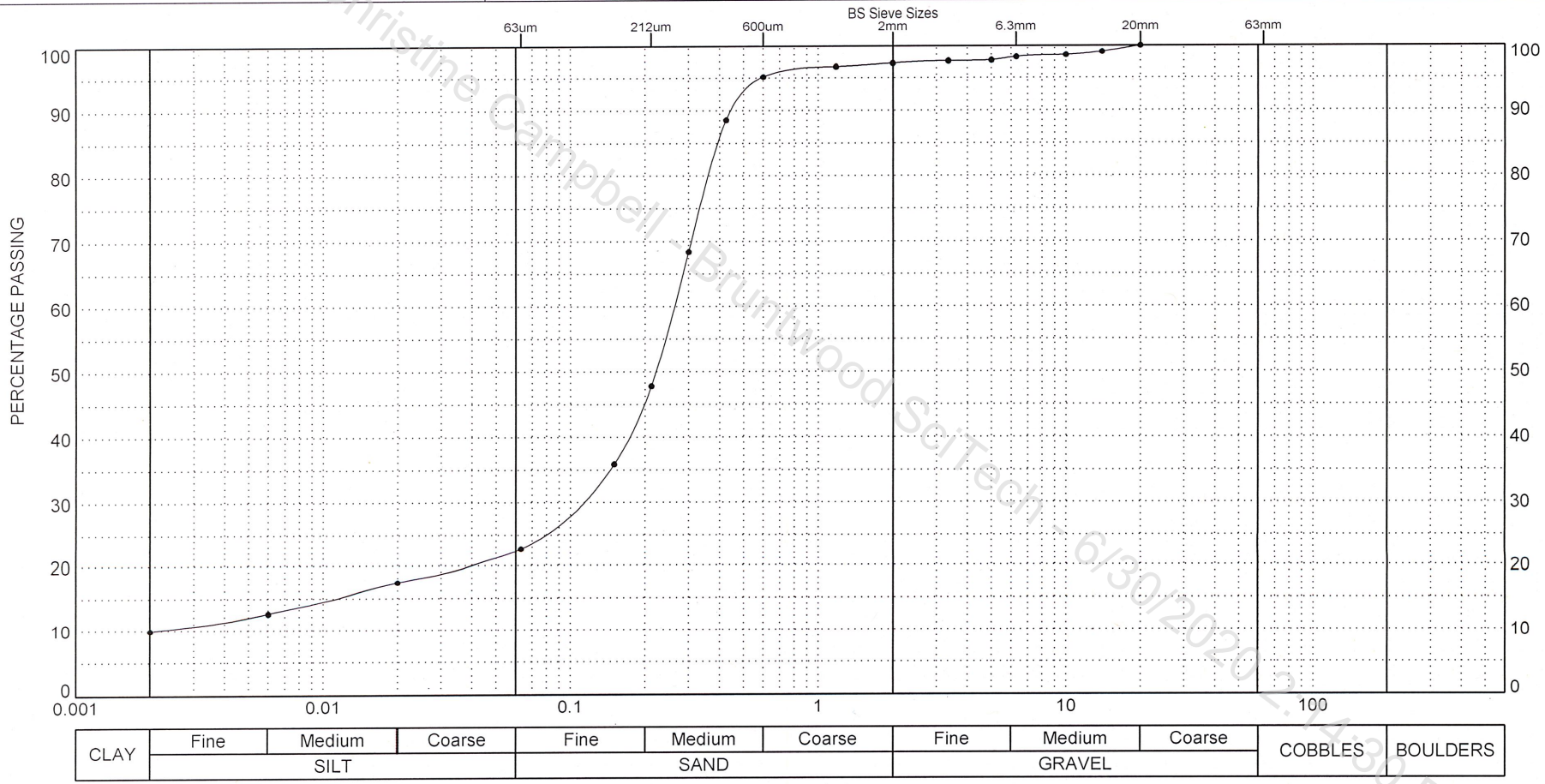
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH012A**	Depth (m) :- **9.00**	Sample Type & No :- **B28**	Specific Depth (m) :- **9.00**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
20	100.0
14	99.0
10	98.5
6.3	98.2
5	97.7
3.35	97.6
2	97.3
1.18	96.8
0.6	95.2
0.425	88.6
0.3	68.4
0.212	47.8
0.15	35.9
0.063	22.8
0.02	17.3
0.006	12.5
0.002	9.9

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Sign	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH012A/B28/9.00	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
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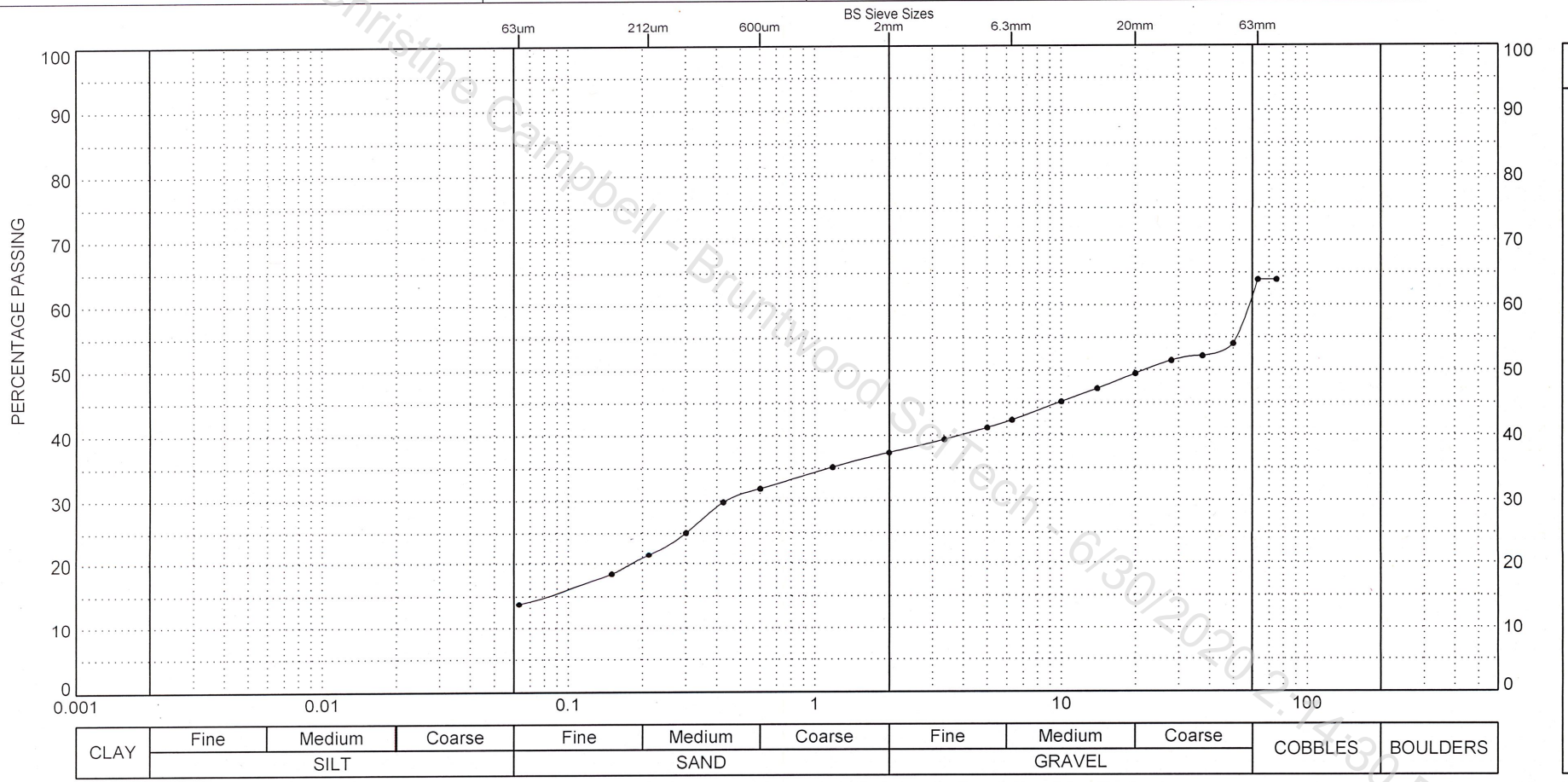
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH013**	Depth (m) :- **1.70**	Sample Type & No :- **B6**	Specific Depth (m) :- **1.70**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
75	63.9
63	63.9
50	54.1
37.5	52.2
28	51.5
20	49.5
14	47.2
10	45.2
6.3	42.4
5	41.2
3.35	39.4
2	37.4
1.18	35.2
0.6	31.9
0.425	29.8
0.3	25.1
0.212	21.4
0.15	18.5
0.063	13.7

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	[redacted]	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH013/B6/1.70		M. SELKIRK	
Client :-		**Contract Title :-**		**AEG Contract No :-**
University of Manchester		ID Manchester Preliminary Ground Investigation		NW1588

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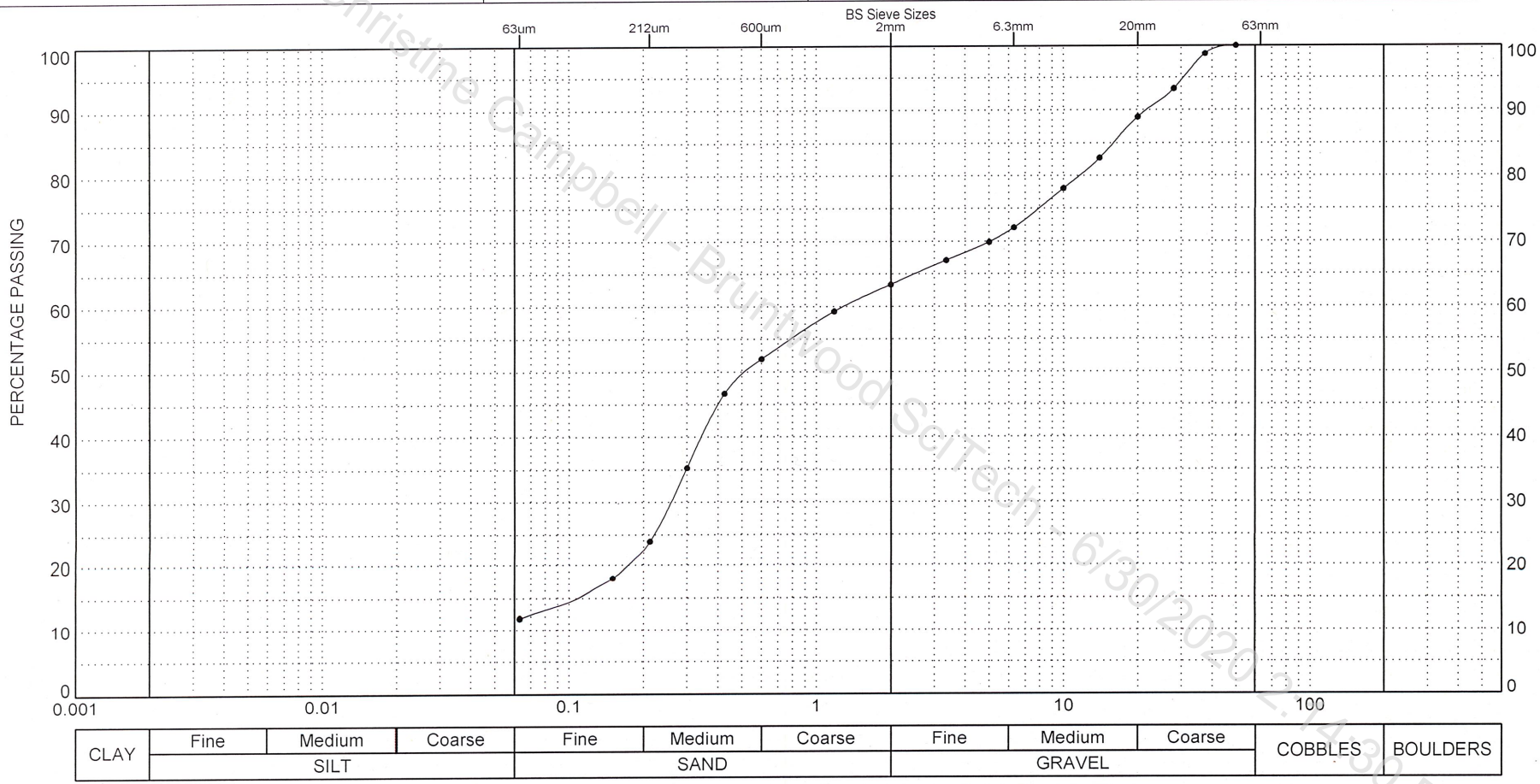
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH013**	Depth (m) :- **6.00**	Sample Type & No :- **B16**	Specific Depth (m) :- **6.00**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	98.7
28	93.3
20	89.0
14	82.7
10	78.1
6.3	72.1
5	69.9
3.35	67.1
2	63.4
1.18	59.3
0.6	52.0
0.425	46.7
0.3	35.3
0.212	24.0
0.15	18.1
0.063	11.8

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH013/B16/6.00	[redacted]	[illegible] SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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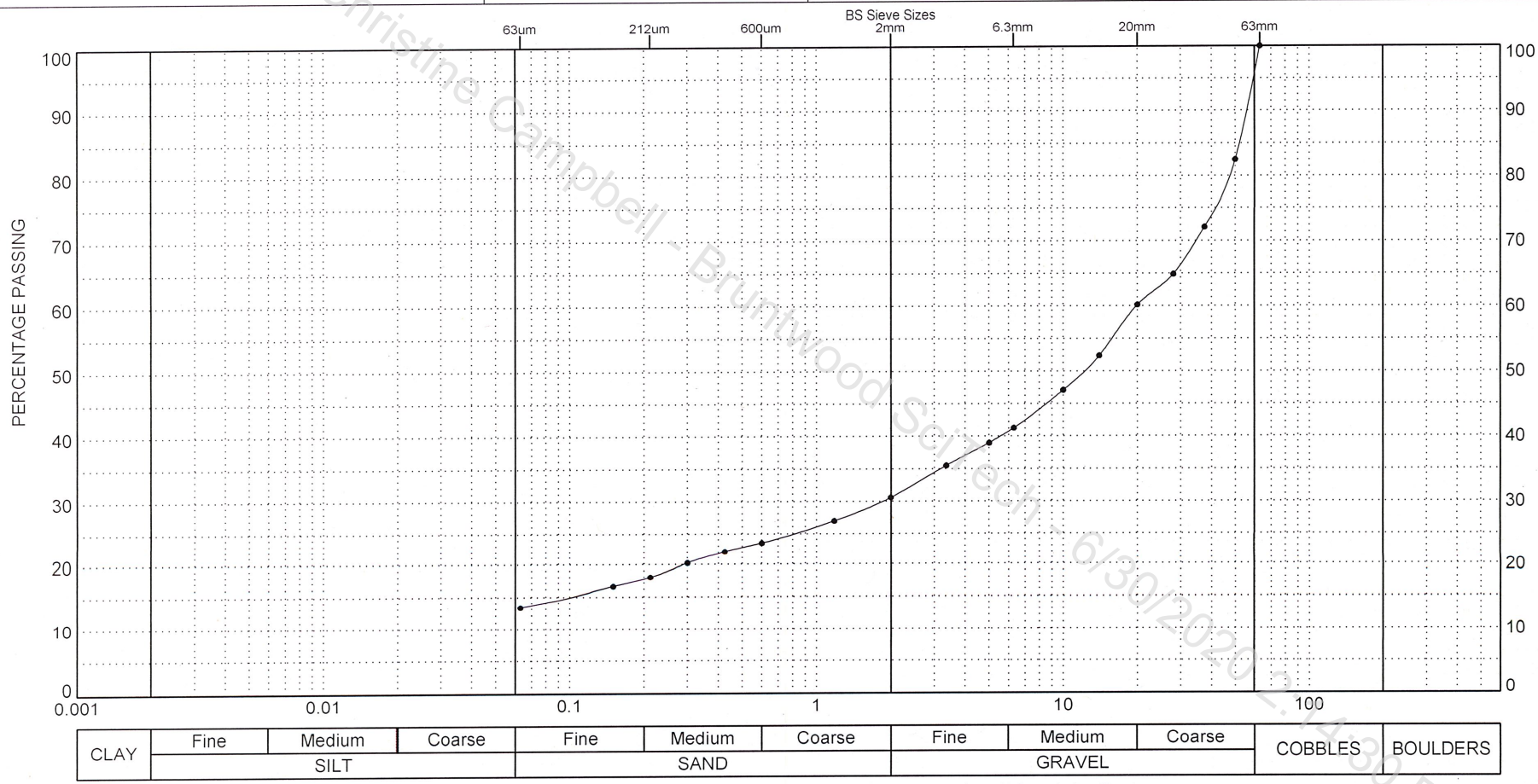
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **BH014**	Depth (m) :- **1.20**	Sample Type & No :- **B8**	Specific Depth (m) :- **1.20**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	82.5
37.5	72.1
28	64.9
20	60.2
14	52.4
10	47.1
6.3	41.3
5	39.0
3.35	35.5
2	30.6
1.18	27.0
0.6	23.6
0.425	22.2
0.3	20.2
0.212	18.1
0.15	16.5
0.063	13.3

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH014/B8/1.20	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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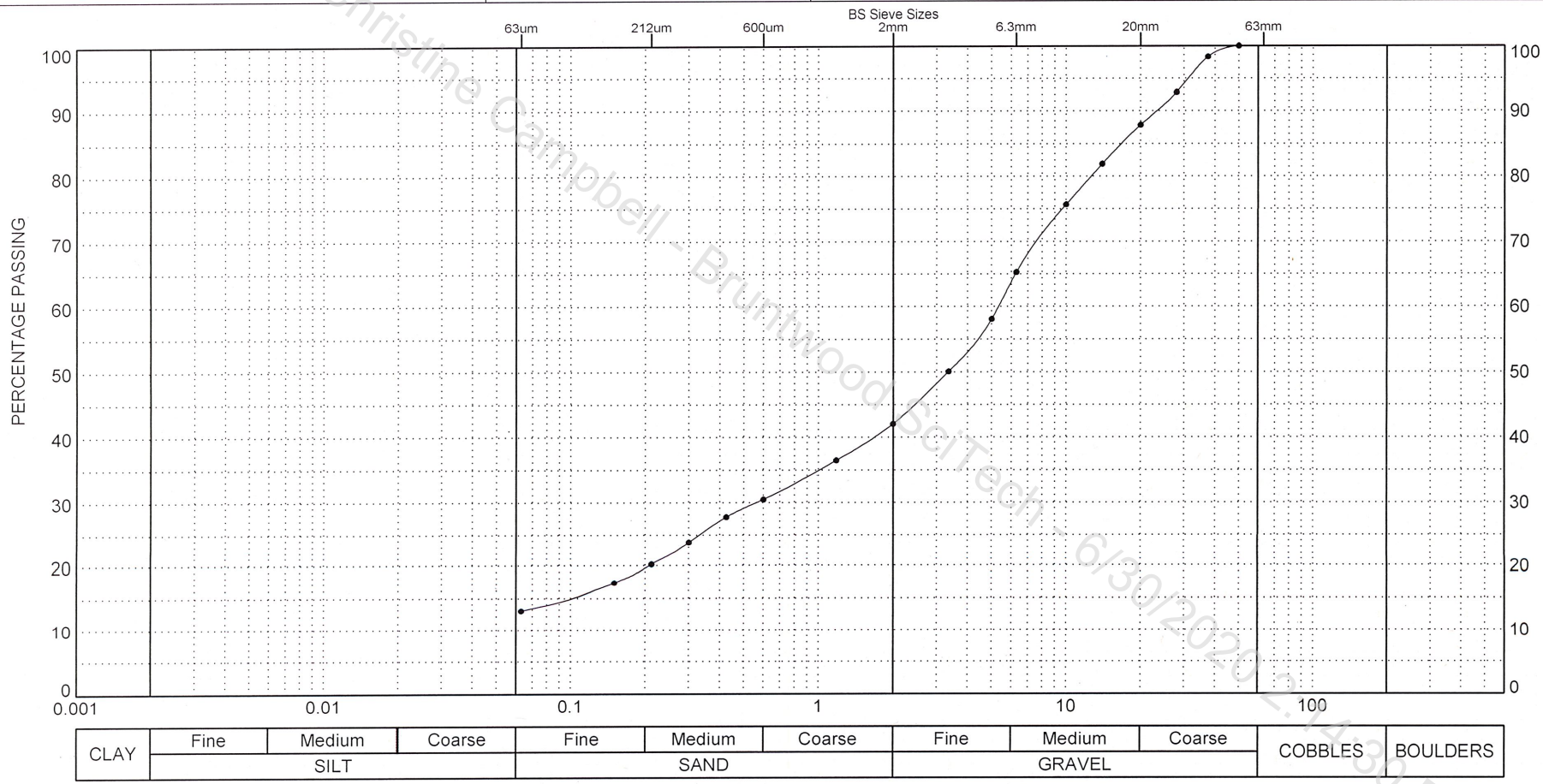
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH014**	Depth (m) :- **3.00**	Sample Type & No :- **B14**	Specific Depth (m) :- **3.00**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	98.3
28	92.9
20	87.9
14	81.9
10	75.7
6.3	65.3
5	58.1
3.35	50.1
2	42.1
1.18	36.5
0.6	30.5
0.425	27.8
0.3	23.9
0.212	20.2
0.15	17.3
0.063	12.9

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH014/B14/3.00	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
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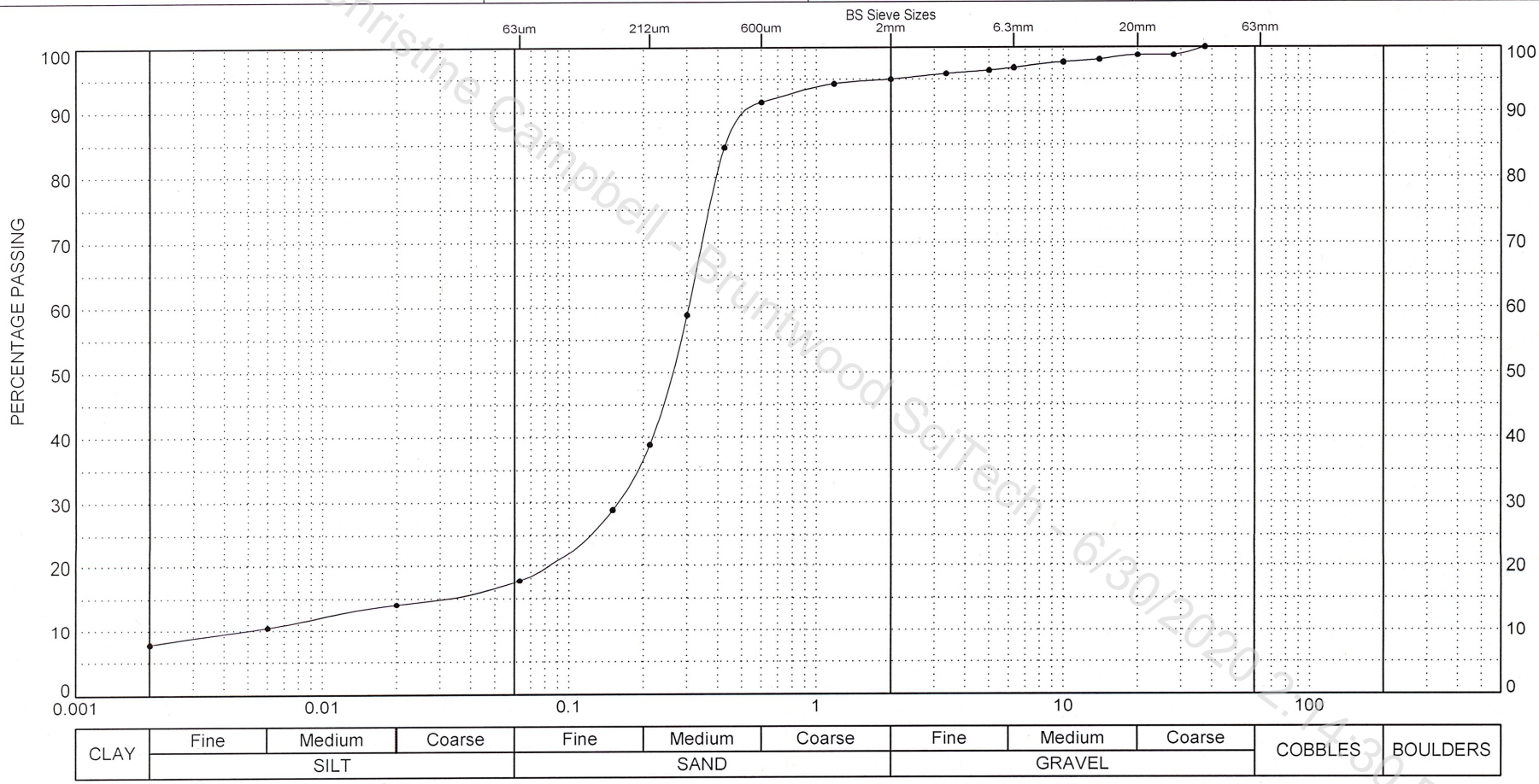
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BH014**	Depth (m) :- **6.00**	Sample Type & No :- **B24**	Specific Depth (m) :- **6.00**	Date Tested :-



Sieve Size (mm)	Passing (%)
37.5	100.0
28	98.7
20	98.7
14	98.0
10	97.6
6.3	96.8
5	96.4
3.35	95.9
2	95.0
1.18	94.3
0.6	91.5
0.425	84.6
0.3	58.9
0.212	38.9
0.15	28.9
0.063	17.7
0.02	14.0
0.006	10.5
0.002	7.9

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/BH014/B24/6.00	[redacted]	M. SELKIRK	

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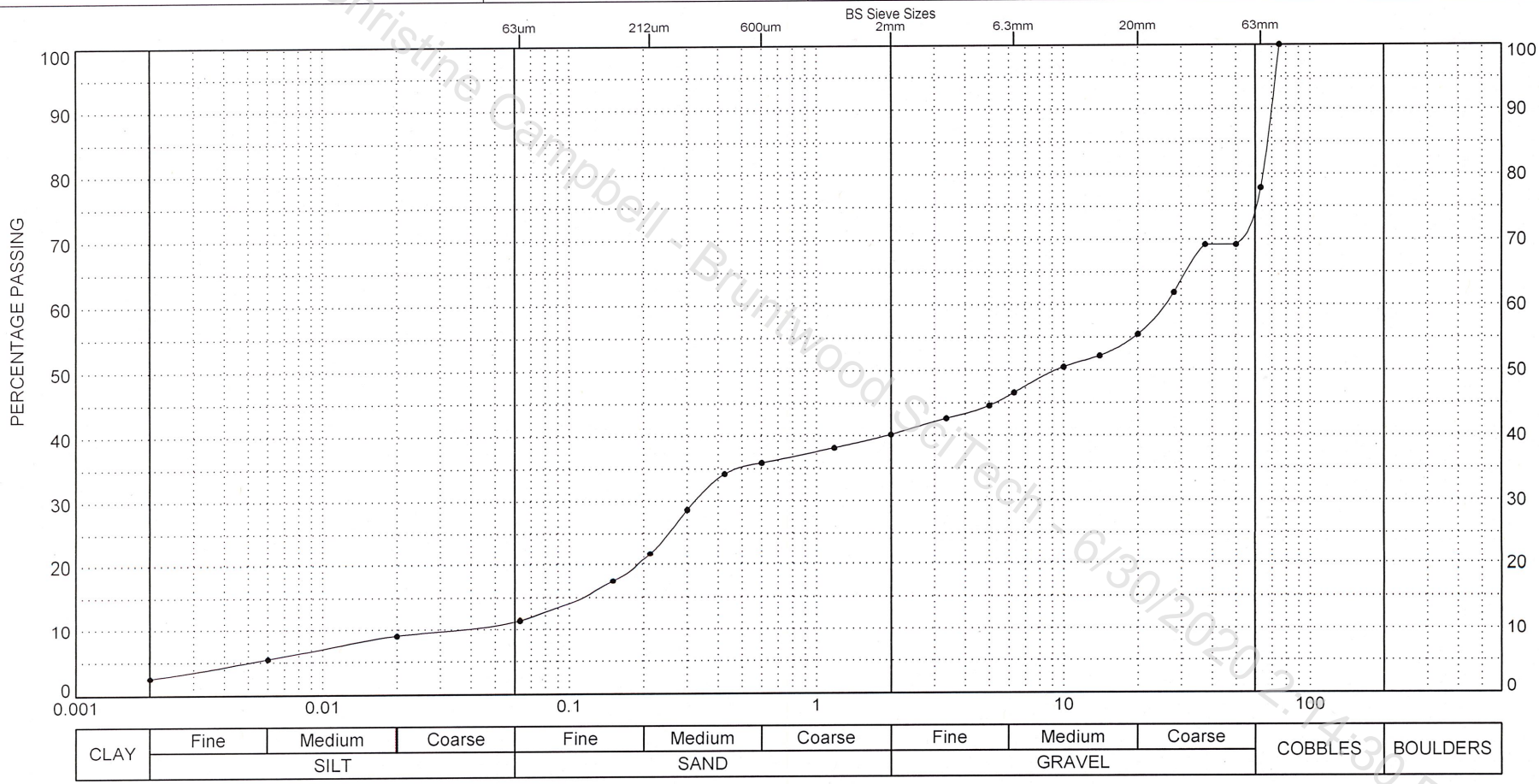
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **DS001**	Depth (m) :- **0.70**	Sample Type & No :- **B6**	Specific Depth (m) :- **0.70**	Date Tested :- **10/12/2019**



Sieve Size (mm)	Passing (%)
75	100.0
63	77.9
50	69.2
37.5	69.2
28	61.9
20	55.5
14	52.2
10	50.5
6.3	46.6
5	44.6
3.35	42.7
2	40.2
1.18	38.2
0.6	35.9
0.425	34.2
0.3	28.7
0.212	21.7
0.15	17.4
0.063	11.4
0.02	9.0
0.006	5.5
0.002	2.6

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/DS001/B6/0.70	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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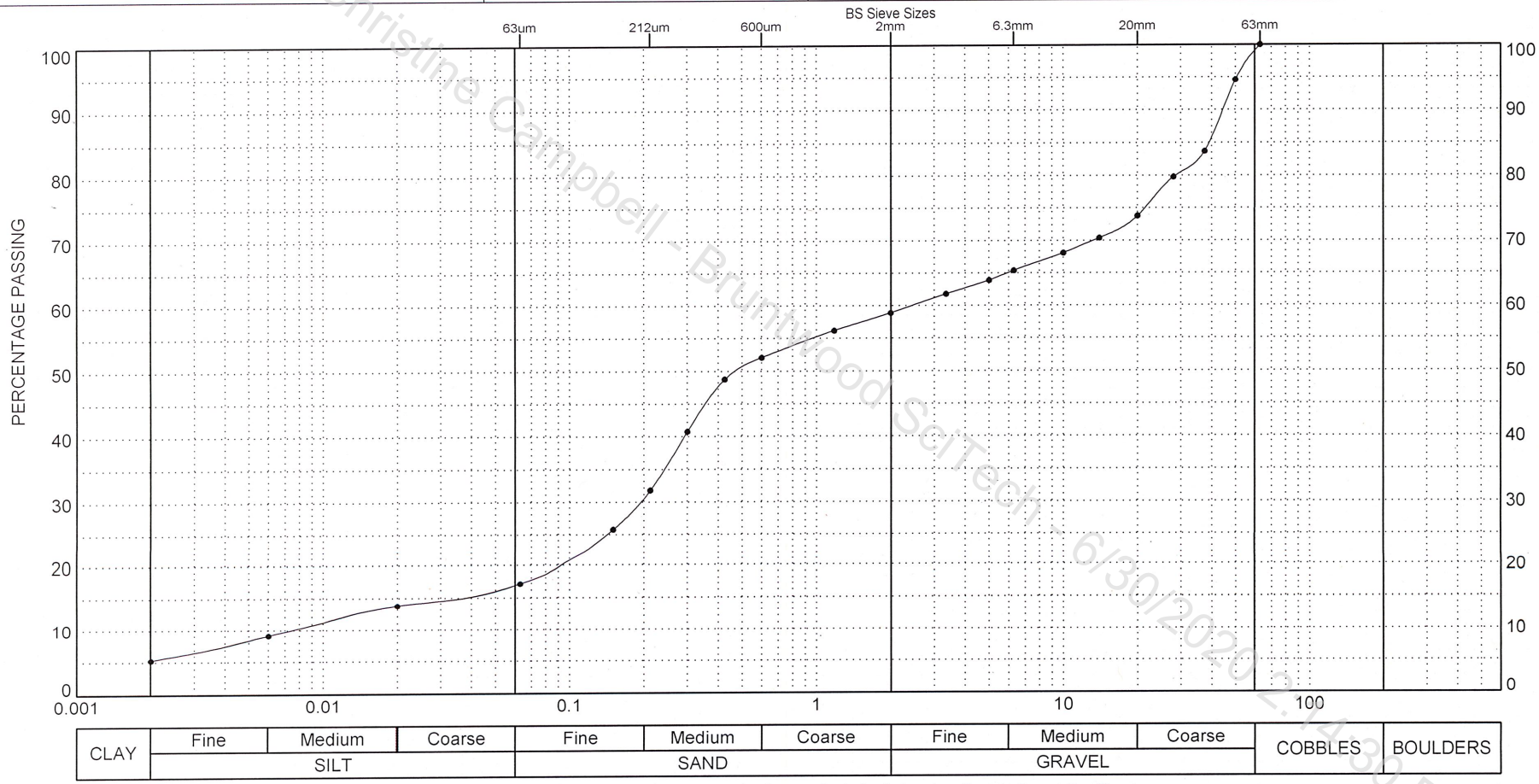
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990
(Test deviated from standard due to insufficient sample mass)

Exploratory Hole No :- **DS002**	Depth (m) :- **0.80**	Sample Type & No :- **B4**	Specific Depth (m) :- **0.80**	Date Tested :- **10/12/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	94.6
37.5	83.7
28	79.8
20	73.8
14	70.4
10	68.1
6.3	65.4
5	63.9
3.35	61.8
2	58.9
1.18	56.2
0.6	52.1
0.425	48.8
0.3	40.8
0.212	31.8
0.15	25.8
0.063	17.0
0.02	13.7
0.006	9.1
0.002	5.3

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/DS002/B4/0.80	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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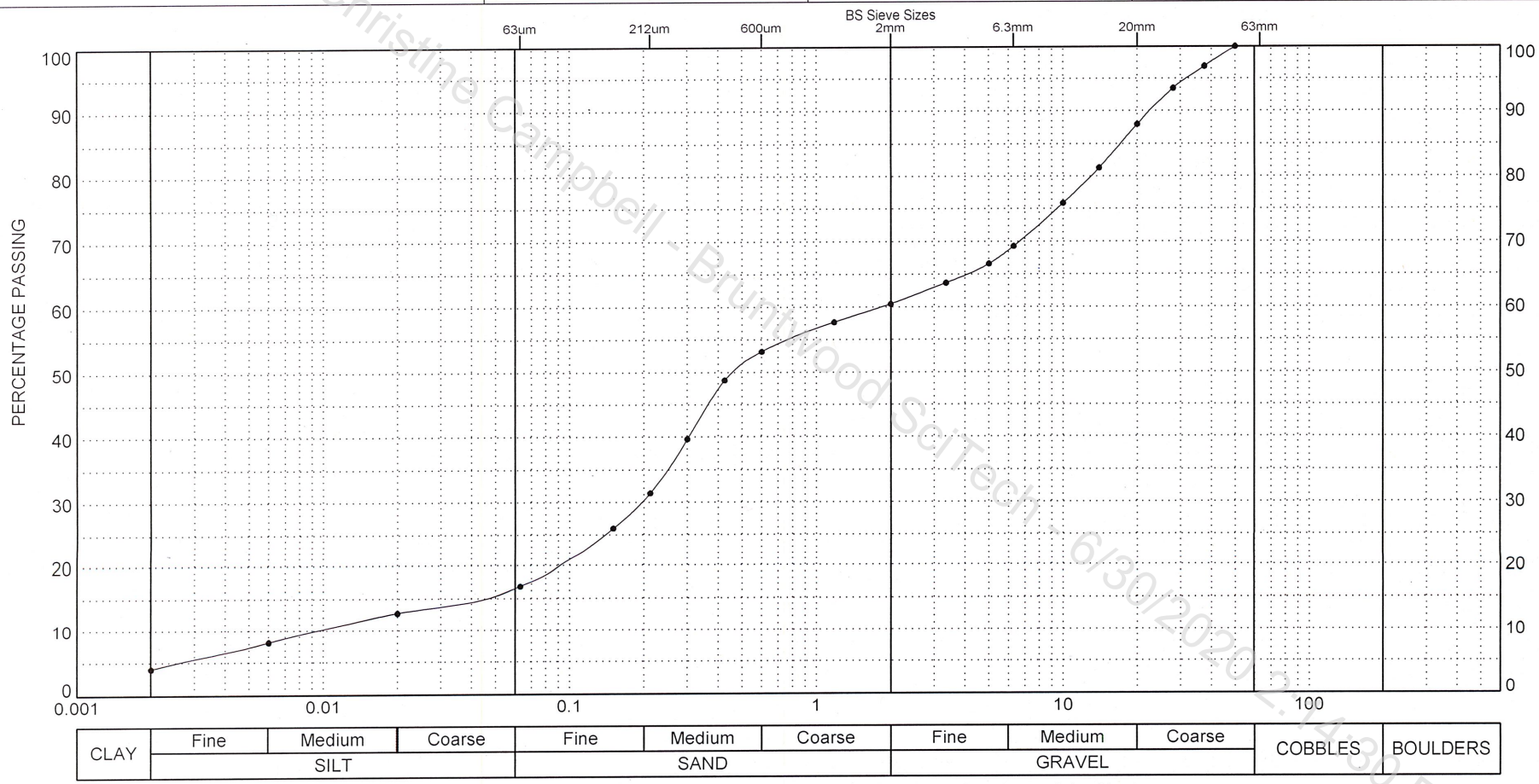
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP001**	Depth (m) :- **0.80**	Sample Type & No :- **B4**	Specific Depth (m) :- **0.80**	Date Tested :- **26/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	96.9
28	93.5
20	88.0
14	81.3
10	75.9
6.3	69.3
5	66.6
3.35	63.7
2	60.5
1.18	57.7
0.6	53.2
0.425	48.8
0.3	39.7
0.212	31.4
0.15	26.0
0.063	16.7
0.02	12.6
0.006	8.2
0.002	4.1

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP001/B4/0.80	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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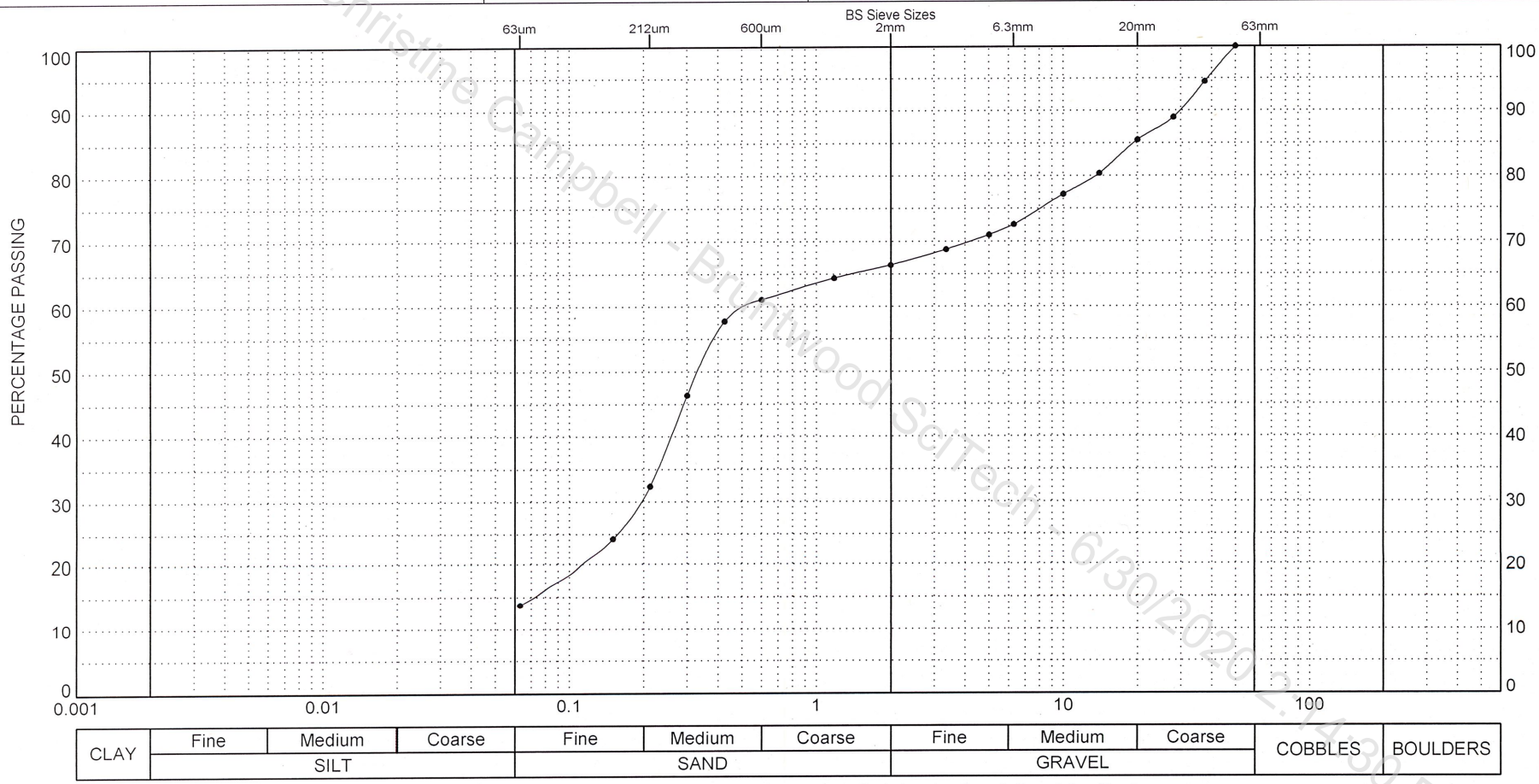
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP001**	Depth (m) :- **1.50**	Sample Type & No :- **B7**	Specific Depth (m) :- **1.50**	Date Tested :-



Sieve Size (mm)	Passing (%)
50	100.0
37.5	94.5
28	89.0
20	85.5
14	80.4
10	77.2
6.3	72.6
5	71.0
3.35	68.8
2	66.4
1.18	64.4
0.6	61.1
0.425	57.8
0.3	46.4
0.212	32.4
0.15	24.3
0.063	13.7

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP001/B7/1.50	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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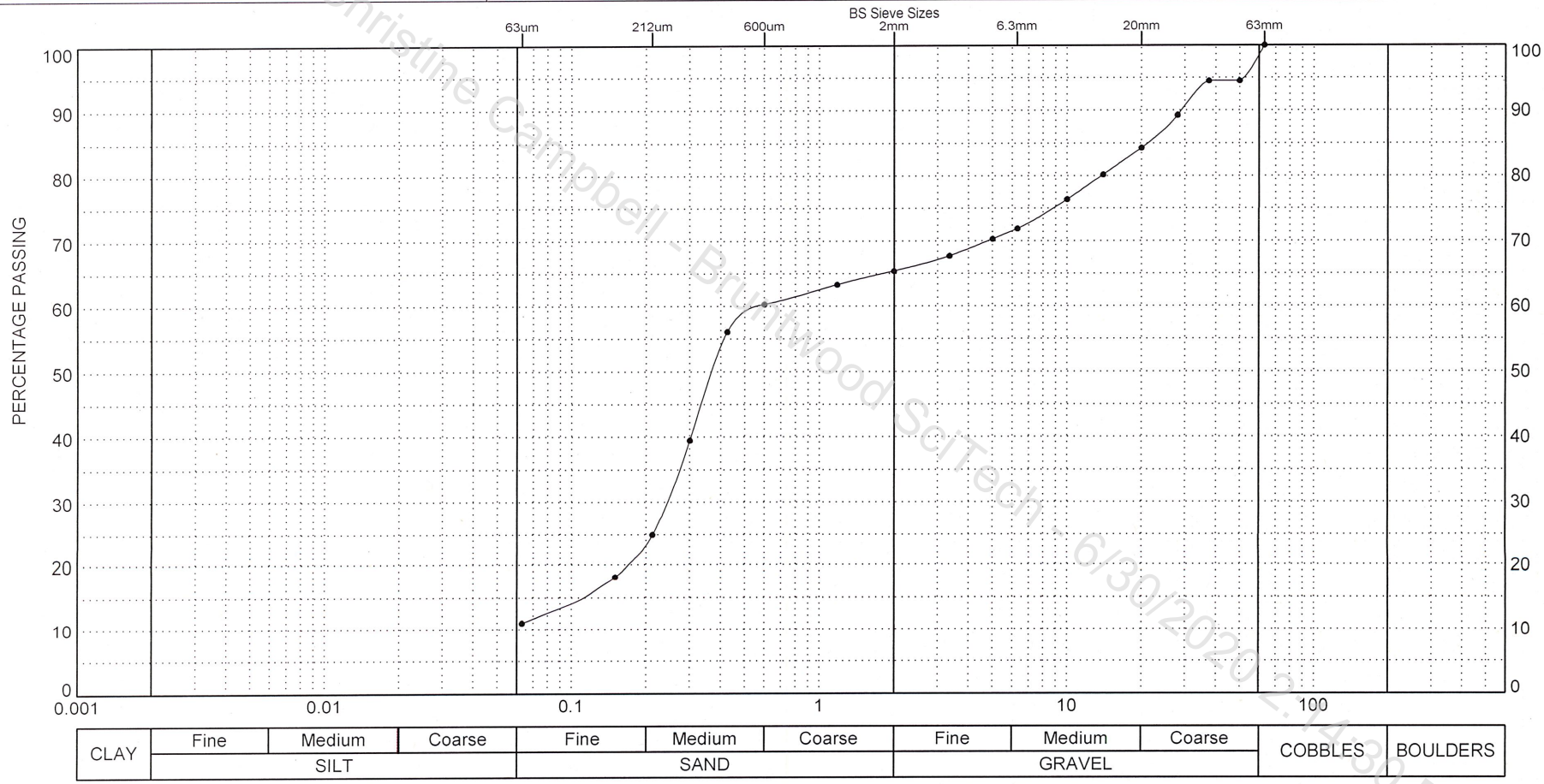
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP002**	Depth (m) :- **1.00**	Sample Type & No :- **B4**	Specific Depth (m) :- **1.00**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
63	100.0
50	94.5
37.5	94.5
28	89.3
20	84.3
14	80.2
10	76.4
6.3	71.9
5	70.3
3.35	67.7
2	65.4
1.18	63.3
0.6	60.3
0.425	56.1
0.3	39.5
0.212	25.0
0.15	18.2
0.063	11.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP002/B4/1.00	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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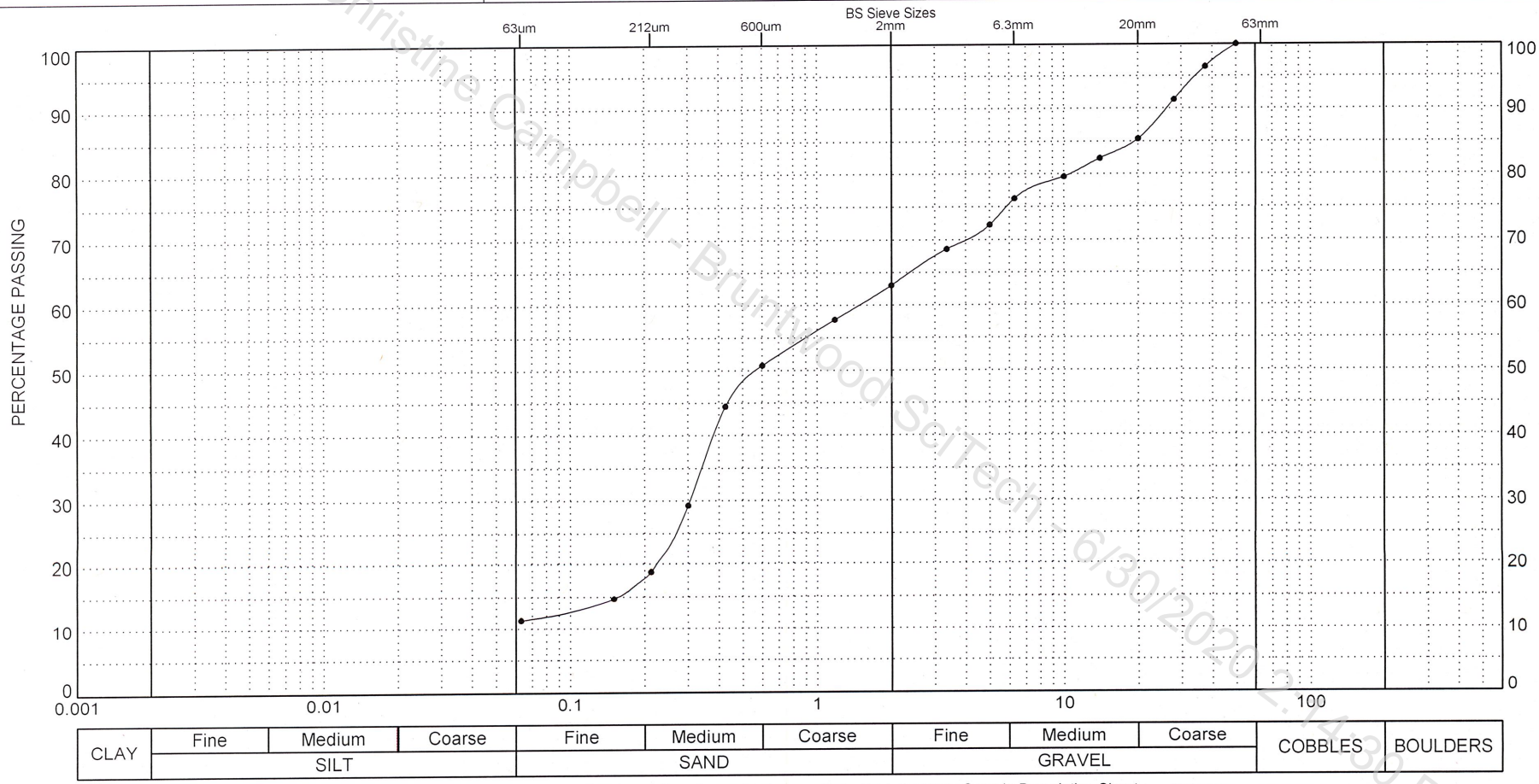
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP002**	Depth (m) :- **2.50**	Sample Type & No :- **B10**	Specific Depth (m) :- **2.50**	Date Tested :- **22/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	96.5
28	91.4
20	85.4
14	82.4
10	79.6
6.3	76.3
5	72.3
3.35	68.6
2	63.1
1.18	57.8
0.6	50.8
0.425	44.5
0.3	29.3
0.212	18.9
0.15	14.7
0.063	11.4

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP002/B10/2.50	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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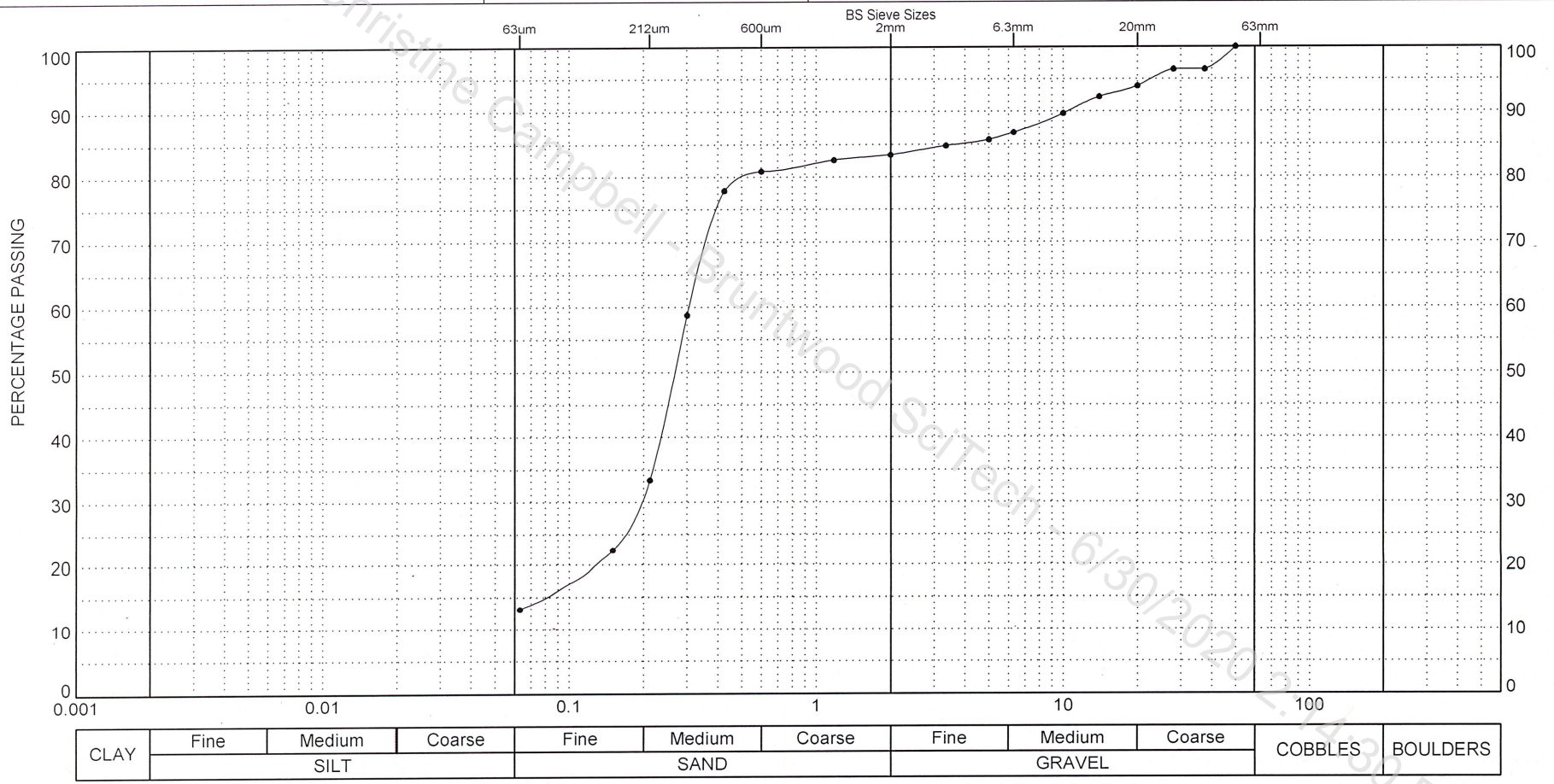
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP003**	Depth (m) :- **1.00**	Sample Type & No :- **B7**	Specific Depth (m) :- **1.00**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	96.5
28	96.5
20	93.9
14	92.3
10	89.7
6.3	86.8
5	85.7
3.35	84.8
2	83.4
1.18	82.6
0.6	80.9
0.425	77.9
0.3	58.8
0.212	33.4
0.15	22.5
0.063	13.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP003/B7/1.00	[redacted]	M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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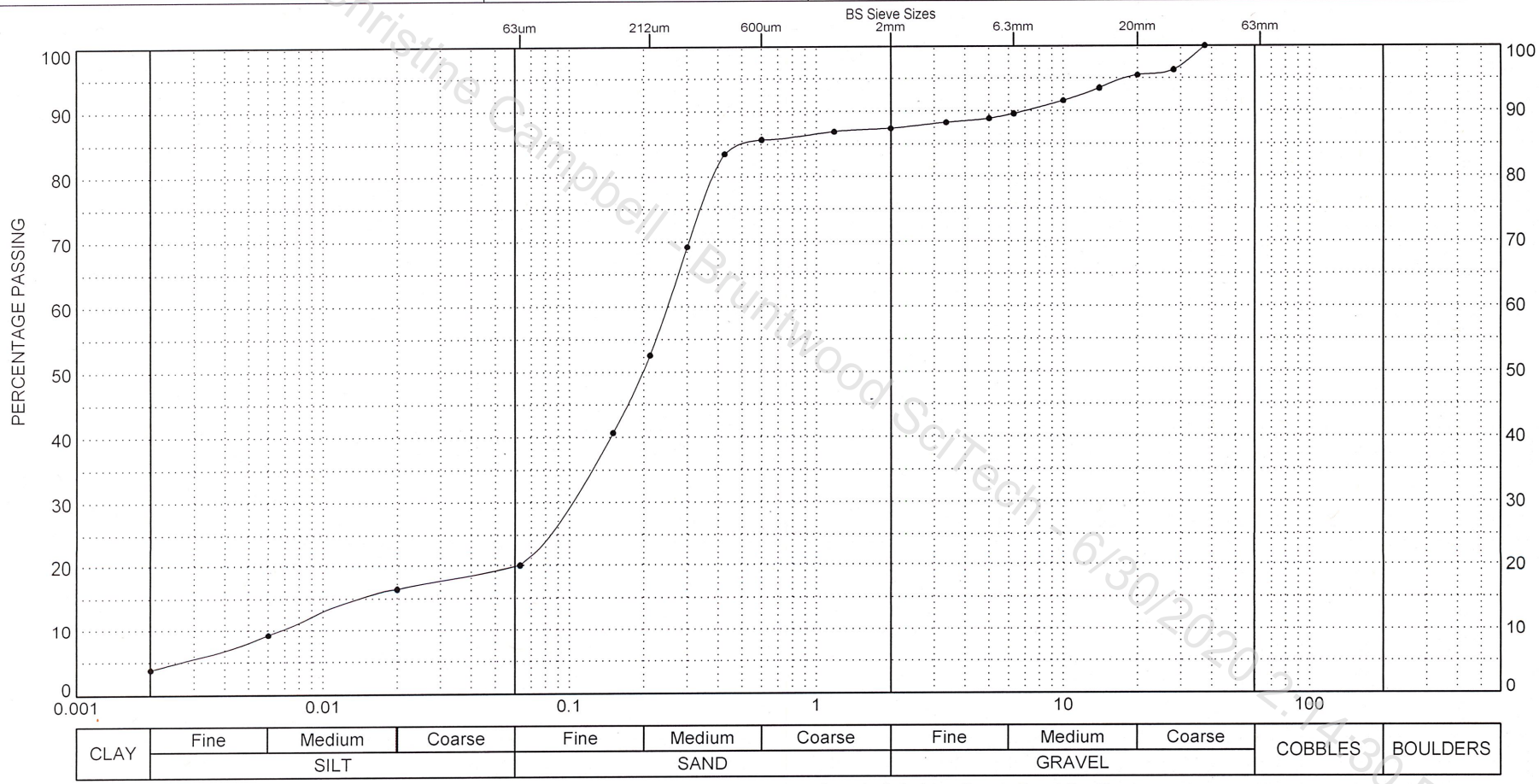
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PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **TP003**	Depth (m) :- **3.00**	Sample Type & No :- **B12**	Specific Depth (m) :- **3.00**	Date Tested :- **25/11/2019**



Sieve Size (mm)	Passing (%)
37.5	100.0
28	96.3
20	95.5
14	93.5
10	91.6
6.3	89.6
5	88.9
3.35	88.3
2	87.4
1.18	86.9
0.6	85.7
0.425	83.5
0.3	69.2
0.212	52.6
0.15	40.7
0.063	20.0
0.02	16.3
0.006	9.2
0.002	3.9

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
22/01/2020	PSD/NW1588/TP003/B12/3.00	[redacted]	L.M. SELKIRK	

Client :-	Contract Title :-	AEG Contract No :-
University of Manchester	ID Manchester Preliminary Ground Investigation	NW1588

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LABORATORY TESTING ENCLOSURE 4

Determination of Total Sulphur, Sulphate and pH

(Tested Externally)

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DETS

Certificate of Analysis

Certificate Number 19-24310

04-Dec-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	19-24310
Client Reference	NW1588
Order No	LA2256
Contract Title	ID Manchester Preliminary Ground Investigation
Description	11 Soil samples.
Date Received	28-Nov-19
Date Started	28-Nov-19
Date Completed	04-Dec-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
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Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
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ID Manchester - Christine Campbell - EarthWood GeoTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Summary of Chemical Analysis

Soil Samples

Our Ref 19-24310
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

				Lab No	1605059	1605060	1605061	1605062	1605063	1605064	1605065	1605066	1605067	1605068	1605069
				Sample ID	BH001	BH001	BH002	BH003	BH003	BH0012A	BH013	BH013	BH014	TP001	TP002
				Depth	1.65	5.50	1.20	1.20	4.70	1.70	1.50	8.00	0.70	0.80	1.50
				Other ID	11	25	5	5	15	8	5	20	6	5	8
				Sample Type	J	J	B	B	J	B	B	J	B	J	J
				Sampling Date	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19	27/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**		**LOD**	**Units**											
Inorganics															
pH	DETSC 2008#			pH	9.4	8.9	10.3	9.3	10.2	8.3	8.4	8.4	9.5	8.0	9.3
Sulphate Aqueous Extract as SO4	DETSC 2076#		10	mg/l	430	22	340	210	160	62	120	31	42	16	40

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Information in Support of the Analytical Results

Our Ref 19-24310
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1605059	BH001 1.65 SOIL	27/11/19	PT 1L		
1605060	BH001 5.50 SOIL	27/11/19	PT 1L		
1605061	BH002 1.20 SOIL	27/11/19	PT 500ml		
1605062	BH003 1.20 SOIL	27/11/19	PT 500ml		
1605063	BH003 4.70 SOIL	27/11/19	PT 500ml		
1605064	BH0012A 1.70 SOIL	27/11/19	PT 500ml		
1605065	BH013 1.50 SOIL	27/11/19	PT 500ml		
1605066	BH013 8.00 SOIL	27/11/19	PT 500ml		
1605067	BH014 0.70 SOIL	27/11/19	PT 500ml		
1605068	TP001 0.80 SOIL	27/11/19	PT 500ml		
1605069	TP002 1.50 SOIL	27/11/19	PT 500ml		

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

ID Manchester - Christine Campbell - Buntwood GeoTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Certificate of Analysis

Certificate Number 19-25093

13-Dec-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	19-25093
Client Reference	NW1588
Order No	LA2256
Contract Title	ID Manchester Preliminary Ground Investigation
Description	10 Soil samples.
Date Received	09-Dec-19
Date Started	09-Dec-19
Date Completed	13-Dec-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved B [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
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ID Manchester - Christine Campbell - Eastwood SoilTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-25093
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Test	Method	LOD	Units	Lab No	1609600	1609601	1609602	1609603	1609604	1609605	1609607	1609608	1609609	1609610
				Sample ID	BH012A	BH001	BH004	BH007	BH011	BH013	BH004	BH007	BH005	BH006A
				Depth	10.00	8.00-9.50	9.50-11.00	7.50-8.10	7.50-8.50	10.50-12.00	6.00	4.50	0.50	0.50
				Other ID	30						18	18	3	3
				Sample Type	B	C	C	C	C	C	B	J	J	J
				Sampling Date	27/10/19	29/10/19	16/11/19	17/11/19	23/11/19	30/10/19	02/11/19	09/11/19	16/11/19	17/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Inorganics														
pH	DETSC 2008#		pH		8.1	8.9	8.2	8.1	7.6	8.4	10.0	10.2	8.4	10.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		61	18	59	14	51	21	1100	630	89	710

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Information in Support of the Analytical Results

Our Ref 19-25093
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1609600	BH012A 10.00 SOIL	27/10/19	PT 1L	pH + Conductivity (7 days)	
1609601	BH001 8.00-9.50 SOIL	29/10/19	PT 1L	pH + Conductivity (7 days)	
1609602	BH004 9.50-11.00 SOIL	16/11/19	PT 1L	pH + Conductivity (7 days)	
1609603	BH007 7.50-8.10 SOIL	17/11/19	PT 1L	pH + Conductivity (7 days)	
1609604	BH011 7.50-8.50 SOIL	23/11/19	PT 1L	pH + Conductivity (7 days)	
1609605	BH013 10.50-12.00 SOIL	30/10/19	PT 1L	pH + Conductivity (7 days)	
1609606	BH004 0.80 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1609607	BH004 6.00 SOIL	02/11/19	PT 500ml	pH + Conductivity (7 days)	
1609608	BH007 4.50 SOIL	09/11/19	PT 500ml	pH + Conductivity (7 days)	
1609609	BH005 0.50 SOIL	16/11/19	PT 500ml	pH + Conductivity (7 days)	
1609610	BH006A 0.50 SOIL	17/11/19	PT 500ml	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub G-Glass J-Jar

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Certificate of Analysis

Certificate Number 19-24307

03-Dec-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	19-24307
Client Reference	NW1588
Order No	LA2256
Contract Title	ID Manchester Preliminary Ground Investigation
Description	9 Soil samples.
Date Received	28-Nov-19
Date Started	28-Nov-19
Date Completed	03-Dec-19
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-24307
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Test	Method	LOD	Units	Lab No	1605045	1605046	1605047	1605048	1605049	1605050	1605051	1605052	1605053
				Sample ID	BH001	BH004	BH007	BH007	BH008	BH008	BH009	BH011	BH011
				Depth	12.50	0.80	1.20	7.20	2.10	5.50	0.80	1.20	5.50
				Other ID	28	5	6	22	6	18	3	5	19
				Sample Type	J	B	J	J	J	J	J	J	J
				Sampling Date	29/10/19	21/11/19	08/11/19	09/11/19	10/11/19	10/11/19	09/11/19	09/11/19	09/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Inorganics													
pH	DETSC 2008#		pH		8.3	8.3	10.6	8.3	11.4	7.8	10.7	11.2	8.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		16	80	120	39	120	200	410	120	68

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 19-24307
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1605045	BH001 12.50 SOIL	29/10/19	PT 500ml	pH + Conductivity (7 days)	
1605046	BH004 0.80 SOIL	21/11/19	PT 500ml		
1605047	BH007 1.20 SOIL	08/11/19	PT 500ml	pH + Conductivity (7 days)	
1605048	BH007 7.20 SOIL	09/11/19	PT 500ml	pH + Conductivity (7 days)	
1605049	BH008 2.10 SOIL	10/11/19	PT 500ml	pH + Conductivity (7 days)	
1605050	BH008 5.50 SOIL	10/11/19	PT 500ml	pH + Conductivity (7 days)	
1605051	BH009 0.80 SOIL	09/11/19	PT 500ml	pH + Conductivity (7 days)	
1605052	BH011 1.20 SOIL	09/11/19	PT 500ml	pH + Conductivity (7 days)	
1605053	BH011 5.50 SOIL	09/11/19	PT 500ml	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

Disposal

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

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Certificate of Analysis

Certificate Number 19-25586

19-Dec-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 19-25586
Client Reference NW1588
Order No LA2256
Contract Title ID Manchester Preliminary Ground Investigation
Description 5 Soil samples.
Date Received 12-Dec-19
Date Started 12-Dec-19
Date Completed 19-Dec-19
Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approv [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
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DETS

Summary of Chemical Analysis
Soil Samples

Our Ref 19-25586
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

				Lab No	1613155	1613156	1613157	1613158	1613159
				Sample ID	DS001	DS002	BH005	BH005	BH005
				Depth	0.70	1.20	5.50	11.00	19.00
				Other ID	6	5			
				Sample Type	B	U	C	C	C
				Sampling Date	30/11/19	01/12/19	24/11/19	25/11/19	30/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Inorganics									
pH	DETSC 2008#		pH	7.9	7.9	7.8	7.8	7.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1400	1800	65	64	68

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DETS

Information in Support of the Analytical Results

Our Ref 19-25586
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1613155	DS001 0.70 SOIL	30/11/19	PT 500ml	pH + Conductivity (7 days)	
1613156	DS002 1.20 SOIL	01/12/19	PT 500ml	pH + Conductivity (7 days)	
1613157	BH005 5.50 SOIL	24/11/19	PT 1L	pH + Conductivity (7 days)	
1613158	BH005 11.00 SOIL	25/11/19	PT 1L	pH + Conductivity (7 days)	
1613159	BH005 19.00 SOIL	30/11/19	PT 1L	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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Disposal

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

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LABORATORY TESTING ENCLOSURE 5

Determination of Dry Density/Moisture Content Relationship

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **BH004** Depth (m) :- **2.00** Sample Type & No :- **B8**

Test Method 2.5kg Compaction Single Sample

Test Results

Optimum Moisture Content (%) = **16.9**

Particle Density (Measured) = **2.60**

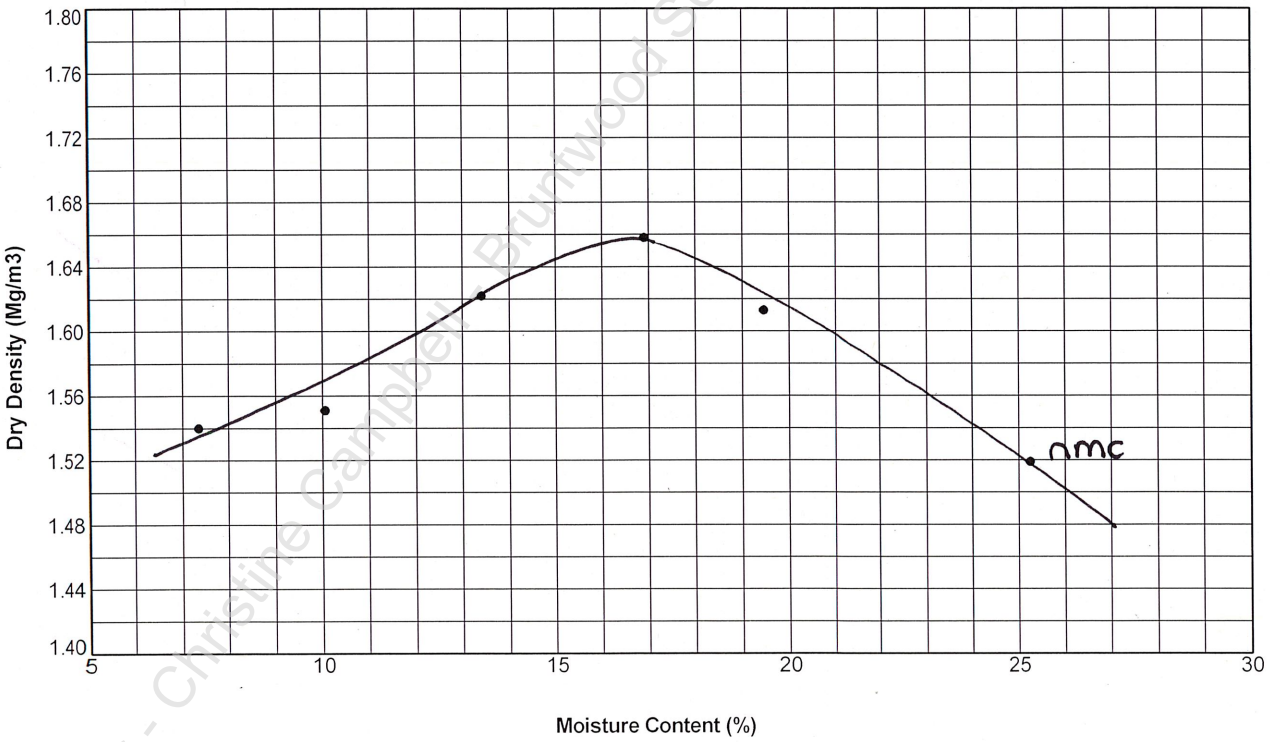
Maximum Dry Density (Mg/m3) = **1.66**

Retained on 20mm Sieve (%) = **17.3**

Date Tested = **09/12/2019**

Retained on 37.5mm Sieve (%) = **9.3**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Sign [redacted]	Name :- M. SELKIRK		Page 1 of 1
Date 22/01/2020	Certificate No :- COMP/NW1588/1	AEG Contract No. :- NW1588	UKAS TESTING 1367

ID Manchester - Christine Campbell - Brynwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **BH005** Depth (m) :- **1.50** Sample Type & No :- **B7**

Test Method 2.5kg Compaction Single Sample

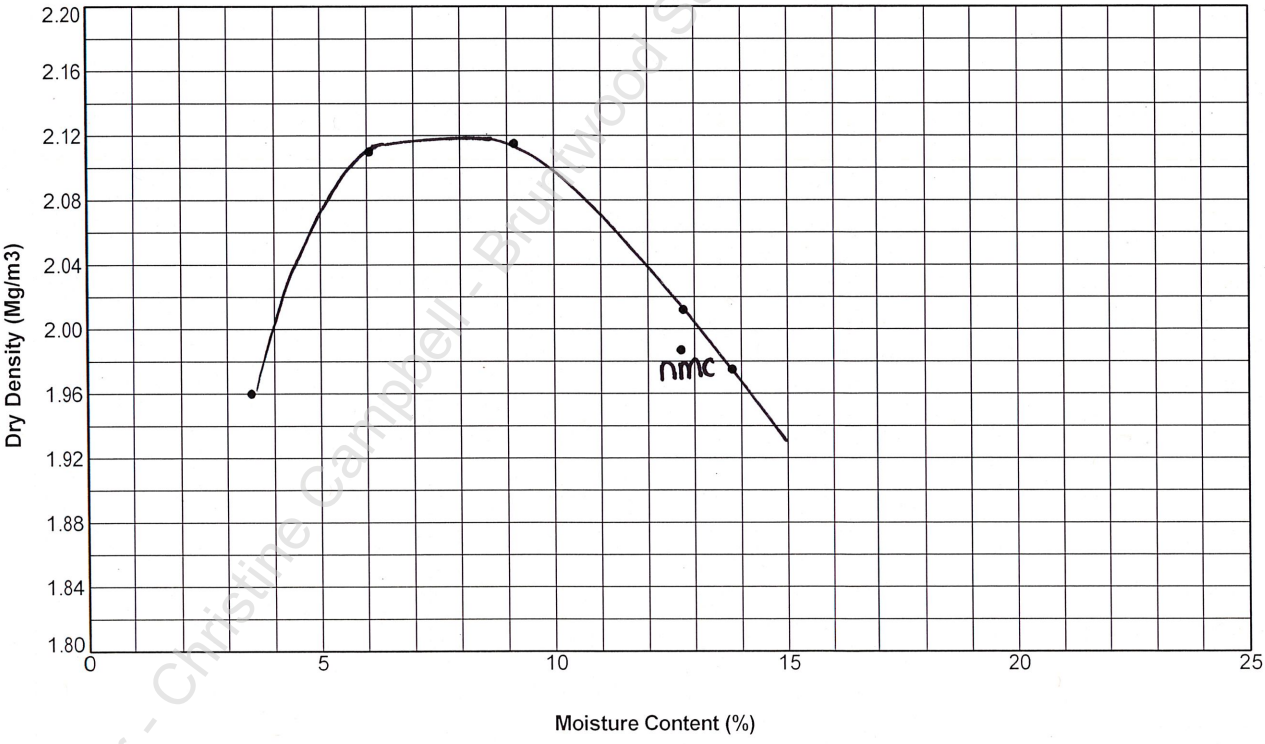
Test Results

Optimum Moisture Content (%) = **8.0** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **2.12** Retained on 20mm Sieve (%) = **21.8**

Date Tested = **04/12/2019** Retained on 37.5mm Sieve (%) = **7.9**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Sign [redacted]	Name :- M. SELKIRK		Page 1 of 1
Date 22/01/2020	Certificate No :- COMP/NW1588/1	AEG Contract No. :- NW1588	UKAS TESTING 1367

ID Manchester - Christine Campbell - Brynwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **BH011** Depth (m) :- **0.80** Sample Type & No :- **B3**

Test Method 2.5kg Compaction Single Sample

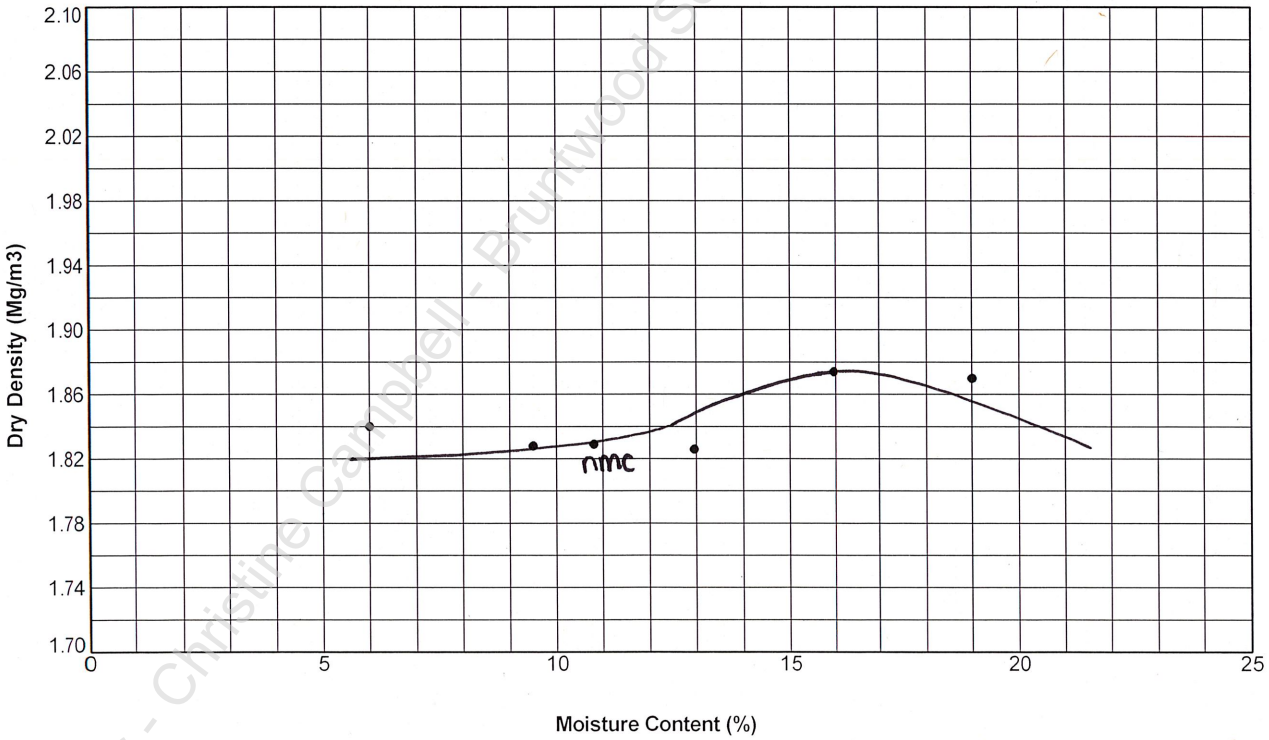
Test Results

Optimum Moisture Content (%) = **16.0** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **1.87** Retained on 20mm Sieve (%) = **17.6**

Date Tested = **04/12/2019** Retained on 37.5mm Sieve (%) = **5.0**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
ID Manchester Preliminary Ground Investigation	University of Manchester

Sig [redacted] Name :- M. SELKIRK Page 1 of 1

Dat 22/01/2020 Certificate No :- COMP/NW1588/1 AEG Contract No. :- NW1588

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **TP001** Depth (m) :- **1.50** Sample Type & No :- **B7**

Test Method 2.5kg Compaction Single Sample

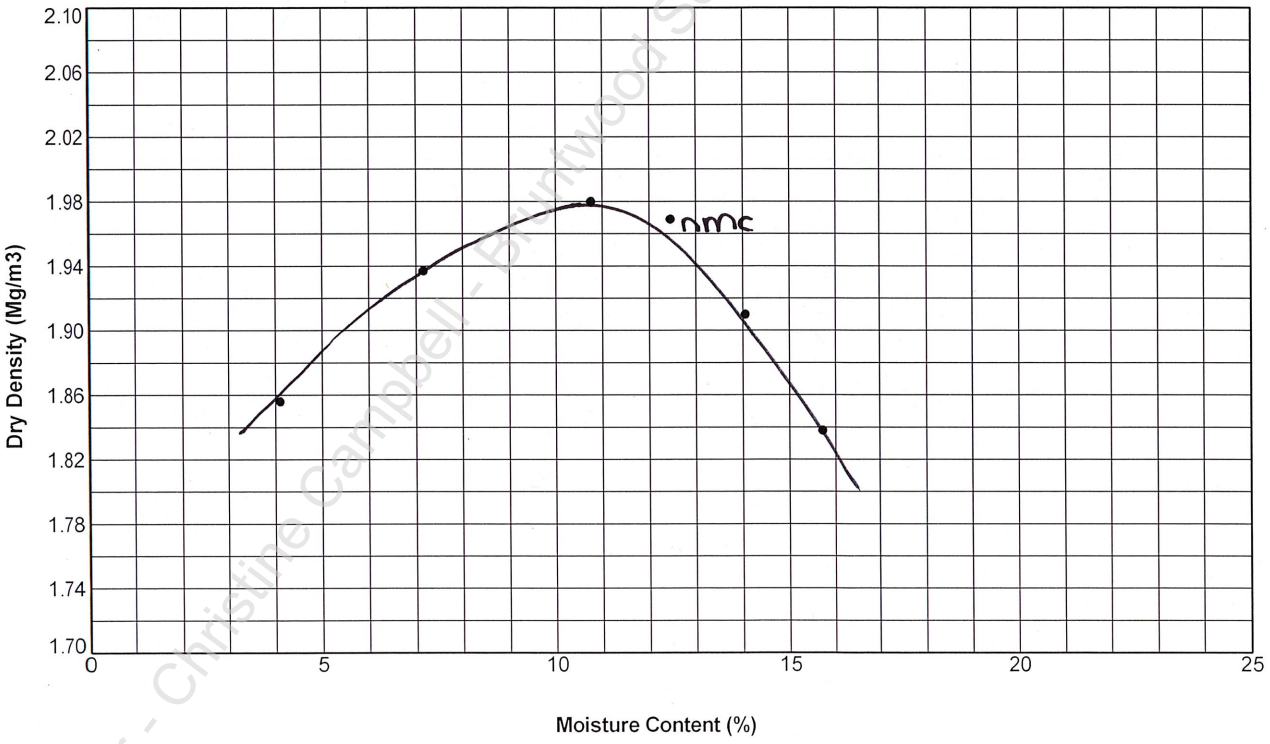
Test Results

Optimum Moisture Content (%) = **10.8** Particle Density (Assumed) = **2.67**

Maximum Dry Density (Mg/m3) = **1.98** Retained on 20mm Sieve (%) = **14.0**

Date Tested = **02/12/2019** Retained on 37.5mm Sieve (%) = **5.0**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- ID Manchester Preliminary Ground Investigation	Client :- University of Manchester
Sig [redacted] Name :- M. SELKIRK	Page 1 of 1
Date of Issue :- 22/01/2020	Certificate No :- COMP/NW1588/1
	AEG Contract No. :- NW1588

UKAS TESTING 1367

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LABORATORY TESTING ENCLOSURE 6

Determination of One Dimensional Consolidation Properties

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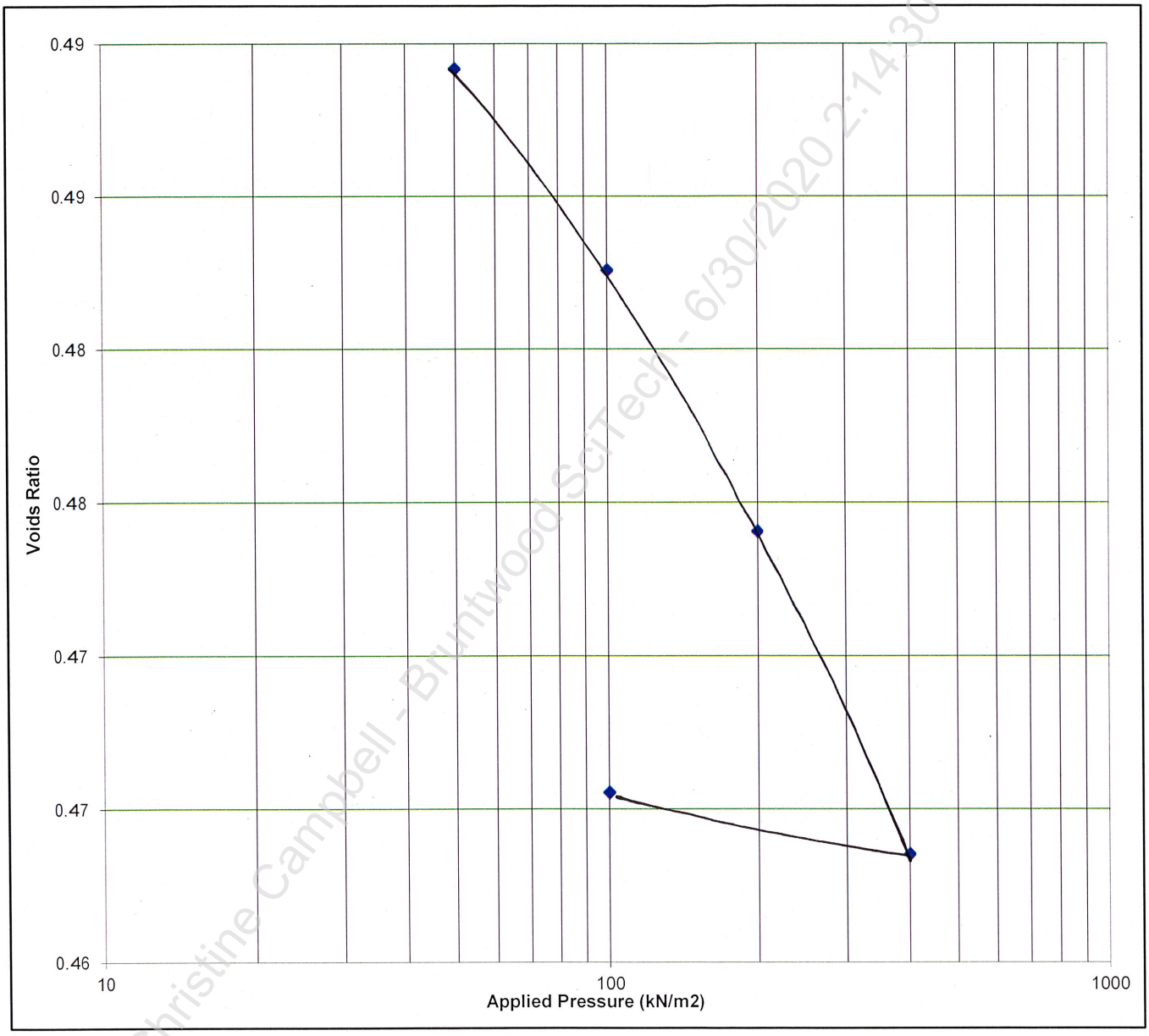
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Regional Office: Unit 20, Buisness Development Centre, Eanam Wharf, Blackburn, BB1 5BL - Tel: 01772735300 Fax: 01772735999

ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : PART 5 : 1990 : CLAUSE 3

Exploratory Hole No	BH012A	Sample	U25	Depth	8.50m
Specimen Type	Undisturbed	Orientation	Vertical	Specific Depth	8.81m



Contract Title:	Client:
ID Manchester Preliminary Ground Investigation	University of Manchester

Signed:	Name:	Page 2 of 2	
	M. SELKIRK		
Date of Issue:	Certificate No:	AEG Contract No:	UKAS TESTING 1367
26/11/2019	NW1588/A	NW1588	

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Regional Office: Unit 20, Buisness Development Centre, Eanam Wharf, Blackburn, BB1 5BL - Tel: 01772735300 Fax: 01772735999

ONE DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : PART 5 : 1990 : CLAUSE 3

Exploratory Hole No	**BH012A**	**Sample**	**U25**	**Depth**	**8.50m**
Specimen Type	**Undisturbed**	**Orientation**	**Vertical**	**Specific Depth**	**8.81m**

	INITIAL	FINAL			
Height	18.8	18.2	mm	Particle Density (Assumed)	2.70
Diameter	74.3	74.3	mm		
Moisture Content	17.6	17.4	%	Degree of Saturation (%)	92.9
Wet Density	2.10	2.15	Mg/m^3		
Dry Density	1.79	1.83	Mg/m^3	Test Duration (Days)	5
				Date Tested	18/11/2019

Square Root of Time Fitting Method

Pressure Range kN/m2	Mv m2/MN	Cv m2/yr	Temp C	Voids Ratio
Initial				0.512
0 - 50	0.296	.	22	0.489
50 - 100	0.089	18.38	22	0.483
100 - 200	0.057	18.76	21	0.474
200 - 400	0.036	17.96	22	0.464
400 - 100	0.005	Swelling	22	0.466

For sample description please refer to the Laboratory Sample Description Sheet.

Contract Title:	Client:
ID Manchester Preliminary Ground Investigation	**University of Manchester**

Signed:	Name: M. SELKIRK	Page 1 of 2		
Date of Issue: 26/11/2019	Certificate No: NW1588/A	AEG Contract No: NW1588	UKAS TESTING 1367	

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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LABORATORY TESTING ENCLOSURE 7

Consolidated Undrained Shear Strength in Triaxial Cell with Measurement of Pore Water Pressure

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 509

ALLIED EXPLORATION AND GEOTECHNICS LIMITED

Unit 25 Stella Gill Industrial Estate,
Pelton Fell, Chester le Street, DH2 2RG.

CONSOLIDATED UNDRAINED TRIAXIAL WITH MEASUREMENT OF PORE WATER PRESSURE

B.S. 1377 : Part 8 : 1990 : Clauses 3,4,5,6 and 7

PROJECT No : NW1588 **CLIENT : University of Manchester**
PROJECT : ID Manchester Preliminary Ground Investigation
HOLE : BH001 **SAMPLE No : U10** **DEPTH (m) : 1.20**

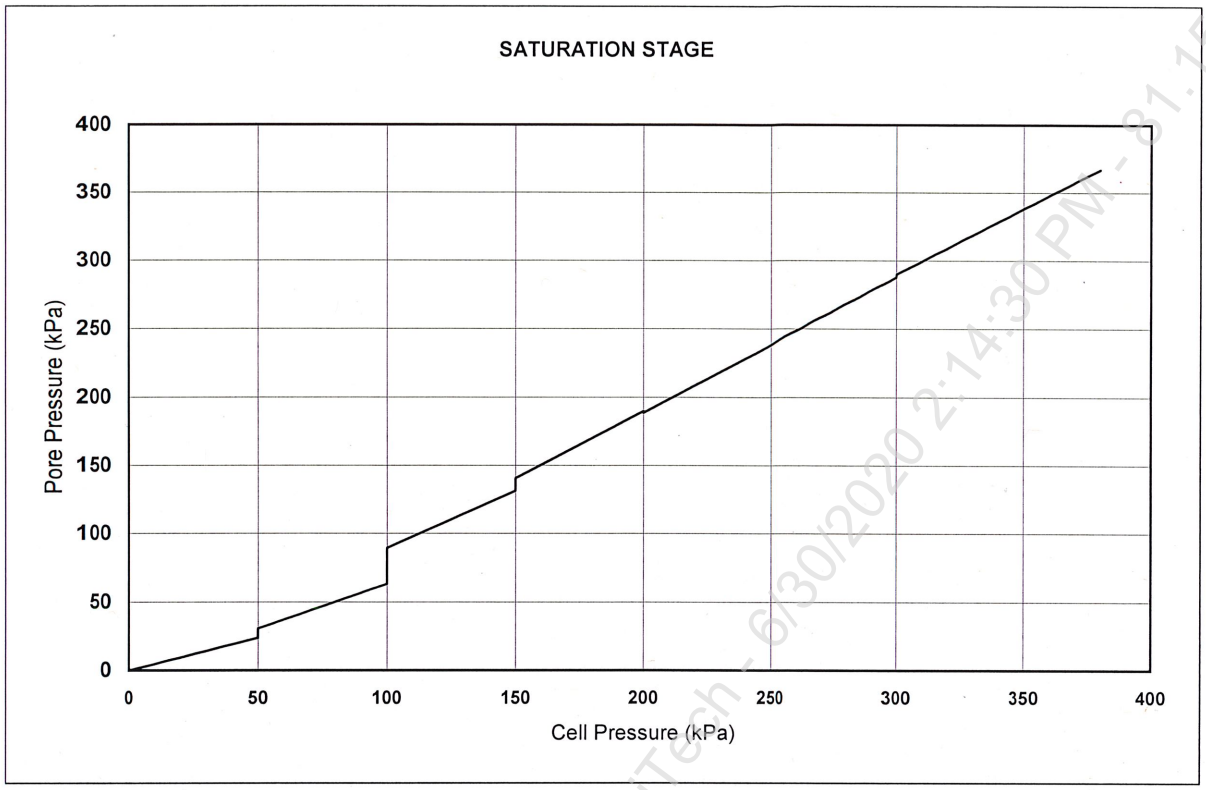
TEST SPECIMEN PREPARATION	Undisturbed	
Depth within original sample	: 1.40m	
Orientation within original sample	:Vertical	
Description	: Please refer to sample description sheet.	
TEST SPECIMEN DETAILS	*Stage*	1
Length	*mm*	203.8
Diameter	*mm*	104.3
Moisture Content	*%*	23.8
Bulk Density	*Mg/m^3*	2.00
SATURATION STAGE		
Drainage Conditions	: Both ends and radial boundary	
Final Cell Pressure	*kPa*	380
Final Pore Pressure	*kPa*	300
Final Pore Pressure Parameter B		0.97
Duration	*day(s)*	2
CONSOLIDATION STAGE		
Cell Pressure	*kPa*	380
Back Pressure	*kPa*	300
Effective Pressure	*kPa*	80
Final Pore Pressure	*kPa*	298.9
Duration	*day(s)*	6
SHEARING STAGE		
Cell Pressure	*kPa*	380
Rate of Axial Displacement	*mm/min*	0.00699
Final Moisture Content	*%*	23.0
Final Bulk Density	*Mg/m^3*	1.99
CONDITIONS AT FAILURE	*Criterion*	Maximum stress ratio
Pore Pressure	*kPa*	332
Minor Effective Principal Stress	*kPa*	49
Deviator Stress	*kPa*	110
Major Effective Principal Stress	*kPa*	159
Effective Principal Stress Ratio		3.27
Pore Pressure Parameter A		0.30
Axial Strain	*%*	5.3
Correction applied to Principal Stress	*kPa*	4.4
Duration	*Days*	4

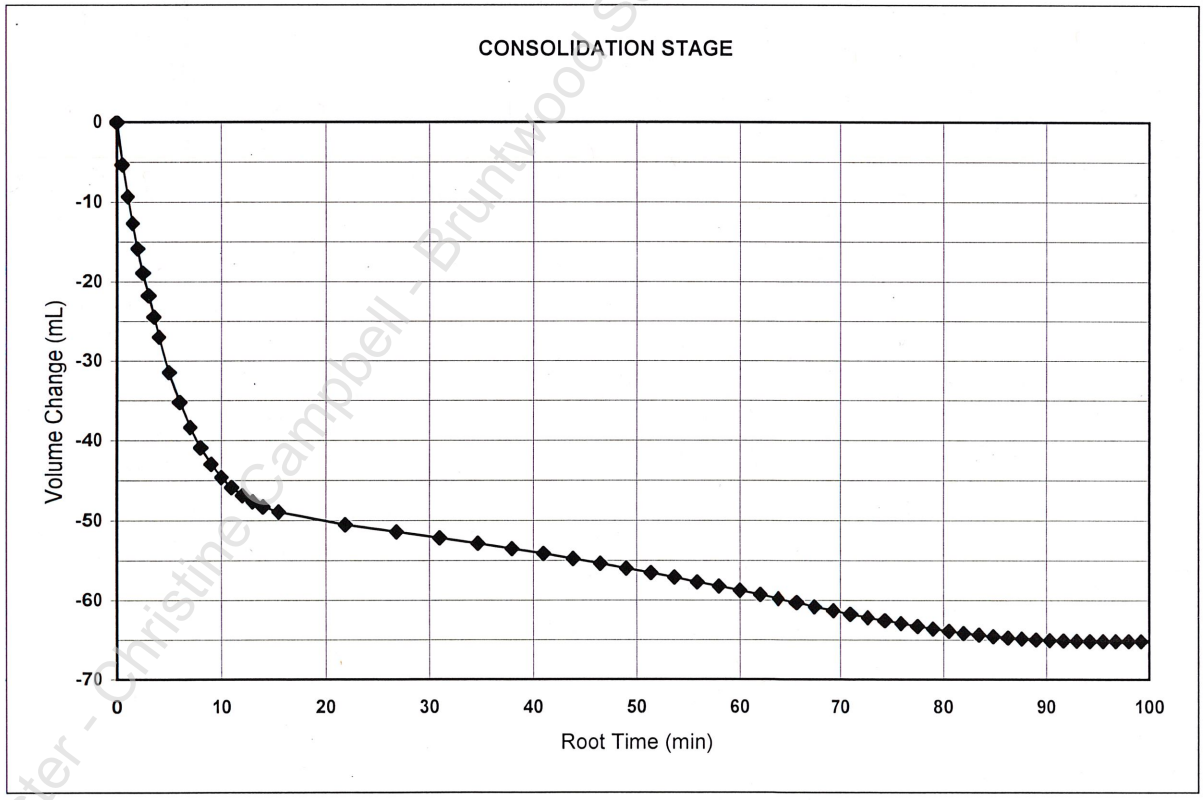
ID Manchester_Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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PROJECT No : NW1588 **CLIENT : University of Manchester**
PROJECT : ID Manchester Preliminary Ground Investigation
HOLE : BH001 **SAMPLE No : U10** **DEPTH (m) : 1.20**

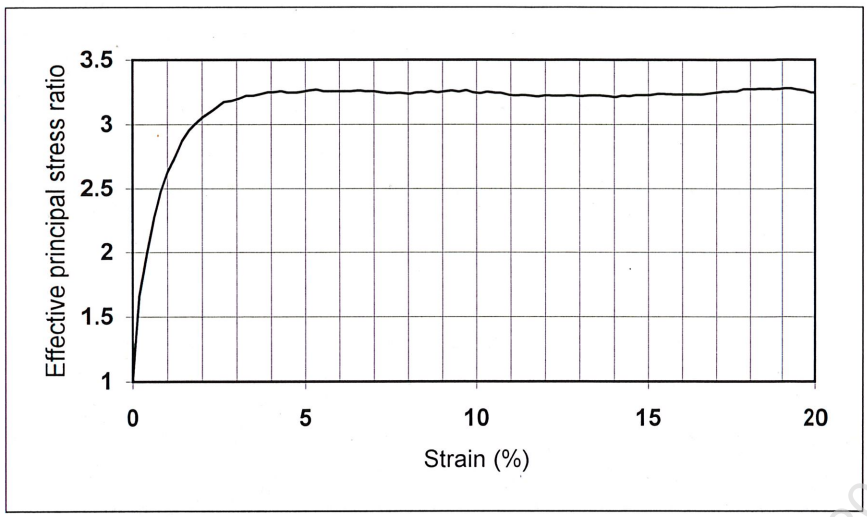




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PROJECT No : NW1588 **CLIENT : University of Manchester**
PROJECT : ID Manchester Preliminary Ground Investigation
HOLE : BH001 **SAMPLE No : U10** **DEPTH (m) : 1.20**

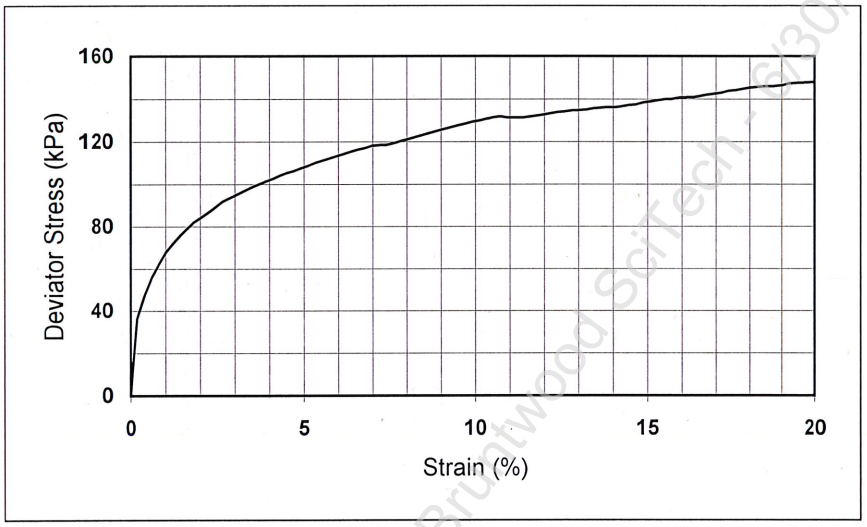


Failure Conditions

Specimen 1

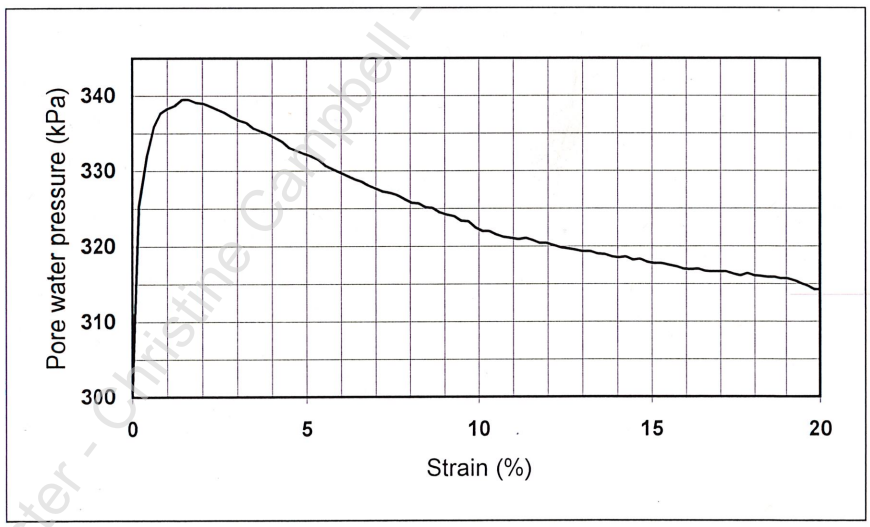
At maximum stress ratio

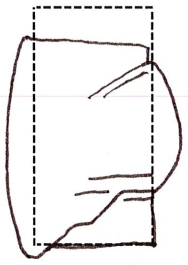
strain	5.33	*%*
deviator stress	110.2	*kPa*
stress ratio	3.27	



At maximum deviator stress

strain	19.85	*%*
deviator stress	148.0	*kPa*
stress ratio	3.25	



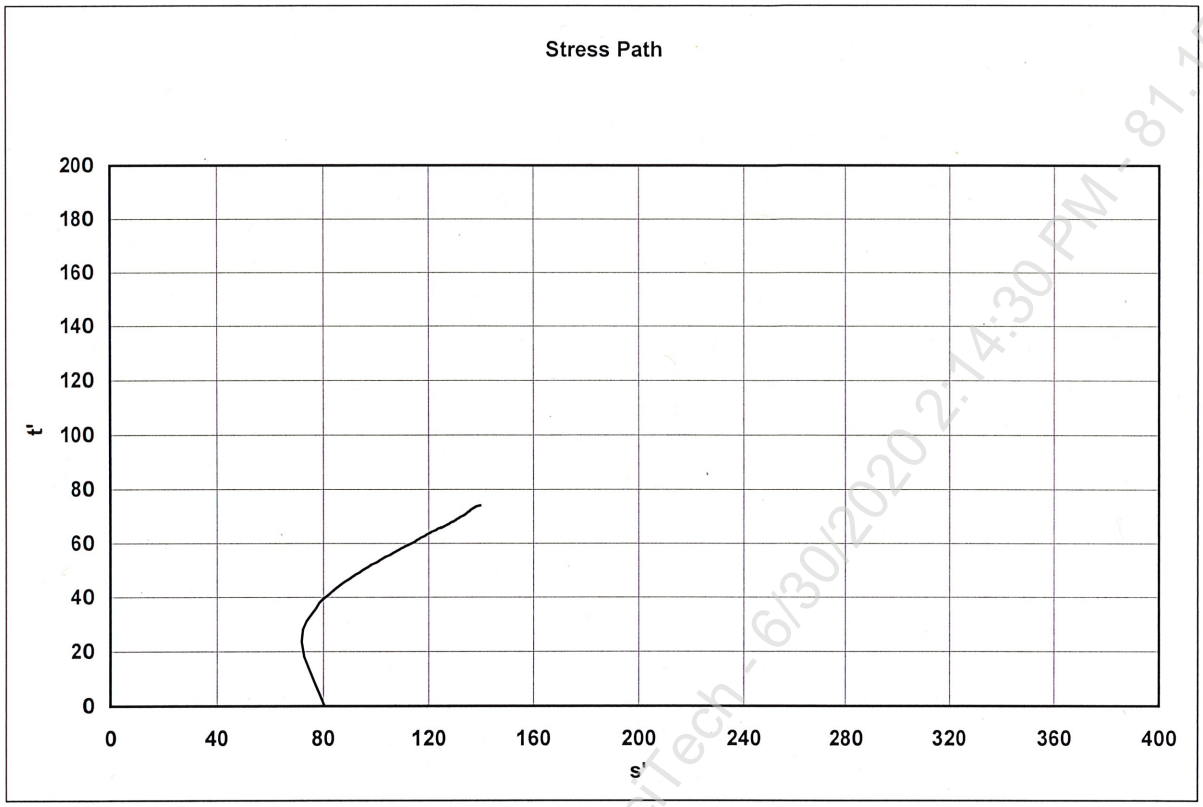


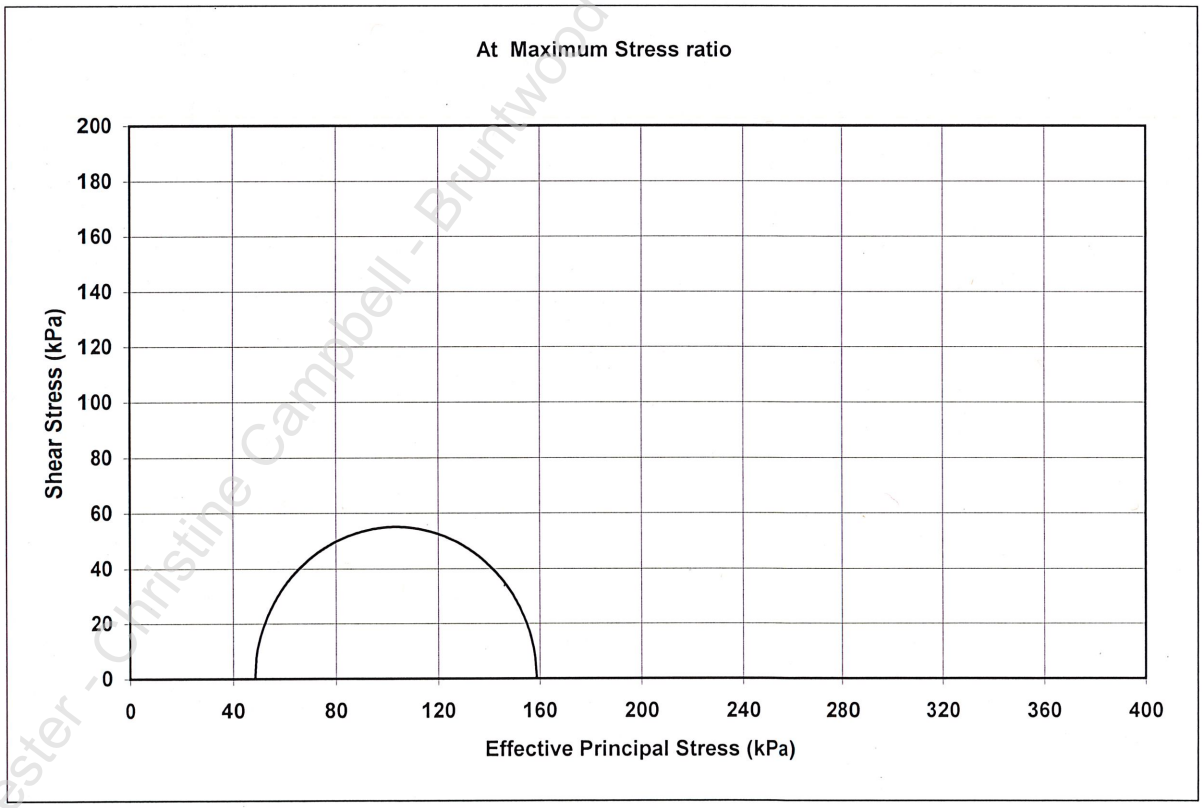
FAILURE MODE

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PROJECT No : NW1588 **CLIENT : University of Manchester**
PROJECT : ID Manchester Preliminary Ground Investigation
HOLE : BH001 **SAMPLE No : U10** **DEPTH (m) : 1.20**





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LABORATORY TESTING ENCLOSURE 8

Moisture Content of Rock

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MOISTURE CONTENT CERTIFICATE

ISRM : 1981

Exploratory Hole No.	Sample Depth (m)	Sample ID	Moisture Content (%)	Date Tested	Remarks
BH001	9.20	C30	12.1	02/12/2019	
BH001	11.64	C32	13.7	02/12/2019	
BH001	14.70	C34	14.7	02/12/2019	
BH004	11.25	C30	15.3	03/12/2019	
BH004	13.20	C32	13.6	04/12/2019	
BH005	9.00	C23	16.0	09/12/2019	
BH005	17.00	C29	15.5	09/12/2019	
BH007	9.15	C27	17.9	03/12/2019	
BH011	8.45	C23	15.3	03/12/2019	
BH011	8.80	C24	15.3	03/12/2019	
BH011	10.00	C25	15.0	03/12/2019	
BH011	11.30	C26	13.4	03/12/2019	
BH011	12.30	C27	12.9	04/12/2019	
BH013	11.65	C26	16.1	02/12/2019	
HC001	0.00	C1	13.0	25/11/2019	
HC002	0.00	C1	17.9	25/11/2019	
HC003	0.00	C1	13.5	25/11/2019	

For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- ID Manchester Preliminary Ground Investigation

Client :- University of Manchester

Signe [redacted]

Name :- M. SELKIRK

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Date of Issue :- 22/01/2020

Certificate No :- RMC/NW1588/1

AEG Contract No. :- **NW1588**

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LABORATORY TESTING ENCLOSURE 9

Determination of Point Load Index

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH001	9.20	Diametral	125.3	97.7	0.3	9545.3	0.026	1.352	0.035	Sandstone	02/12/2019
BH001	9.20	Axial	100.2	74.2	1.2	9466.3	0.128	1.349	0.173	Sandstone#	02/12/2019
BH001	9.70	Diametral	127.9	93.2	0.1	8686.2	0.007	1.323	0.009	Sandstone	03/12/2019
BH001	9.70	Axial	99.1	49.1	0.0	6195.3	0.004	1.227	0.004	Sandstone	03/12/2019
BH001	10.50	Diametral	126.3	99.3	0.1	9860.5	0.014	1.362	0.019	Sandstone	03/12/2019
BH001	10.50	Axial	100.1	36.0	0.0	4588.2	0.006	1.146	0.006	Sandstone	03/12/2019
BH001	10.70	Diametral	135.5	94.7	0.1	8968.1	0.012	1.333	0.016	Sandstone	03/12/2019
BH001	10.70	Axial	101.7	44.6	0.3	5775.2	0.055	1.207	0.066	Sandstone	03/12/2019
BH001	11.00	Diametral	98.1	92.6	0.1	8574.8	0.013	1.32	0.017	Sandstone	02/12/2019
BH001	11.64	Axial	98.9	78.8	0.9	9922.8	0.088	1.364	0.12	Sandstone#	02/12/2019
BH001	12.60	Irregular Lump	95.6	85.2	0.7	10370.7	0.067	1.377	0.092	Sandstone#	04/12/2019
BH001	12.70	Irregular Lump	101.3	61.3	0.2	7906.4	0.027	1.296	0.035	Sandstone	04/12/2019
BH001	12.90	Axial	100.3	68.9	0.3	8798.9	0.033	1.327	0.044	Sandstone#	04/12/2019
BH001	12.95	Axial	109.4	68.9	0.4	9597.2	0.038	1.353	0.051	Sandstone	04/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

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Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH001	13.60	Diametral	98.7	91.3	0.0	8335.7	0.003	1.311	0.003	Sandstone	04/12/2019
BH001	13.60	Axial	94.5	33.3	0.2	4006.7	0.054	1.112	0.06	Sandstone	04/12/2019
BH001	14.10	Axial	98.9	69.5	0.6	8751.7	0.064	1.326	0.085	Sandstone	02/12/2019
BH001	14.30	Axial	100.5	34.5	0.1	4414.6	0.026	1.136	0.03	Sandstone	02/12/2019
BH001	14.35	Axial	100.9	43.7	0.1	5614.1	0.023	1.12	0.028	Sandstone	02/12/2019
BH001	14.40	Axial	100.6	45.6	0.2	5840.8	0.034	1.21	0.041	Sandstone	02/12/2019
BH001	14.65	Axial	100.5	75.6	0.6	9673.8	0.061	1.356	0.083	Sandstone	02/12/2019
BH001	14.70	Axial	102.0	57.1	0.4	7415.6	0.053	1.277	0.068	Sandstone	02/12/2019
BH001	14.90	Axial	100.1	79.7	0.5	10157.9	0.052	1.371	0.071	Sandstone	02/12/2019
BH001	15.00	Diametral	158.2	94.3	0.1	8892.5	0.005	1.33	0.006	Sandstone	04/12/2019
BH001	15.00	Axial	99.8	57.8	0.6	7344.6	0.079	1.274	0.101	Sandstone	04/12/2019
BH001	15.30	Axial	104.2	86.9	0.4	11529.2	0.036	1.41	0.051	Sandstone	02/12/2019
BH001	15.40	Irregular Lump	100.4	67.7	0.1	8654.3	0.009	1.322	0.012	Sandstone#	04/12/2019
BH004	11.20	Axial	100.3	35.5	0.0	4533.6	0.003	1.143	0.003	Sandstone	03/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

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Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588	

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH004	11.25	Irregular Lump	99.4	62.5	0.2	7910.0	0.025	1.296	0.032	Sandstone#	03/12/2019
BH004	11.30	Diametral	127.8	83.4	0.0	6955.6	0.005	1.259	0.006	Sandstone	03/12/2019
BH004	11.30	Axial	100.4	33.9	0.0	4333.5	0.009	1.132	0.01	Sandstone	03/12/2019
BH004	11.45	Diametral	113.1	96.1	0.0	9235.2	0.002	1.342	0.002	Sandstone	03/12/2019
BH004	11.45	Axial	99.3	39.4	0.3	4981.4	0.067	1.168	0.078	Sandstone#	03/12/2019
BH004	11.60	Irregular Lump	112.8	80.2	0.1	11518.4	0.006	1.41	0.008	Sandstone#	03/12/2019
BH004	11.80	Axial	100.4	77.2	0.9	9868.7	0.092	1.362	0.125	Sandstone	03/12/2019
BH004	11.90	Diametral	123.7	91.3	0.1	8335.7	0.014	1.311	0.018	Sandstone	03/12/2019
BH004	11.90	Axial	99.4	50.4	0.2	6378.6	0.03	1.235	0.037	Sandstone#	03/12/2019
BH004	12.00	Axial	99.8	81.0	0.6	10292.6	0.058	1.375	0.08	Sandstone#	04/12/2019
BH004	12.10	Axial	100.2	44.7	0.5	5702.8	0.089	1.204	0.107	Sandstone	04/12/2019
BH004	12.15	Axial	100.4	72.5	1.2	9267.9	0.132	1.343	0.177	Sandstone#	04/12/2019
BH004	12.20	Axial	101.8	43.9	0.6	5690.1	0.102	1.203	0.123	Sandstone	04/12/2019
BH004	12.25	Diametral	109.3	96.8	0.2	9370.2	0.02	1.346	0.027	Sandstone	04/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/3	Signed :- [redacted]	Name :- M. SELKIRK	Page 3 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH004	12.25	Axial	100.4	29.4	0.5	3758.3	0.133	1.096	0.146	Sandstone	04/12/2019
BH004	12.42	Axial	104.2	85.0	1.3	11277.1	0.114	1.403	0.16	Sandstone#	04/12/2019
BH004	13.20	Diametral	104.2	96.3	0.1	9273.7	0.005	1.343	0.006	Sandstone	04/12/2019
BH004	13.20	Axial	100.1	55.9	0.7	7124.5	0.102	1.266	0.129	Sandstone	04/12/2019
BH005	9.00	Axial	97.5	69.1	0.3	8575.3	0.04	1.32	0.048	Sandstone#	09/12/2019
BH005	14.10	Diametral	233.1	100.2	0.8	10030.0	0.08	1.37	0.114	Sandstone	09/12/2019
BH005	14.10	Axial	100.4	62.8	0.7	8024.4	0.09	1.3	0.12	Sandstone	09/12/2019
BH005	14.30	Axial	94.7	73.7	1.4	8880.7	0.16	1.33	0.21	Sandstone	09/12/2019
BH005	14.38	Axial	93.4	40.1	0.7	4773.3	0.14	1.16	0.165	Sandstone	09/12/2019
BH005	14.50	Axial	99.3	89.9	2.0	11367.2	0.17	1.41	0.242	Sandstone#	09/12/2019
BH005	14.60	Diametral		99.6	1.4		0.14	1.36	0.19	Sandstone	
BH005	15.00	Diametral	230.4	100.3	1.1	10052.1	0.11	1.37	0.144	Sandstone	09/12/2019
BH005	15.00	Axial	100.5	68.8	1.7	8798.2	0.19	1.33	0.255	Sandstone	09/12/2019
BH005	15.24	Axial	100.4	63.5	0.9	8113.9	0.11	1.3	0.149	Sandstone	09/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

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Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH005	15.30	Diametral	150.8	100.1	0.8	10024.0	0.08	1.37	0.108	Sandstone	09/12/2019
BH005	15.30	Axial	100.3	64.4	1.4	8222.4	0.18	1.31	0.229	Sandstone	09/12/2019
BH005	17.00	Diametral	182.4	100.3	1.1	10008.0	0.1	1.37	0.143	Sandstone	09/12/2019
BH005	17.00	Axial	100.2	74.8	1.3	9540.7	0.14	1.35	0.184	Sandstone	09/12/2019
BH005	20.00	Diametral	176.5	100.2	0.8	10036.0	0.08	1.37	0.109	Sandstone	09/12/2019
BH005	20.00	Axial	100.9	86.2	1.5	11065.9	0.14	1.4	0.194	Sandstone#	09/12/2019
BH005	20.20	Diametral	144.2	100.5	0.8	10102.3	0.08	1.37	0.104	Sandstone	09/12/2019
BH005	20.20	Axial	100.7	59.9	1.5	7673.2	0.19	1.29	0.25	Sandstone	09/12/2019
BH005	20.30	Diametral	230.9	99.6	0.9	9922.2	0.09	1.36	0.12	Sandstone	09/12/2019
BH005	20.30	Axial	100.3	60.3	0.8	7696.6	0.11	1.29	0.136	Sandstone	09/12/2019
BH005	20.55	Diametral		99.9	2.0		0.2	1.37	0.27	Sandstone	
BH005	21.00	Axial	101.3	49.8	0.7	6427.7	0.1	1.24	0.129	Sandstone	09/12/2019
BH005	21.14	Diametral	148.6	100.2	0.5	10042.0	0.05	1.37	0.068	Sandstone	09/12/2019
BH005	21.14	Axial	100.4	51.4	0.5	6569.4	0.08	1.24	0.096	Sandstone	09/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

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Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588	

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POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH005	21.35	Axial	100.2	68.5	0.3	8739.9	0.04	1.33	0.052	Sandstone	09/12/2019
BH007	8.10	Diametral	117.4	91.5	0.0	8372.3	2.508	1.313	0.003	Sandstone	03/12/2019
BH007	8.10	Axial	98.8	55.2	0.1	6943.9	0.021	1.258	0.026	Sandstone	03/12/2019
BH007	8.30	Axial	98.1	74.4	0.0	9292.9	0.004	1.344	0.005	Sandstone	03/12/2019
BH007	8.50	Axial	100.5	29.5	0.1	3774.8	0.016	1.097	0.018	Sandstone	03/12/2019
BH007	8.55	Axial	100.0	38.7	0.0	4927.4	0.004	1.165	0.004	Sandstone	03/12/2019
BH007	8.60	Diametral	115.3	92.8	0.0	8611.8	0.002	1.321	0.002	Sandstone	03/12/2019
BH007	8.60	Axial	100.9	31.8	0.0	4085.3	0.011	1.117	0.012	Sandstone	03/12/2019
BH007	8.80	Diametral	111.9	87.1	0.2	7586.4	0.023	1.284	0.03	Sandstone	03/12/2019
BH007	8.80	Axial	98.8	53.4	0.2	6717.5	0.028	1.249	0.035	Sandstone	03/12/2019
BH007	9.15	Axial	104.6	39.3	0.2	5234.0	0.029	1.181	0.034	Sandstone/Clay	03/12/2019
BH007	9.60	Axial	98.3	44.1	0.3	5519.5	0.05	1.195	0.06	Sandstone	03/12/2019
BH007	9.65	Diametral	105.2	92.8	0.0	8611.8	0.004	1.321	0.005	Sandstone	03/12/2019
BH007	9.65	Axial	100.1	39.6	0.2	5047.1	0.035	1.171	0.041	Sandstone	03/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/6	Signed [redacted]	Name :- M. SELKIRK	Page 6 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH007	9.80	Axial	100.6	72.4	0.5	9273.6	0.049	1.343	0.066	Sandstone	03/12/2019
BH007	9.90	Diametral	104.9	91.2	0.1	8317.4	0.013	1.311	0.017	Sandstone	03/12/2019
BH007	9.90	Axial	99.3	43.0	0.2	5436.6	0.031	1.191	0.037	Sandstone	03/12/2019
BH007	11.00	Diametral	105.9	95.3	0.2	9082.1	0.021	1.337	0.028	Sandstone	03/12/2019
BH007	11.00	Axial	99.8	41.3	0.1	5248.0	0.015	1.182	0.018	Sandstone	03/12/2019
BH007	13.10	Diametral		99.8	2.1		0.21	1.36	0.29	Sandstone	
BH011	8.45	Axial	99.7	86.4	0.2	10967.8	0.02	1.395	0.028	Sandstone	03/12/2019
BH011	8.50	Axial	96.6	39.7	0.4	4882.9	0.084	1.163	0.098	Sandstone	03/12/2019
BH011	8.80	Axial	99.3	75.9	0.7	9596.2	0.072	1.353	0.097	Sandstone	03/12/2019
BH011	9.17	Diametral	120.5	97.4	0.3	9486.8	0.027	1.35	0.036	Sandstone	03/12/2019
BH011	9.17	Axial	100.0	53.5	1.0	6811.8	0.143	1.253	0.179	Sandstone	03/12/2019
BH011	9.35	Diametral	107.9	97.2	0.3	9447.8	0.036	1.349	0.049	Sandstone	03/12/2019
BH011	9.35	Axial	101.8	36.4	0.3	4718.0	0.07	1.154	0.081	Sandstone	03/12/2019
BH011	9.50	Diametral	103.8	97.2	0.1	9447.8	0.012	1.349	0.016	Sandstone	03/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/7	Signed :- [redacted]	Name :- M. SELKIRK	Page 7 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH011	9.50	Axial	101.3	37.0	0.5	4772.2	0.102	1.157	0.118	Sandstone	03/12/2019
BH011	9.65	Diametral	112.7	96.4	0.5	9293.0	0.056	1.344	0.075	Sandstone	03/12/2019
BH011	9.65	Axial	101.5	43.5	0.8	5621.7	0.146	1.2	0.175	Sandstone	03/12/2019
BH011	10.00	Diametral	151.2	92.1	0.3	8482.4	0.033	1.316	0.043	Sandstone	03/12/2019
BH011	10.00	Axial	99.4	41.4	0.3	5239.6	0.059	1.181	0.07	Sandstone	03/12/2019
BH011	11.10	Diametral	104.4	95.4	0.4	9101.2	0.043	1.337	0.058	Sandstone	03/12/2019
BH011	11.10	Axial	100.7	32.9	0.7	4218.3	0.162	1.125	0.182	Sandstone	03/12/2019
BH011	11.30	Irregular Lump	98.5	75.1	1.3	9418.6	0.14	1.348	0.189	Sandstone#	03/12/2019
BH011	12.30	Axial	100.9	71.2	1.6	9147.1	0.179	1.339	0.24	Sandstone	04/12/2019
BH011	12.36	Axial	102.2	36.7	0.5	4775.6	0.095	1.157	0.11	Sandstone	04/12/2019
BH011	12.40	Diametral	106.5	98.7	0.5	9741.7	0.047	1.358	0.064	Sandstone	04/12/2019
BH011	12.40	Axial	101.1	39.3	0.9	5058.9	0.17	1.172	0.199	Sandstone	04/12/2019
BH011	12.50	Diametral	140.2	92.2	0.3	8500.9	0.033	1.317	0.043	Sandstone	04/12/2019
BH011	12.50	Axial	101.1	48.3	0.8	6217.4	0.127	1.228	0.156	Sandstone	04/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/8	Signed :- [redacted]	Name :-	Page 8 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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M SELKIRK

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Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH011	12.75	Diametral	102.6	91.3	0.9	8335.7	0.112	1.311	0.147	Sandstone	04/12/2019
BH011	12.75	Axial	100.7	49.7	0.4	6372.3	0.06	1.234	0.074	Sandstone	04/12/2019
BH013	10.85	Diametral	103.0	89.7	0.2	8046.1	0.025	1.301	0.033	Sandstone	02/12/2019
BH013	10.85	Axial	98.7	39.7	1.3	4989.1	0.26	1.17	0.298	Sandstone	02/12/2019
BH013	11.00	Diametral	159.1	99.4	0.8	9880.4	0.082	1.362	0.112	Sandstone	02/12/2019
BH013	11.00	Axial	101.1	40.4	0.9	5200.5	0.176	1.179	0.208	Sandstone	02/12/2019
BH013	11.30	Axial	100.7	40.9	0.5	5244.0	0.095	1.181	0.112	Sandstone	02/12/2019
BH013	11.40	Diametral	108.6	92.8	0.6	8611.8	0.064	1.321	0.085	Sandstone	02/12/2019
BH013	11.40	Axial	106.9	43.0	0.5	5852.7	0.085	1.211	0.103	Sandstone	02/12/2019
BH013	11.65	Axial	100.7	63.9	0.9	8193.0	0.109	1.306	0.142	Sandstone	02/12/2019
BH013	11.70	Diametral	122.4	91.0	0.2	8281.0	0.02	1.309	0.026	Sandstone	02/12/2019
BH013	11.70	Axial	99.2	49.4	0.5	6239.5	0.078	1.228	0.096	Sandstone	02/12/2019
BH013	12.00	Diametral	137.4	93.9	0.2	8817.2	0.027	1.328	0.036	Sandstone	04/12/2019
BH013	12.00	Axial	98.2	50.7	0.7	6339.1	0.103	1.233	0.127	Sandstone	04/12/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/9	Signed [redacted]	Name :- M. SELKIRK	Page 9 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
BH013	12.40	Diametral	132.8	93.1	0.1	8667.6	0.013	1.323	0.017	Sandstone	04/12/2019
BH013	12.40	Axial	100.6	48.0	0.9	6148.2	0.152	1.224	0.186	Sandstone	04/12/2019
BH013	12.60	Diametral	140.9	92.7	1.2	8593.3	0.138	1.32	0.182	Sandstone	04/12/2019
BH013	12.60	Axial	100.9	41.9	1.0	5382.9	0.191	1.188	0.227	Sandstone	04/12/2019
BH013	14.00	Diametral	103.3	94.2	0.8	8873.6	0.092	1.33	0.122	Sandstone	04/12/2019
BH013	14.00	Axial	97.8	41.8	0.4	5205.1	0.078	1.179	0.092	Sandstone	04/12/2019
BH013	15.40	Diametral	109.9	94.8	0.9	8987.0	0.103	1.334	0.137	Sandstone	04/12/2019
BH013	15.40	Axial	99.2	51.0	1.0	6441.6	0.162	1.237	0.2	Sandstone	04/12/2019
HC001	0.00	Irregular Lump	106.3	46.3	7.0	6266.5	1.117	1.23	1.375	Brick	25/11/2019
HC001	0.35	Irregular Lump	100.2	64.2	0.9	8190.5	0.111	1.306	0.145	Brick#	02/12/2019
HC001	0.70	Irregular Lump	118.4	56.1	1.7	8457.2	0.199	1.315	0.262	Brick	02/12/2019
HC001	0.80	Irregular Lump	196.9	42.9	4.8	10755.1	0.442	1.389	0.614	Brick	02/12/2019
HC001	1.35	Irregular Lump	103.1	29.7	2.0	3898.7	0.512	1.105	0.566	Brick	02/12/2019
HC002	0.00	Irregular Lump	145.1	35.2	1.9	6503.1	0.298	1.24	0.37	Brick#	25/11/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/10	Signed [redacted]	Name :-	Page 10 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

POINT LOAD STRENGTH INDEX

ISRM : 1985

Exploratory Hole No	Depth (m)	Type/ Orientation	Width (mm)	Platen Separation (mm)+	Failure Load (kN)*	De^2 (mm^2)	Point Load (IS) (MPa)	Size Factor	Point Load Index (IS50) (MPa)	Type	Date Tested
HC002	0.50	Irregular Lump	157.1	48.7	2.5	9741.3	0.26	1.358	0.353	Brick	02/12/2019
HC002	0.80	Irregular Lump	70.8	57.9	2.8	5224.6	0.54	1.18	0.639	Brick	02/12/2019
HC002	1.00	Irregular Lump	88.9	49.3	2.1	5580.3	0.361	1.198	0.432	Brick	02/12/2019
HC002	1.30	Irregular Lump	100.9	44.3	2.9	5691.2	0.511	1.203	0.615	Brick#	02/12/2019
HC003	0.00	Irregular Lump	128.6	38.7	8.8	6336.7	1.388	1.234	1.711	Brick	25/11/2019
HC003	0.00	Irregular Lump	108.6	21.9	2.2	3028.2	0.732	1.044	0.764	Brick	25/11/2019
HC003	0.00	Irregular Lump	115.9	29.8	5.2	4397.5	1.176	1.135	1.335	Brick	25/11/2019
HC003	0.00	Irregular Lump	87.3	39.3	2.4	4368.3	0.541	1.134	0.613	Brick	25/11/2019
HC003	0.00	Irregular Lump	80.2	32.9	2.5	3359.5	0.74	1.07	0.789	Brick#	25/11/2019
HC004	0.23	Diametral	128.8	67.2	11.1	4515.9	2.458	1.142	2.808	Concrete	25/11/2019
HC004	0.23	Diametral	89.8	67.6	10.0	4569.8	2.19	1.145	2.508	Concrete	25/11/2019
HC004	0.23	Axial	86.9	49.8	9.3	5510.1	1.696	1.195	2.026	Concrete	25/11/2019

NOTES - +Tested specimen measured using calibrated vernier calipers *Loads of less than 10kN Outside of UKAS accreditation #-Invalid Failure (Did not pass through both points) !-Too soft to register a reading

Date of issue :- 22/01/2020	Certificate No :- PL/NW1588/11	Signed [redacted]	Name :- M. SLURK	Page 11 of 11
Client :- University of Manchester	Contract Title :- ID Manchester Preliminary Ground Investigation			AEG Contract No :- NW1588

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GSTL	Point Load Test Int. J. Rock Mech. Sci. & Geomech. Abstr. Vol. 22, No. 2, pp. 51 - 60, 1985.	
Contract Number	47038	
Site Name	ID Manchester Preliminary Ground Investigation	
Sample Type	Core	
Date Tested	06/01/2020	
	*Please note that GSTL is not accredited for the water content of rock	

Hole Reference	Depth (m)			Test Type d / a / b / i	Test Type I //	Width	Platen Seperation	Failure Load	Equivalent Diameter	Point Load	Size Factor	Point Load Index	Moisture Content	Description	Angle Between Plane of Anisotropy & Core Axis	Type of Anisotropy (Bedding or Cleavage)
BH005	14.60	-		d			99.6	1.37		0.14	1.36	0.19	14.9	SANDSTONE		
BH005	20.55	-		d			99.9	2.00		0.20	1.37	0.27	15.0	SANDSTONE		
BH007	13.10	-		d			99.8	2.10		0.21	1.36	0.29	13.7	SANDSTONE		

Key	Reported As
Width	(W) mm
Platen Separation	(D) mm
Failure Load	(P) kN
Equivalent Diameter	(De) mm
Point Load	(Is) MPa
Size Factor	(F)
Point Load Index	(Is(50)) MPa
Moisture Content	%
Description	SC

Operators	Checked	08.01.2020	Emma Sharp	
KS	Approved	09.01.2020	Paul Evans	

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LABORATORY TESTING ENCLOSURE 10

Determination of Unconfined Compressive Strength
(Tested Externally)

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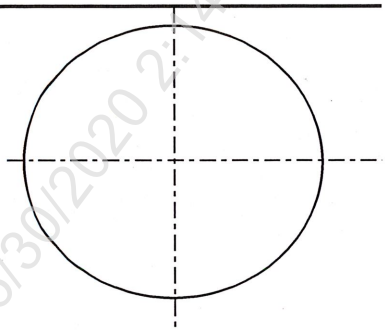
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Test Report: **Testing concrete in structures. Cored specimens. Taking, examining and testing in compression BS EN 12504-1:2009 & BS EN 12390-3: 2009**

Client:	AEG
Client Ref:	NW1588
Contract Number:	47038
Location	ID Manchester Preliminary Ground Investigation

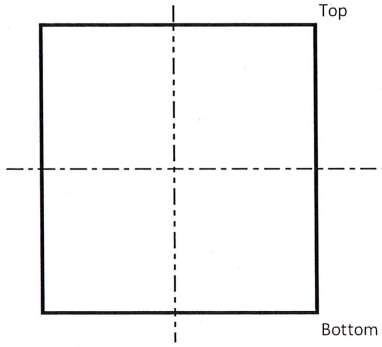
Core Description	Concrete Core
Sample Number	HC004
Maximum aggregate Size (mm)	29
Direction of coring	Unknown
Date cored	Unknown
Date of Test	06/01/2020
Method used for Preparation	Cutting
Condition On Test	Surface Dry
Core Density (kg/m^3)	2310
Density Condition	As received



Vertical re-bar	
From Centre (mm)	n/a
Horizontal Rebar	
From Top (mm)	n/a
From Centre (mm)	n/a
Re-bar Diameter (mm)	n/a

Measurement Dimensions: BS EN 12390-1: 2012

Size of sample Received in Lab (mm)	Diameter	86.1
	Length	238.0
Size of sample tested (mm)	Diameter	86.1
	Length	86.1
Length Diameter ratio of prepared specimen:		1.00



Compression: BS EN 12390-3:2009

Compressive Strength N/mm2	25.9
Appearance of concrete and Type of Fracture	Satisfactory
Compaction of concrete, classification of void %	0.5
Any Deviations from the standard Method of Testing [1]	n/a

Remarks:

[1] All the testing was carried out in accordance with BS EN 12390-3: 2009 except as detailed

Technician Responsible
Kyle Simmonite

For and behalf of GEO Site & Testing Services Ltd

Checked by:
Wayne Honey Administrative/Quality Assistant

[redacted]

GSTL
GEO SITE & TESTING SERVICES LTD

Date: 9.1.20

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2788

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APPENDIX I

Specialist Chemical Testing

(Tested Externally)

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Certificate of Analysis

Certificate Number 20-01032

27-Jan-20

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	20-01032
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	5 Water samples.
Date Received	20-Jan-20
Date Started	20-Jan-20
Date Completed	27-Jan-20
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

A [redacted]

Adam Fenwick
Contracts Manager

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Summary of Chemical Analysis
Water Samples

Our Ref 20-01032
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

				Lab No	1625617	1625618	1625619	1625620	1625621
				Sample ID	BH001	BH004	BH005	BH007	BH011
				Depth	9.50-15.50	6.06-14.00	5.60-21.50	6.07-13.60	7.40-12.40
				Other ID	100	100	100	100	100
				Sample Type	EW	EW	EW	EW	EW
				Sampling Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Antimony, Dissolved	DETSC 2306	0.17	ug/l	0.25	0.18	0.23	0.18	0.28
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.82	4.7	0.54	15	0.57
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1	< 0.1	0.2	< 0.1	0.5
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.26	< 0.03	0.38
Calcium, Dissolved	DETSC 2306	0.09	mg/l	43	140	11	83	130
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.63	< 0.25	< 0.25	0.32	1.1
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.0	< 0.4	1.0	< 0.4	0.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.21	0.12	0.26	0.31	3100
Manganese, Dissolved	DETSC 2306	0.22	ug/l	780	1900	170	2600	210
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.3	1.0	8.6	2.3	3.7
Selenium, Dissolved	DETSC 2306	0.25	ug/l	2.6	1.5	0.87	0.81	2.4
Tin, Dissolved	DETSC 2306*	0.4	ug/l	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	1.3	0.6	1.0	< 0.6	0.9
Zinc, Dissolved	DETSC 2306	1.3	ug/l	7.8	3.9	8.8	13	45
Inorganics									
pH	DETSC 2008		pH	6.7	6.7	6.9	6.8	4.8
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	1000
Dissolved Organic Carbon	DETSC 2085	2	mg/l	< 2.0	2.3	< 2.0	< 2.0	< 2.0
Hardness	DETSC 2303	0.1	mg/l	170	420	39.6	246	349
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	0.53	0.027	< 0.015	0.31
Chloride	DETSC 2055	0.1	mg/l	26	32	30	24	180
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	2.7	2.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	3.9	< 0.1	< 0.1	7.9	9.7
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C35-C44	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C35-C44	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

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Summary of Chemical Analysis
Water Samples

Our Ref 20-01032
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No				1625617	1625618	1625619	1625620	1625621
Sample ID				BH001	BH004	BH005	BH007	BH011
Depth				9.50-15.50	6.06-14.00	5.60-21.50	6.07-13.60	7.40-12.40
Other ID				100	100	100	100	100
Sample Type				EW	EW	EW	EW	EW
Sampling Date				16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020
Sampling Time				n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	4.9	< 0.05	0.42	0.12
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	0.09	< 0.01	0.02	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.37	< 0.01	0.36	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.01	0.27	< 0.01	0.15	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	0.56	< 0.01	0.42	0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	0.08	< 0.01	0.07	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.10	< 0.01	0.09	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.08	< 0.01	0.07	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	6.4	< 0.20	1.6	< 0.20
Phenols								
Phenols, Total	DETSC 3451*	2	ug/l	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

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Summary of Chemical Analysis
Water Samples

Our Ref 20-01032
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1625617	1625618	1625619	1625620	1625621
Sample ID	BH001	BH004	BH005	BH007	BH011
Depth	9.50-15.50	6.06-14.00	5.60-21.50	6.07-13.60	7.40-12.40
Other ID	100	100	100	100	100
Sample Type	EW	EW	EW	EW	EW
Sampling Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
VOCs								
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	1	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1

Key: * -not accredited. n/s -not supplied.

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Preliminary Ground Investigation Interpretive Report and Final Factual Report.pdf - Page 535

Summary of Chemical Analysis
Water Samples

Our Ref 20-01032
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1625617	1625618	1625619	1625620	1625621
			Sample ID	BH001	BH004	BH005	BH007	BH011
			Depth	9.50-15.50	6.06-14.00	5.60-21.50	6.07-13.60	7.40-12.40
			Other ID	100	100	100	100	100
			Sample Type	EW	EW	EW	EW	EW
			Sampling Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
SVOCs								
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Key: * -not accredited. n/s -not supplied.

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Summary of Chemical Analysis

Water Samples

Our Ref 20-01032
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

	Lab No	1625617	1625618	1625619	1625620	1625621
	Sample ID	BH001	BH004	BH005	BH007	BH011
	Depth	9.50-15.50	6.06-14.00	5.60-21.50	6.07-13.60	7.40-12.40
	Other ID	100	100	100	100	100
	Sample Type	EW	EW	EW	EW	EW
	Sampling Date	16/01/2020	17/01/2020	17/01/2020	17/01/2020	17/01/2020
	Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Information in Support of the Analytical Results

Our Ref 20-01032
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1625617	BH001 9.50-15.50 WATER	16/01/20	GB 1L x3, GV x4, PB 1L		
1625618	BH004 6.06-14.00 WATER	17/01/20	GB 1L x3, GV x4, PB 1L		
1625619	BH005 5.60-21.50 WATER	17/01/20	GB 1L x3, GV x4, PB 1L		
1625620	BH007 6.07-13.60 WATER	17/01/20	GB 1L x3, GV x4, PB 1L		
1625621	BH011 7.40-12.40 WATER	17/01/20	GB 1L x3, GV x4, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Certificate of Analysis

Certificate Number 20-00912-1

14-Apr-20

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	20-00912-1
Client Reference	1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	One Water sample.
Date Received	17-Jan-20
Date Started	17-Jan-20
Date Completed	14-Apr-20
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 20-00912, amendments.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

[redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
2139

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Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Antimony, Dissolved	DETSC 2306	0.17	ug/l	0.53
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.78
Beryllium, Dissolved	DETSC 2306*	0.1	ug/l	< 0.1
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.04
Calcium, Dissolved	DETSC 2306	0.09	mg/l	140
Chromium, Dissolved	DETSC 2306	0.25	ug/l	9.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.33
Manganese, Dissolved	DETSC 2306	0.22	ug/l	52
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	22
Tin, Dissolved	DETSC 2306*	0.4	ug/l	0.6
Vanadium, Dissolved	DETSC 2306	0.6	ug/l	0.8
Zinc, Dissolved	DETSC 2306	1.3	ug/l	10
Inorganics				
pH	DETSC 2008		pH	7.0
Cyanide, Total	DETSC 2130	40	ug/l	78
Dissolved Organic Carbon	DETSC 2085	2	mg/l	2.6
Hardness	DETSC 2303	0.1	mg/l	405
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.025
Chloride	DETSC 2055	0.1	mg/l	36

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Key: * -not accredited. n/s -not supplied.

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Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	3.4
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C35-C44	DETSC 3072*	1	ug/l	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0
Aromatic C35-C44	DETSC 3072*	1	ug/l	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0
PAHs				
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01

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Key: * -not accredited. n/s -not supplied.

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Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

ID Manchester Preliminary
Contract Title Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20

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Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Phenols				
Phenols, Total	DETSC 3451*	2	ug/l	< 2.0
VOCs				
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1
2,2-dichloropropane	DETSC 3432	2	ug/l	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4
Chloroform	DETSC 3432	1	ug/l	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1
Benzene	DETSC 3432	1	ug/l	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
Toluene	DETSC 3432	1	ug/l	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1

Key: * -not accredited. n/s -not supplied.

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Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

ID Manchester Preliminary
Contract Title Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
Styrene	DETSC 3432	1	ug/l	< 1
Bromoform	DETSC 3432	1	ug/l	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1
MTBE	DETSC 3432*	1	ug/l	< 1
SVOCs				
Phenol	DETSC 3434*	1	ug/l	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0

Key: * -not accredited. n/s -not supplied.

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ID Planning Ltd - Christine Campbell, Brunswood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

Summary of Chemical Analysis
Water Samples

Our Ref 20-00912-1
Client Ref 1588

ID Manchester Preliminary
Contract Title Ground Investigation

Lab No	1624853
Sample ID	BH013
Depth	5.30-16.50
Other ID	100
Sample Type	EW
Sampling Date	16/01/2020
Sampling Time	n/s

Test	Method	LOD	Units	
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0

ID Manchester - Christine Campbell - Brynwood Sci Tech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Information in Support of the Analytical Results

Our Ref 20-00912-1
Client Ref 1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1624853	BH013 5.30-16.50 WATER	16/01/20	GB 1L x3, GV x4, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

ID Manchester - Christine Campbell - Bruntwood SciTech - 03/09/2020 2:04:30 PM - 81.154.246.72

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Certificate of Analysis

Certificate Number 19-25005-1

17-Dec-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	19-25005-1
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investiagtion
Description	2 Soil samples.
Date Received	06-Dec-19
Date Started	06-Dec-19
Date Completed	17-Dec-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	**This report supersedes 19-25005, amendments.** Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Ap [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

ID Manchester - e Compliant - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 19-25005-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiagtion

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
DS001	5	0.6	1608858	13/12/2019	Dark brown gravelly, clayey SAND
DS002	3	0.8	1608859	13/12/2019	Dark brown gravelly, clayey SAND (Possible made ground - brick)

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-25005-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiagtion

			Lab No	1608858	1608859
			Sample ID	DS001	DS002
			Depth	0.60	0.80
			Other ID	5	3
			Sample Type	ES	ES
			Sampling Date	30/11/19	01/12/19
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Asbestos Quantification	DETSC 1102	0		Y	
Metals					
Antimony	DETSC 2301*	1	mg/kg	3.5	260
Arsenic	DETSC 2301#	0.2	mg/kg	32	56
Beryllium	DETSC 2301#	0.2	mg/kg	0.8	1.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.4	1.0
Cadmium	DETSC 2301#	0.1	mg/kg	1.2	1.2
Chromium	DETSC 2301#	0.15	mg/kg	27	33
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	80	160
Lead	DETSC 2301#	0.3	mg/kg	330	2400
Mercury	DETSC 2325#	0.05	mg/kg	0.37	1.1
Nickel	DETSC 2301#	1	mg/kg	17	26
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Tin	DETSC 2301	1	mg/kg	53	330
Vanadium	DETSC 2301#	0.8	mg/kg	28	36
Zinc	DETSC 2301#	1	mg/kg	210	470
Inorganics					
pH	DETSC 2008#		pH	10.7	8.2
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.6	1.6
Total Organic Carbon	DETSC 2002	0.1	%	1.1	1.8
Petroleum Hydrocarbons					
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.16
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.03	0.25
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.30
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.22	2.7
Anthracene	DETSC 3303	0.03	mg/kg	0.04	0.56
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.39	3.4
Pyrene	DETSC 3303#	0.03	mg/kg	0.37	3.2
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.13	1.0
Chrysene	DETSC 3303	0.03	mg/kg	0.18	1.2
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	1.1
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	0.44
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.11	0.88
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.06	0.32

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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ID Manchester - Christine Campbell - Brunel Geotech - 6/30/2020 2:14:30 PM - 81.154.246.72

Summary of Chemical Analysis

Soil Samples

Our Ref 19-25005-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiagtion

			Lab No	1608858	1608859
			Sample ID	DS001	DS002
			Depth	0.60	0.80
			Other ID	5	3
			Sample Type	ES	ES
			Sampling Date	30/11/19	01/12/19
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.10
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.06	0.41
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.8	16
Phenols					
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/3/2020 2:14:30 PM - 81.154.246.72

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Summary of Asbestos Analysis

Soil Samples

Our Ref 19-25005-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiagtion

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1608858	DS001 5 0.60	SOIL	Amosite	Bundle of Amosite	Michael Kay
1608859	DS002 3 0.80	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.248.72

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Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 19-25005-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiagtion

Lab No	1608858
Sample ID	DS001
Depth	0.60
Other ID	5
Sample Type	SOIL
Sampling Date	30/11/19
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	564.66
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	0.001
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

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Information in Support of the Analytical Results

Our Ref 19-25005-1
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investiagtion

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1608858	DS001 0.60 SOIL	30/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1608859	DS002 0.80 SOIL	01/12/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

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Certificate of Analysis

Certificate Number	19-23765
	02-Dec-19
Client	Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG
Our Reference	19-23765
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	3 Soil samples.
Date Received	22-Nov-19
Date Started	22-Nov-19
Date Completed	02-Dec-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Appr [redacted]

Adam Fenwick
Contracts Manager

UKAS TESTING
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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23765
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1601468	1601469	1601470
Sample ID	BH005	BH006A	BH006B
Depth	1.00	1.00	0.60
Other ID	5	5	4
Sample Type	ES	ES	ES
Sampling Date	16/11/19	17/11/19	17/11/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Antimony	DETSC 2301*	1	mg/kg	3.0	9.1	< 1.0
Arsenic	DETSC 2301#	0.2	mg/kg	35	25	7.8
Beryllium	DETSC 2301#	0.2	mg/kg	1.1	0.8	0.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3	1.2	0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.8	0.8
Chromium	DETSC 2301#	0.15	mg/kg	25	17	8.2
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	130	76	22
Lead	DETSC 2301#	0.3	mg/kg	110	180	30
Mercury	DETSC 2325#	0.05	mg/kg	0.13	0.39	0.05
Nickel	DETSC 2301#	1	mg/kg	31	19	6.1
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.5
Tin	DETSC 2301	1	mg/kg	13	18	4.7
Vanadium	DETSC 2301#	0.8	mg/kg	35	27	11
Zinc	DETSC 2301#	1	mg/kg	96	130	35
Inorganics						
pH	DETSC 2008#		pH	8.4	9.0	11.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	11	0.5
Total Organic Carbon	DETSC 2002	0.1	%	1.7	1.4	0.4
Petroleum Hydrocarbons						
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.21	0.05
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.13	0.04
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.11	1.0	0.54
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.33	0.10
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.12	1.5	0.81
Pyrene	DETSC 3303#	0.03	mg/kg	0.12	1.6	0.82
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	0.38	0.27
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.48	0.32
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	0.42	0.24
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.16	0.10
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.32	0.21
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.10
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.14	0.11
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.47	6.9	3.7

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Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23765
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1601468	1601469	1601470
			Sample ID	BH005	BH006A	BH006B
			Depth	1.00	1.00	0.60
			Other ID	5	5	4
			Sample Type	ES	ES	ES
			Sampling Date	16/11/19	17/11/19	17/11/19
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Phenols						
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0
VOCs						
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01
SVOCs						
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23765
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1601468	1601469	1601470
			Sample ID	BH005	BH006A	BH006B
			Depth	1.00	1.00	0.60
			Other ID	5	5	4
			Sample Type	ES	ES	ES
			Sampling Date	16/11/19	17/11/19	17/11/19
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	0.2	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	0.1	< 0.1

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Summary of Asbestos Analysis
Soil Samples

Our Ref 19-23765
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1601468	BH005 5 1.00	SOIL	NAD	none	Michael Kay
1601469	BH006A 5 1.00	SOIL	NAD	none	Michael Kay
1601470	BH006B 4 0.60	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

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Information in Support of the Analytical Results

Our Ref 19-23765
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1601468	BH005 1.00 SOIL	16/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1601469	BH006A 1.00 SOIL	17/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1601470	BH006B 0.60 SOIL	17/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

Disposal

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

ID Manchester - Christine Campbell - Brunswood SciTech 03/03/2020 2:04:30 PM - 81.154.248.72

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Certificate of Analysis

Certificate Number	19-23099-1
	26-Nov-19
Client	Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG
Our Reference	19-23099-1
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	7 Soil samples.
Date Received	13-Nov-19
Date Started	14-Nov-19
Date Completed	26-Nov-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	**This report supersedes 19-23099, amendments.** Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.
Approved By	

UKAS TESTING
2139

Derwentside Environmental Testing Services Limited
Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY
Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

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ID Manchester - Christine Campbell - Bruntwood SciTech - 6/30/2020 2:14:30 PM - 81.154.246.72

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1597114	1597115	1597116	1597117	1597118	1597119
			Sample ID	BH007	BH007	BH008	BH008	BH009	BH011
			Depth	1.00	3.30	2.20	5.20	2.60	1.00
			Other ID	5	12	7	17	9	4
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/11/19	09/11/19	10/11/19	10/11/19	10/11/19	09/11/19
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Asbestos Quantification	DETSC 1102	0			Y				
Metals									
Antimony	DETSC 2301*	1	mg/kg	< 1.0	2.2	2.9	3.9	1.7	1.5
Arsenic	DETSC 2301#	0.2	mg/kg	7.7	18	22	28	18	12
Beryllium	DETSC 2301#	0.2	mg/kg	0.3	0.6	0.9	0.9	1.0	0.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	< 0.2	0.4	0.5	0.4	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.4	0.4	0.5	0.7	0.9
Chromium	DETSC 2301#	0.15	mg/kg	11	20	33	29	15	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	56	65	87	30	32
Lead	DETSC 2301#	0.3	mg/kg	100	140	160	250	120	150
Mercury	DETSC 2325#	0.05	mg/kg	0.07	0.20	0.30	0.41	0.10	0.22
Nickel	DETSC 2301#	1	mg/kg	7.9	16	22	20	11	9.2
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.5	< 0.5	0.9
Tin	DETSC 2301	1	mg/kg	11	16	28	41	15	14
Vanadium	DETSC 2301#	0.8	mg/kg	14	17	29	25	16	15
Zinc	DETSC 2301#	1	mg/kg	36	86	100	130	170	60
Inorganics									
pH	DETSC 2008#		pH	7.9	11.6	9.6	9.2	8.6	11.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.4	0.3	0.3	0.4	0.5	< 0.1
Total Organic Carbon	DETSC 2002	0.1	%	1.6	0.9	2.4	2.1	0.5	0.3
Petroleum Hydrocarbons									
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.53	0.25	5.7	4.2	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	1.1	< 0.03	0.37	0.16	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.53	0.23	4.2	4.6	< 0.03	0.10
Fluorene	DETSC 3303	0.03	mg/kg	0.38	0.14	3.7	3.6	< 0.03	0.09
Phenanthrene	DETSC 3303#	0.03	mg/kg	5.6	1.4	24	24	0.09	1.6
Anthracene	DETSC 3303	0.03	mg/kg	1.4	0.37	5.7	6.3	< 0.03	0.34
Fluoranthene	DETSC 3303#	0.03	mg/kg	20	1.5	21	21	0.11	1.9
Pyrene	DETSC 3303#	0.03	mg/kg	21	1.4	21	20	0.09	1.8
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	11	0.56	9.6	8.6	0.07	0.78
Chrysene	DETSC 3303	0.03	mg/kg	9.3	0.43	7.3	6.9	0.05	0.73
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	12	0.46	6.4	6.7	0.04	0.69
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	6.9	0.20	3.0	2.8	< 0.03	0.29
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	12	0.43	6.7	6.3	< 0.03	0.59
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	5.0	0.12	1.7	2.0	< 0.03	0.21

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Summary of Chemical Analysis

Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1597114	1597115	1597116	1597117	1597118	1597119
			Sample ID	BH007	BH007	BH008	BH008	BH009	BH011
			Depth	1.00	3.30	2.20	5.20	2.60	1.00
			Other ID	5	12	7	17	9	4
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	08/11/19	09/11/19	10/11/19	10/11/19	10/11/19	09/11/19
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	1.0	< 0.03	0.45	0.36	< 0.03	0.06
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	7.3	0.14	2.3	2.7	< 0.03	0.22
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	110	7.6	120	120	0.45	9.4
Phenols									
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiga

Lab No	1597120
Sample ID	BH011
Depth	3.60
Other ID	11
Sample Type	ES
Sampling Date	09/11/19
Sampling Time	n/s

Test	Method	LOD	Units	
Asbestos Quantification	DETSC 1102	0		
Metals				
Antimony	DETSC 2301*	1	mg/kg	< 1.0
Arsenic	DETSC 2301#	0.2	mg/kg	16
Beryllium	DETSC 2301#	0.2	mg/kg	1.2
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.4
Chromium	DETSC 2301#	0.15	mg/kg	11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	440
Lead	DETSC 2301#	0.3	mg/kg	290
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05
Nickel	DETSC 2301#	1	mg/kg	17
Selenium	DETSC 2301#	0.5	mg/kg	1.1
Tin	DETSC 2301	1	mg/kg	4.5
Vanadium	DETSC 2301#	0.8	mg/kg	23
Zinc	DETSC 2301#	1	mg/kg	150
Inorganics				
pH	DETSC 2008#		pH	7.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1
Total Organic Carbon	DETSC 2002	0.1	%	0.2
Petroleum Hydrocarbons				
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.04
Pyrene	DETSC 3303#	0.03	mg/kg	0.04
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiga

Lab No	1597120
Sample ID	BH011
Depth	3.60
Other ID	11
Sample Type	ES
Sampling Date	09/11/19
Sampling Time	n/s

Test	Method	LOD	Units	
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.12
Phenols				
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0

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Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Asbestos Analysis

Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1597114	BH007 5 1.00	SOIL	NAD	none	D Wilkinson
1597115	BH007 12 3.30	SOIL	Chrysotile	Chrysotile present as microscopic loose fibrous asbestos debris	D Wilkinson
1597116	BH008 7 2.20	SOIL	NAD	none	D Wilkinson
1597117	BH008 17 5.20	SOIL	NAD	none	D Wilkinson
1597118	BH009 9 2.60	SOIL	NAD	none	D Wilkinson
1597119	BH011 4 1.00	SOIL	NAD	none	D Wilkinson
1597120	BH011 11 3.60	SOIL	NAD	none	D Wilkinson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

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Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 19-23099-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	1597115
Sample ID	BH007
Depth	3.30
Other ID	12
Sample Type	SOIL
Sampling Date	09/11/19
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**0.192**
Gravimetric Quantification (a)	DETSC 1102	Mass %	0.192
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	na
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na
Breakdown of Gravimetric Analysis (a)			
Mass of Sample		g	1024.85
ACMs present*		type	Insulation
Mass of ACM in sample		g	2.32
% ACM by mass		%	0.23
% asbestos in ACM		%	85.00
% asbestos in sample		%	0.19
Breakdown of Detailed Gravimetric Analysis (b)			
% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	na
Breakdown of PCOM Analysis (c)			
% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na
Breakdown of Potentially Respirable Fibre Analysis (d)			
Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

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Information in Support of the Analytical Results

Our Ref 19-23099-1
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1597114	BH007 1.00 SOIL	08/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597115	BH007 3.30 SOIL	09/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597116	BH008 2.20 SOIL	10/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597117	BH008 5.20 SOIL	10/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597118	BH009 2.60 SOIL	10/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597119	BH011 1.00 SOIL	09/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1597120	BH011 3.60 SOIL	09/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Certificate of Analysis

Certificate Number	19-22787-1
	26-Nov-19
Client	Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG
Our Reference	19-22787-1
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	7 Soil samples.
Date Received	08-Nov-19
Date Started	08-Nov-19
Date Completed	26-Nov-19
Test Procedures	Identified by prefix DETSn (details on request).
Notes	**This report supersedes 19-22787, extra testing.** Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Appr [redacted]

Adam Fenwick
Contracts Manager

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
BH002	4	1	1595310	15/11/2019	Dark brown gravelly, sandy CLAY (Possible made ground - brick)
BH002	8	2.5	1595311	15/11/2019	Dark brown gravelly, sandy CLAY (Possible made ground - brick)
BH004	9	2.3	1595312	15/11/2019	Dark brown gravelly, sandy CLAY (Possible made ground - brick)
BH004	17	5.3	1595313	15/11/2019	Dark brown red clayey, very gravelly SAND (Made ground - brick)
BH003	4	1	1595314	15/11/2019	Dark brown gravelly, sandy CLAY
BH003	11	3.5	1595315	15/11/2019	Dark brown gravelly, sandy CLAY
BH006	4	1.2	1595316	15/11/2019	Dark brown gravelly, sandy CLAY

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

				Lab No	1595310	1595311	1595312	1595313	1595314	1595315
				Sample ID	BH002	BH002	BH004	BH004	BH003	BH003
				Depth	1.00	2.50	2.30	5.30	1.00	3.50
				Other ID	4	8	9	17	4	11
				Sample Type	ES	ES	ES	ES	ES	ES
				Sampling Date	02/11/19	02/11/19	02/11/19	02/11/19	02/11/19	02/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Asbestos Quantification	DETSC 1102	0							Y	
Metals										
Antimony	DETSC 2301*	1	mg/kg	1.9	5.8	2.4	2.0	1.4	1.1
Arsenic	DETSC 2301#	0.2	mg/kg	7.7	21	9.4	13	10	8.2
Beryllium	DETSC 2301#	0.2	mg/kg	0.6	1.1	0.5	0.5	0.3	0.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.6	0.3	0.7	0.5	0.5	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.4	1.2	0.5	0.2	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	14	210	12	20	10	11
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	24	77	120	46	180	110
Lead	DETSC 2301#	0.3	mg/kg	110	150	400	98	88	59
Mercury	DETSC 2325#	0.05	mg/kg	0.05	0.23	0.43	< 0.05	1.6	0.06
Nickel	DETSC 2301#	1	mg/kg	15	30	9.8	13	9.5	8.7
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.3	1.1	0.7	0.9	< 0.5
Tin	DETSC 2301	1	mg/kg	2.6	31	8.2	12	17	11
Vanadium	DETSC 2301#	0.8	mg/kg	21	32	23	18	16	18
Zinc	DETSC 2301#	1	mg/kg	43	100	310	91	74	31
Inorganics										
pH	DETSC 2008#		pH	10.8	8.1	10.8	10.7	11.5	9.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	1.0	0.4	9.0	0.2	0.3
Total Organic Carbon	DETSC 2002	0.1	%	0.4	2.1	0.8	0.5	1.0	0.4
Petroleum Hydrocarbons										
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	0.61	< 0.03	< 0.03	3.7
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.10	< 0.03	< 0.03	0.09
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.12	< 0.03	1.2	< 0.03	0.08	2.4
Fluorene	DETSC 3303	0.03	mg/kg	0.09	< 0.03	1.0	< 0.03	0.08	2.5
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.84	0.08	8.5	0.21	0.67	12
Anthracene	DETSC 3303	0.03	mg/kg	0.17	< 0.03	1.4	< 0.03	0.17	3.2
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.5	0.09	9.8	0.30	1.9	9.5
Pyrene	DETSC 3303#	0.03	mg/kg	1.3	0.08	9.8	0.25	1.5	8.8
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.35	< 0.03	3.5	0.09	0.57	2.7
Chrysene	DETSC 3303	0.03	mg/kg	0.51	< 0.03	3.7	0.13	0.74	2.9
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.41	< 0.03	3.6	0.20	1.1	2.4
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	1.4	0.11	0.40	0.77
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.21	< 0.03	2.4	0.05	1.1	1.8
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.13	< 0.03	1.0	0.04	0.53	0.71
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.25	< 0.03	0.11	0.17
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	1.2	0.04	0.60	0.81

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

				Lab No	1595310	1595311	1595312	1595313	1595314	1595315
				Sample ID	BH002	BH002	BH004	BH004	BH003	BH003
				Depth	1.00	2.50	2.30	5.30	1.00	3.50
				Other ID	4	8	9	17	4	11
				Sample Type	ES	ES	ES	ES	ES	ES
				Sampling Date	02/11/19	02/11/19	02/11/19	02/11/19	02/11/19	02/11/19
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	5.9	0.24	49	1.4	9.6	55
Phenols										
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiga

Lab No	1595316
Sample ID	BH006
Depth	1.20
Other ID	4
Sample Type	ES
Sampling Date	02/11/19
Sampling Time	n/s

Test	Method	LOD	Units	
Asbestos Quantification	DETSC 1102	0		Y
Metals				
Antimony	DETSC 2301*	1	mg/kg	3.2
Arsenic	DETSC 2301#	0.2	mg/kg	20
Beryllium	DETSC 2301#	0.2	mg/kg	1.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.7
Chromium	DETSC 2301#	0.15	mg/kg	21
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	100
Lead	DETSC 2301#	0.3	mg/kg	270
Mercury	DETSC 2325#	0.05	mg/kg	0.48
Nickel	DETSC 2301#	1	mg/kg	28
Selenium	DETSC 2301#	0.5	mg/kg	1.5
Tin	DETSC 2301	1	mg/kg	20
Vanadium	DETSC 2301#	0.8	mg/kg	39
Zinc	DETSC 2301#	1	mg/kg	180
Inorganics				
pH	DETSC 2008#		pH	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	1.0
Total Organic Carbon	DETSC 2002	0.1	%	3.5
Petroleum Hydrocarbons				
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.29
Anthracene	DETSC 3303	0.03	mg/kg	0.08
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.72
Pyrene	DETSC 3303#	0.03	mg/kg	0.74
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.24
Chrysene	DETSC 3303	0.03	mg/kg	0.30
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.50
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.29
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.18
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.12
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.13

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investiga

Lab No	1595316
Sample ID	BH006
Depth	1.20
Other ID	4
Sample Type	ES
Sampling Date	02/11/19
Sampling Time	n/s

Test	Method	LOD	Units	
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	3.6
Phenols				
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0

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Summary of Asbestos Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1595310	BH002 4 1.00	SOIL	NAD	none	Michael Kay
1595311	BH002 8 2.50	SOIL	NAD	none	Michael Kay
1595312	BH004 9 2.30	SOIL	NAD	none	Michael Kay
1595313	BH004 17 5.30	SOIL	NAD	none	Michael Kay
1595314	BH003 4 1.00	SOIL	Amosite	Small bundle of Amosite	Michael Kay
1595315	BH003 11 3.50	SOIL	NAD	none	Michael Kay
1595316	BH006 4 1.20	SOIL	Amosite	Small bundle of Amosite	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

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Summary of Asbestos Quantification Analysis
Soil Samples

Our Ref 19-22787-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

		Lab No	1595314	1595316
		Sample ID	BH003	BH006
		Depth	1.00	1.20
		Other ID	4	4
		Sample Type	SOIL	SOIL
		Sampling Date	02/11/19	02/11/19
		Sampling Time		
Test	**Method**	**Units**		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	**< 0.001**	**< 0.001**
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na
Breakdown of Gravimetric Analysis (a)				
Mass of Sample		g	832.22	886.10
ACMs present*		type		
Mass of ACM in sample		g		
% ACM by mass		%		
% asbestos in ACM		%		
% asbestos in sample		%		
Breakdown of Detailed Gravimetric Analysis (b)				
% Amphibole bundles in sample		Mass %	<0.001	<0.001
% Chrysotile bundles in sample		Mass %	na	na
Breakdown of PCOM Analysis (c)				
% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na
Breakdown of Potentially Respirable Fibre Analysis (d)				
Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
% asbestos in Asbestos Containing Materials (ACMs) is determined by by reference to HSG 264.
Recommended sample size for quantification is approximately 1kg
# denotes deviating sample

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Information in Support of the Analytical Results

Our Ref 19-22787-1
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1595310	BH002 1.00 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595311	BH002 2.50 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595312	BH004 2.30 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595313	BH004 5.30 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595314	BH003 1.00 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595315	BH003 3.50 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1595316	BH006 1.20 SOIL	02/11/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

Disposal

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

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

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Certificate of Analysis

Certificate Number 19-22333-2

10-Jan-20

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference	19-22333-2
Client Reference	NW1588
Order No	CH1547
Contract Title	ID Manchester Preliminary Ground Investigation
Description	8 Soil samples.
Date Received	05-Nov-19
Date Started	05-Nov-19
Date Completed	10-Jan-20
Test Procedures	Identified by prefix DETSn (details on request).

Notes **This report supersedes 19-22333-1, amendments.**

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Ap [redacted]

Adam Fenwick
Contracts Manager

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THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 19-22333-2
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
BH013	4	1	1592554	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
BH013	11	3.5	1592555	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
BH014	5	0.7	1592556	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
BH014	15	4	1592557	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
TP001	6	0.8	1592558	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
TP002	6	1	1592559	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
TP002	12	2.5	1592560	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)
TP003	9	1	1592561	20/11/2019	Dark red and brown slightly clayey, very gravelly SAND (Possible made ground - brick)

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22333-2
Client Ref NW1588

Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1592554	1592555	1592556	1592557
			Sample ID	BH013	BH013	BH014	BH014
			Depth	1.00	3.50	0.70	4.00
			Other ID	4	11	5	15
			Sample Type	ES	ES	ES	ES
			Sampling Date	28/10/19	28/10/19	28/10/19	28/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Antimony	DETSC 2301*	1	mg/kg	1.7	1.5	7.4	2.3
Arsenic	DETSC 2301#	0.2	mg/kg	19	7.4	32	13
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.6	0.6	0.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.3	< 0.2	< 0.2	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.5	0.9	0.3
Chromium	DETSC 2301#	0.15	mg/kg	18	11	24	25
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	36	46	430	79
Lead	DETSC 2301#	0.3	mg/kg	51	73	230	82
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.24	0.17	0.12
Nickel	DETSC 2301#	1	mg/kg	22	13	34	20
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Tin	DETSC 2301	1	mg/kg	3.3	8.2	31	16
Vanadium	DETSC 2301#	0.8	mg/kg	29	21	24	27
Zinc	DETSC 2301#	1	mg/kg	75	84	560	110
Inorganics							
pH	DETSC 2008#		pH	8.1	10.8	8.4	8.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	3.5	0.3
Total Organic Carbon	DETSC 2002	0.1	%	0.8	0.9	1.2	0.3

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22333-2
Client Ref NW1588

Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1592554	1592555	1592556	1592557
			Sample ID	BH013	BH013	BH014	BH014
			Depth	1.00	3.50	0.70	4.00
			Other ID	4	11	5	15
			Sample Type	ES	ES	ES	ES
			Sampling Date	28/10/19	28/10/19	28/10/19	28/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.20	0.12	0.42	0.04
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	0.08	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.48	0.26	2.3	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.46	0.20	1.4	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	2.9	1.6	13	0.14
Anthracene	DETSC 3303	0.03	mg/kg	0.91	0.46	2.5	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	3.4	2.9	11	0.14
Pyrene	DETSC 3303#	0.03	mg/kg	2.8	2.6	9.9	0.14
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.86	0.84	3.2	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.78	0.81	3.0	0.06
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.74	0.71	2.8	0.05
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.27	0.25	0.95	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.54	0.54	2.1	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.20	0.18	0.70	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	0.20	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.24	0.22	0.86	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	15	12	54	0.66
Phenols							
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22333-2
Client Ref NW1588

Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1592558	1592559	1592560	1592561
			Sample ID	TP001	TP002	TP002	TP003
			Depth	0.80	1.00	2.50	1.00
			Other ID	6	6	12	9
			Sample Type	ES	ES	ES	ES
			Sampling Date	28/10/19	29/10/19	29/10/19	28/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Antimony	DETSC 2301*	1	mg/kg	4.8	6.1	3.3	16
Arsenic	DETSC 2301#	0.2	mg/kg	87	44	20	22
Beryllium	DETSC 2301#	0.2	mg/kg	0.7	1.3	0.6	2.5
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.2	0.9	0.8	0.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	0.8	0.2
Chromium	DETSC 2301#	0.15	mg/kg	20	22	15	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	110	230	100	380
Lead	DETSC 2301#	0.3	mg/kg	300	530	250	370
Mercury	DETSC 2325#	0.05	mg/kg	0.45	1.6	0.67	1.0
Nickel	DETSC 2301#	1	mg/kg	17	32	16	450
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.3	< 0.5	< 0.5
Tin	DETSC 2301	1	mg/kg	20	31	19	96
Vanadium	DETSC 2301#	0.8	mg/kg	31	37	18	61
Zinc	DETSC 2301#	1	mg/kg	140	620	220	92
Inorganics							
pH	DETSC 2008#		pH	8.4	7.7	9.0	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	2.9	1.8	0.3	0.4
Total Organic Carbon	DETSC 2002	0.1	%	1.1	3.6	1.5	4.4

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22333-2
Client Ref NW1588

Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1592558	1592559	1592560	1592561
			Sample ID	TP001	TP002	TP002	TP003
			Depth	0.80	1.00	2.50	1.00
			Other ID	6	6	12	9
			Sample Type	ES	ES	ES	ES
			Sampling Date	28/10/19	29/10/19	29/10/19	28/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Petroleum Hydrocarbons							
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.05	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11	0.36	0.06
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.07	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.19	0.55	0.09
Pyrene	DETSC 3303#	0.03	mg/kg	0.03	0.20	0.55	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.09	0.20	0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.10	0.21	0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.20	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	0.07	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.08	0.16	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.08	0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.09	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	1.0	2.6	0.33
Phenols							
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0

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Summary of Asbestos Analysis

Soil Samples

Our Ref 19-22333-2
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1592554	BH013 4 1.00	SOIL	NAD	none	Keith Wilson
1592555	BH013 11 3.50	SOIL	NAD	none	Keith Wilson
1592556	BH014 5 0.70	SOIL	NAD	none	Keith Wilson
1592557	BH014 15 4.00	SOIL	NAD	none	Keith Wilson
1592558	TP001 6 0.80	SOIL	NAD	none	Keith Wilson
1592559	TP002 6 1.00	SOIL	NAD	none	Keith Wilson
1592560	TP002 12 2.50	SOIL	NAD	none	Keith Wilson
1592561	TP003 9 1.00	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

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Information in Support of the Analytical Results

Our Ref 19-22333-2
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1592554	BH013 1.00 SOIL	28/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1592555	BH013 3.50 SOIL	28/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1592556	BH014 0.70 SOIL	28/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1592557	BH014 4.00 SOIL	28/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1592558	TP001 0.80 SOIL	28/10/19	GJ 250ml, GJ 60ml x2, PT 1L x2		
1592559	TP002 1.00 SOIL	29/10/19	GJ 250ml, GJ 60ml x2, PT 500ml x2		
1592560	TP002 2.50 SOIL	29/10/19	GJ 250ml, GJ 60ml x2, PT 500ml x2		
1592561	TP003 1.00 SOIL	28/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

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Certificate of Analysis

Certificate Number 19-22225-1

15-Nov-19

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 19-22225-1

Client Reference NW1588

Order No CH1547

Contract Title ID Manchester Preliminary Ground Investigation

Description 4 Soil samples.

Date Received 30-Oct-19

Date Started 04-Nov-19

Date Completed 15-Nov-19

Test Procedures Identified by prefix DETSn (details on request).

Notes This test supersedes 19-22225, additional testing.
Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Ap [redacted]

Adam Fenwick
Contracts Manager

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

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Summary of Chemical Analysis
Matrix Descriptions

Our Ref 19-22225-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
BH001	8	1	1591955	11/11/2019	Dark brown gravelly, sandy CLAY
BH001	15	3	1591956	11/11/2019	Dark brown gravelly, sandy and CLAY (Possible made ground - brick)
BH012A	10	2.6	1591957	11/11/2019	Dark brown gravelly, sandy CLAY (Possible made ground - brick)
BH012A	23	7.5	1591958	11/11/2019	Dark brown gravelly, sandy CLAY

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22225-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1591955	1591956	1591957	1591958
			Sample ID	BH001	BH001	BH012A	BH012A
			Depth	1.00	3.00	2.60	7.50
			Other ID	8	15	10	23
			Sample Type	ES	ES	ES	ES
			Sampling Date	26/10/19	27/10/19	26/10/19	27/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Antimony	DETSC 2301*	1	mg/kg	1.5	1.4	< 1.0	1.2
Arsenic	DETSC 2301#	0.2	mg/kg	9.1	10	6.4	7.2
Beryllium	DETSC 2301#	0.2	mg/kg	0.9	0.7	0.5	0.7
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.0	0.7	0.8	1.1
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.2	0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	23	17	12	18
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	38	35	23	25
Lead	DETSC 2301#	0.3	mg/kg	39	200	34	42
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.16	0.06	0.09
Nickel	DETSC 2301#	1	mg/kg	30	18	13	18
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Tin	DETSC 2301	1	mg/kg	1.5	4.4	5.2	2.5
Vanadium	DETSC 2301#	0.8	mg/kg	29	25	17	25
Zinc	DETSC 2301#	1	mg/kg	60	43	37	48
Inorganics							
pH	DETSC 2008#		pH	8.1	8.4	8.5	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.1	< 0.1	0.1
Total Organic Carbon	DETSC 2002	0.1	%	0.7	0.7	0.7	1.2
Petroleum Hydrocarbons							
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.05	0.04	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Chemical Analysis
Soil Samples

Our Ref 19-22225-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

			Lab No	1591955	1591956	1591957	1591958
			Sample ID	BH001	BH001	BH012A	BH012A
			Depth	1.00	3.00	2.60	7.50
			Other ID	8	15	10	23
			Sample Type	ES	ES	ES	ES
			Sampling Date	26/10/19	27/10/19	26/10/19	27/10/19
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10
Phenols							
Phenols, Total	DETSC 3451*	5	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0

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Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

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Summary of Asbestos Analysis
Soil Samples

Our Ref 19-22225-1
Client Ref NW1588
Contract Title ID Manchester Preliminary Ground Investigation

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1591955	BH001 8 1.00	SOIL	NAD	none	Michael Kay
1591956	BH001 15 3.00	SOIL	NAD	none	Michael Kay
1591957	BH012A 10 2.60	SOIL	NAD	none	Michael Kay
1591958	BH012A 23 7.50	SOIL	NAD	none	Michael Kay

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

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Information in Support of the Analytical Results

Our Ref 19-22225-1
Client Ref NW1588
Contract ID Manchester Preliminary Ground Investigation

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1591955	BH001 1.00 SOIL	26/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1591956	BH001 3.00 SOIL	27/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1591957	BH012A 2.60 SOIL	26/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1591958	BH012A 7.50 SOIL	27/10/19	GJ 250ml x2, GJ 60ml x2, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

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Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

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Derwentside Environmental Testing Services

Quality Control

Quality Systems.

Derwentside Environmental Testing Services employs numerous measures to ensure high levels of confidence in the results produced. Our laboratory has been accredited by the United Kingdom Accreditation Service (UKAS) since its inception and operates in full compliance with the internationally recognised standard ISO17025 and the Environment Agency's MCERTS (Monitoring & Certification Scheme) standard for soils and waters, which provides greater assurance to all parties of the reliability of data from chemical analysis.

To obtain a copy of our full UKAS schedule visit the UKAS website at www.ukas.org and search for our laboratory number 2139.

2139

Proficiency Testing Schemes.

DETS participates in seven external proficiency testing schemes in order to monitor and ensure the continuing quality of analysis. These schemes are:

Aquacheck, LGC Contest, WEPAL, RTC, AIMS, AISS, pt:a proficiency testing australia

Internal Quality Control.

DETS runs a strict internal quality control system. A minimum of 5% of all samples that undergo analysis in our laboratories are quality control samples. This way we can ensure a high level of confidence in all of the analytical data produced. In addition, MCERTS accredited tests must meet strict, ongoing limits for precision and bias in order to maintain their accreditation status.

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SAMPLE HOLDING TIME INFORMATION

Soil

Analyte	Container type	Minimum sample required	Reference	Maximum holding time from sampling	
				pre drying/extraction[1]	post drying/extraction[2]
Ammonium	Glass or plastic	20g	BS ISO18512:2007	1 week	
Anions	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
BTEX	60ml glass jar	Full container	EPA 8260	2 weeks	N/A
Conductivity	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Cyanide	Glass or plastic	20g	EPA 9010B/9012	2 weeks	
Heavy metals	Glass or plastic	10g	BS ISO18512:2007	6 months	30 years
Hexavalent chromium	Glass or plastic	20g	BS ISO18512:2007	1 month	
Loss on ignition	Glass or plastic	10g	BS ISO18512:2007	1 month	
OCP	Glass	20g	BS ISO18512:2007	1 month	
Oil & grease	Glass	20g	EPA 9070/1	1 month	
Organic matter/TOC	Glass or plastic	20g	BS ISO18512:2007	1 month	
PAH	Glass	20g	EPA 8100/8270	2 weeks	6 weeks
PCB	Glass	20g	BS ISO18512:2007	1 month	
pH	Glass or plastic	20g	BS ISO18512:2007	1 week	3 years
Phenols	Glass	20g	EPA 8270	2 weeks	6 weeks
PRO	60ml glass jar	Full container	EPA 8015	2 weeks	N/A
Sulphide	Glass or plastic	20g	BRE SD1	3 weeks	1 month
SVOC	Glass	20g	EPA 8270	2 weeks	6 weeks
TEM/CEM	Glass	20g	EPA 418.1	2 weeks	6 weeks
Thiocyanate	Glass or plastic	20g	EPA 9251	No special requirement	
Total sulphur	Glass or plastic	20g	BS ISO18512:2007	1 month	3 years
TPH (C10-C40)	Glass	20g	EPA 418.1	2 weeks	6 weeks
VOC	60ml glass jar	Full container	EPA 8260	2 weeks	N/A

Sample storage environment 5°C

1. From sampling to extraction
2. Once extracted

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Waters

Analyte	Container type	Min sample required (ml)	Reference	Preservative required	Max holding time until extraction
Alkalinity	Glass or plastic	100	EPA 310.2	none	2 weeks
Ammonium	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	3 weeks
BOD	Glass or plastic	500	EPA 405.1 5120B	none	2 days
BTEX	Glass vial	Full container	Lab validation	none	2 weeks
Chloride	Glass or plastic	20	ISO 5667 3:2012	none	1 month
COD	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	1 month
Conductivity/TDS	Glass or plastic	100	EPA 160.1	none	1 week
Cyanide	Plastic	50	EPA 9012/335.3	Sodium hydroxide	2 weeks
Hexavalent chromium	Glass or plastic	20	ISO 5667 3:2012	none	4 days
Metals	Glass or plastic	20	ISO 5667 3:2012	Nitric acid	1 month
Nitrate	Glass or plastic	20	EPA 353.2	none	2 days
Nitrite	Glass or plastic	20	EPA 600/4 079-020	none	2 days
OCP	Glass	500	EPA 8081A/608	none	1 week
Oil & grease	Glass	500	ISO 5667 3:2012	Hydrochloric acid	1 month
PAH	Glass	500	ISO 5667 3:2012	none	1 week
pH	Glass or plastic	50	Lab validation	none	1 week
PCB	Glass	500	EPA 8082A	none	6 weeks
Phenols	Glass	500	ISO 5667 3:2012	Sulphuric acid	3 weeks
Phosphate	Glass or plastic	20	ISO 5667 3:2012	Sulphuric acid	1 month
PRO	Glass vial	Full container	EPA 8015	none	2 weeks
Sulphate	Glass or plastic	20	ISO 5667 3:2012	none	1 month
Sulphide	Plastic	50	ISO 5667 3:2012	NaOH/Zinc acetate	1 week
Suspended solids	Glass or plastic	100	EPA 160.2 2540D	none	1 week
SVOC	Glass	500	EPA 8270/625	none	1 week
TOC	Glass or plastic	20	ISO 5667 3:2012	Sulphuric/Phosphoric acid	1 week
TON	Glass or plastic	20	EPA 353.2	none	1 month
TPH/EPH	Glass	500	Lab validation	none	1 weeks
VOC	Glass vial	Full container	Lab validation	none	1 week

Sample storage environment 3°C ± 2°C

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETS 036	**Leachate Preparation** **(NRA Method and BS EN 12457 Parts 1-3)**	Leachates are prepared as per the NRA (1994) method and as per BS EN 12457 Parts 1 - 3 one and two stage leachate preparation.	Leaching Test Method for the Assessment of Contaminated Land, Interim Guidance, NRA(1994) BS EN 12457 Part 1,2 & 3	n/a	Not Accredited
DETS 073	**Acid Neutralisation Capacity of Soils and Other Solids**	ANC is a measure of the buffering capacity of soils and other waste materials. The analysis measures the amount of acid required to bring the sample to a fixed pH. The initial pH of the sample extract must be measured before analysis begins. Analysis is performed by the addition of acid in conjunction with pH measurement by pH meter until the specified pH has been reached as indicated by the meter. The result is expressed in mol/kg (dry wt).	Annex B (Preliminary determination of the acid/base consumption) – CEN/TC 292 – WI 292046 – Characterization of waste – Leaching behaviour tests – Acid and Base neutralization capacity test	1.0 mol/kg	Not Accredited
DETS 074	**Low Level PAH by HPLC Fluorescence**	PAH is extracted from one litre of filtered water sample by solid phase extraction. PAH is eluted from the SPE column with DCM evaporated to dryness under nitrogen and redissolved in acetonitrile. Analysis of samples is carried out by HPLC fluorescence.	EPA Method 550 The Analyst 2001, 126:1336-1331 Phenomonex Strata X Application Note for PAH by SPE	0.01ug/L each 5.0 ug/L Total	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 1001	**Sample Pre-Treatment and Preparation of Solids**	Solid samples are classified and identified. Samples requiring analysis for unstable or volatile determinands are analysed as received. Samples requiring analysis for stable and non-volatile determinands are dried at <30◦C or 50◦C, depending on requirements, for a minimum of 16hrs (overnight). Dried samples are crushed in a jaw crusher, if necessary, and then ground using a mechanical mixer mill and sieved through a 250µm sieve to ensure they are homogenous.	BS1377:1990 – Soils for Civil Engineering Purposes The preparation and pre-treatment of potentially contaminated soils prior to chemical analysis – MEWAM – 2006 – Environment Agency (Updated procedure under preparation)	n/a	Not Accredited
DETSC 1002	**Description of Soil Sample Type**	This method outlines the procedure used to describe soil samples with respect to basic type, predominant colour and inclusions. The procedure is carried out during the sample preparation stage.	BS 5930:Section 6:1999	n/a	Not Accredited
DETSC 1003	**Stone and Glass / Metal / Plastic Content of Soil**	This method outlines the procedure used to determine the Stone and Glass/Metal/Plastic content of soil samples. The procedure is carried out during the sample preparation stage.	BS 3882:2007 BS 1377:1990	0.1%	Not Accredited
DETSC 1004	**Moisture Content/Loss on Drying of Soil**	Loss on drying is determined by loss of mass on drying in an oven set at 28ºC or 50ºC. Moisture content is determined by loss of mass on drying in an oven set at 105ºC. The procedure is carried out during the sample preparation stage.	Practical Environmental Analysis. Radojevic & Bashkin. RSC 1999 BS 1377: Part 2:1990 DETS drying time study	0.1%	Not Accredited
DETSC 1101	**Asbestos - Bulk Analysis**	Samples are examined visually for the presence of asbestos containing materials or asbestos fibres. Suspect fibres are removed from the sample and examined using polarised light microscopy to determine whether they are asbestos fibres. If no asbestos fibres are identified by the method after an adequate length of examination time, and after at least two small pinch samples have been examined, then the sample may be reported as 'NAD' (no asbestos detected).	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 McCrone W.C., Asbestos Identification (Second Edition), The McCrone Research Institute, 1987 LAB 30, Application of ISO/IEC17025 for Asbestos Sampling and Testing, UKAS, Edition 2, April 2008	n/a	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 1102	**Quantification of asbestos in soils, loose aggregates and ballast**	The method of quantification is divided into three procedures: Gravimetric analysis, detailed gravimetric analysis and PCOM analysis. The analysis may be affected by the client's requirements as determined by contract review, and by the nature of the asbestos found in the sample, e.g. whether ACMs are present, and whether fibre bundles large enough to pick out using tweezers are have been found in the sample.	HSG 248 Asbestos: The Analysis Guide for Sampling, Analysis and Clearance Procedures. 2005 HSG264 Asbestos: The survey guide. HSE Books, 2010. Davies, L. S.T., Wetherill, G. Z., McIntosh, C., McGonagle, C., Addison, J. 1996. Development and validation of an analytical method to determine the amount of asbestos in soils and loose aggregates. HSE Contract Research Report N0. 83/1996. HSE Books	Gravimetric Analysis: 0.01% for 1kg sample Detailed Gravimetric Analysis: 0.001% for 50g sample PCOM Analysis: 0.001%	UKAS
DETSC 1103	**Asbestos Water Absorption Test**	This test involves a sample of the asbestos product being dried and weighed before being immersed in water for a period of time. The sample is then removed from the water and re-weighed. If the amount of water absorbed is <30% by weight, then the sample should be reported as 'Not Licensed'. If ≥30% water is absorbed then the sample should be reported as being 'Licensed', i.e. an asbestos material for which a licence is required to work on.	Work with Materials Containing Asbestos: Approved Code of Practice and Guidance. HSE Books, 2006.	n/a	UKAS
DETSC 2002	**Organic matter content of soil**	The procedure is based upon Walkley and Black's method. Organic matter in soil is oxidised with potassium dichromate in the presence of concentrated sulphuric acid. The excess dichromate is titrated with ferrous sulphate using diphenylamine as an external indicator. The organic matter content is calculated from the amount of dichromate used during the oxidation process based on an empirical relationship.	BS1377 : Part 3 : 1990 Method 3 BS1377 : Part 1 : 1990 BS 3882:2007	0.1%	UKAS MCERTS(Soils)

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

DETSC 2003	**Loss On Ignition**	Soil is ignited at 440C and the amount of sample lost on ignition is determined gravimetrically. Other specified temperatures may be used but are not accredited.	BS1377 : Part 3 : 1990 Method 4 BS1377 : Part 1 : 1990	0.01%	UKAS MCERTS(Soils)
Method Number	**Title**	**Description**	**Reference**	**LOD**	**Accreditation Status**
DETSC 2004	**Sulphate Content of Soil and Water**	The sulphate in the soil is dissolved in dilute hydrochloric acid, or in an aqueous extract having a water:soil ratio of 2:1 and the insoluble residue is removed by filtration. Waters are also filtered prior to analysis. The sulphate in the filtrate is precipitated as barium sulphate which is then filtered, ignited and weighed.	BS1377 : Part 3 : 1990 Method 5 BS1377 : Part 1 : 1990 BRE SD1: 2005 Concrete in Aggressive Ground	**Acid Soluble:** 0.01% **Water Soluble** 100mg/l **Waters** 10mg/l	UKAS MCERTS(Soils)
DETSC 2005	**Carbonate content of soil by Rapid Titration**	The carbonate present in the soil reacts with a known excess of hydrochloric acid liberating carbon dioxide. The acid remaining after the reaction is determined by titration against sodium hydroxide. The result is calculated in terms of the equivalent proportion of carbon dioxide.	BS 1377: Part 1: 1990. BS 1377: Part 3: 1990: Method 5	1%	UKAS
DETSC 2006	**Water Soluble Chloride Content of Soil & Chloride Content of Water**	The chloride in the soil is dissolved in water and the insoluble material is removed by filtration. Waters are filtered before analysis. The chloride is analysed by Mohr's method. The chloride in a neutral solution is titrated against standard silver nitrate using potassium chromate as an indicator. The colour change is from yellow to brick red.	BS1377 : Part 3 : 1990 Method 7.2 BS1377: Part 1: 1990	**Soil:** 0.01% **Water:** 10mg/l	UKAS MCERTS(Soils)
DETSC 2007	**Acid Soluble Chloride Content of Soil and Concrete**	The chloride in the sample is dissolved in nitric acid and the insoluble material is removed by filtration. The dissolved chloride is analysed by Volhard's method. The chloride in solution is precipitated with a known excess of standard silver nitrate. The excess silver nitrate is titrated against standard ammonium thiocyanate using ferric alum as an indicator. The colour change is white to red.	BS1377 : Part 3 : 1990 Method 7.3 BS1377: Part 1: 1990 BS 1881-124:1988	0.01%	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2008	**pH Value of Soil and Water**	The pH value of a soil suspension in water or a groundwater sample is determined electrometrically using a glass electrode.	BS1377: Part 3: 1990 – Soils for Civil Engineering Purposes – Chemical and Electrochemical Methods	n/a	UKAS (Soils + Waters) MCERTS (Soils + Waters-Trade Effluent only)
DETSC 2009	**Electrical Conductivity of Soil & Water**	The electrical conductance of a soil suspension in water or of a water sample is determined by voltammetry using a conductivity meter. In some cases, the soil may need to be extracted with an aqueous solution of an inorganic salt e.g. the conductivity of topsoil is determined by preparing a suspension of the soil in saturated calcium sulphate.	Standard Methods for the Examination of water and Wastewater Part 2510B 21st Edition 2005 APHA, AWWA, WEF BS3882:2007 Specification for Topsoil	1uS/cm	UKAS
DETSC 2019	**Loose Packed Dry Soil Density**	Dried, ground soil is transferred to a dry, tared measuring cylinder and the volume recorded. The cylinder and its contents are then weighed and the density of the soil calculated.	BS3882:2007 Specification for Topsoil	n/a	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2024	**Sulphide in Soil and Water by Iodometry**	Hydrogen sulphide is liberated by acidification of the sample with hydrochloric acid in a steam distillation unit. The hydrogen sulphide produced is carried over with the steam and is absorbed in alkaline zinc acetate. The zinc sulphide produced reacts with iodine formed when iodate-iodide is acidified and the excess iodine titrated with standard thiosulphate.	In House Method based on: Environment Agency The determination of easily liberated sulphide in soils and similar matrices (2010) - Blue Book 228 Method D - The determination of easily liberated sulphide in as received or air-dried samples following acid steam distillation with iodometric titration. Environment Agency The determination of sulphide in waters and associated materials (2007) Draft Method D - The determination of easily liberated sulphide in as received or air-dried samples following phosphoric acid steam distillation with iodometric titration.	**Soils:** 10mg/kg . **Waters:** 250ug/l	**Soils:** UKAS MCERTS(Soils) **Waters:** Not Accredited
DETSC 2030	**Alkalinity in Water**	Alkalinity of a water sample is determined by indicator end point titration with a strong acid from sample pH to pH8.3 (where applicable) and then to pH4.5. From the titres obtained the total alkalinity and concentrations and types of alkalinity present can be calculated.	SCA Method ISBN 0 11 751601 5 The Determination of Alkalinity and Acidity in Water 1981 Instruction Manual for Skalar SP50 Robotic Analyser	20mg/l as CaCO3	UKAS MCERTS(Waters) Trade Effluent only
DETSC 2031	**5 Day Biochemical Oxygen Demand**	The sample, either diluted or undiluted, is placed in a BOD bottle and the initial dissolved oxygen content of the sample is measured using a dissolved oxygen meter. The bottle is placed in an incubator at 20ºC in the dark for 5 days. After this time the bottle is removed and the residual dissolved oxygen content of the sample is measured. The BOD of the sample is calculated from the reduction in the concentration of dissolved oxygen over 5 days.	SCA Method ISBN 0 117522120 5 Day Biochemical Oxygen Demand (BOD5) Second Edition 1988	1 mg/l	UKAS MCERTS(Waters)- Trade Effluent only

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2032	**Chemical Oxygen Demand**	Oxidisable substances react with sulphuric acid – potassium dichromate solution in the presence of silver sulphate as a catalyst. Chloride is masked by mercury sulphate. The reduction in the yellow colouration of Cr6+ is evaluated using a spectrophotometer for the low range tubes (LCK 314) whilst the green colouration of Cr3+ is evaluated for the medium and high range tubes (LCK 014 and LCK 114).	Environment Agency The determination of chemical oxygen demand in waters and effluents (2007) Methods for the Examination of Waters and Associated Materials	10 mg/l	UKAS MCERTS(Waters)-Trade Effluent only
DETSC 2033	**Total and Dissolved Organic Carbon in Water**	The term TOC (Total Organic Carbon) is used to describe the total content of organically bound carbon in dissolved and undissolved compounds. The TOC content is expressed in mg/l. If DOC (Dissolved Organic Carbon) is required, samples are filtered through a 0.45µm filter paper prior to analysis. Inorganic carbon is expelled by acidification of the sample. TOC is then determined by digestion of the sample with sulphuric acid and peroxodisulphate. Carbon containing compounds are transformed into carbon dioxide. The carbon dioxide evolves and reacts with an indicator solution. The colour change is measured using a spectrophotometer.	Hach-Lange Technical Instructions: LCK 385, LCK 386, LCK 387	2 mg/l	UKAS
DETSC 2034	**Suspended and Settleable Solids in Water**	Suspended matter is removed from a measured volume of sample by filtration under reduced pressure through a pre-treated, pre-weighed glass fibre filter paper. The paper is washed with deionised water to remove dissolved salts and the total suspended matter is determined gravimetrically after drying at 105 ±5°C Settleable solids are determined by subtracting the solids left in suspension after settlement for 1 hour (or other agreed time) from the total suspended matter in the sample.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980	5 mg/l	**Suspended Solids:** UKAS MCERTS(Waters)-Trade Effluent only **Settleable Solids:** Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2035	**Total Dissolved Solids in Water**	Water samples are pre-filtered to remove any suspended solids and evaporated in an oven at 180°C. The amount of residual dissolved solids is determined gravimetrically. An estimate of the total dissolved solids can be obtained by measuring the conductivity of the sample. This method is not accredited.	SCA Method ISBN 011 751957 X Suspended, Settleable and Total Dissolved Solids in Waters and Effluents 1980 BS1377: Part 3 : 1990 Section 8	5 mg/l	UKAS
DETSC 2047	**Formaldehyde in Water**	Formaldehyde in soil is extracted in water, with a water to soil ratio of 10:1. The insoluble residue is removed by filtration prior to analysis. Waters are filtered prior to analysis to remove any particulates in suspension. Formaldehyde in the extract or water sample reacts with chromatropic acid-sulphuric acid solution to form a purple coloured complex. The absorbance of the coloured solution is read at 580nm using a suitable visible spectrophotometer.	Formaldehyde by visible absorption spectrophotometry – Method 3500, Issue 2 – NIOSH Manual of Analytical Methods, Fourth edition, August 1994	**Soil:** 0.2mg/kg **Water:** 20µg/l	Not Accredited
DETSC 2048	**Dissolved Oxygen Content of Water**	The dissolved oxygen content of the sample is measured using a dissolved oxygen meter either electrochemically or by fluorescence, or by the titrimetric method developed by Winkler.	SCA Method ISBN 0.11 751442X Dissolved Oxygen in Natural and Waste Waters 1979	0.1 mg/l	Not Accredited
DETSC 2055	**Anions in Water and Aqueous Soil Extracts by Ion Chromatography**	Liquid samples and aqueous soil extracts are filtered through a 0.22µm syringe filter prior to analysis. The filtered samples are injected into an Ion Chromatograph. The anions of interest are separated on the basis of their affinity for the active sites of the column packing material. The separated anions are converted into their highly conductive acid forms and measured by conductivity. The anions are identified on the basis of retention time as compared to standards and quantisation is by measurement of peak area.	Standard Methods for the Examination of Water and Wastewater Section 4110 21st Edition 2005 APHA, AWWA, WEF	**Soil:** 1.0 mg/kg **Water:** 0.1 mg/L	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2076	**Sulphate and Magnesium Content of 2:1 Aqueous Extract of Soil by ICP-OES**	The sulphate and magnesium in the soil are extracted in an aqueous extract having water: soil ratio of 2:1 and the insoluble material is removed by filtration. The concentrations of sulphate and magnesium in the filtrate are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelengths used for identification and quantification are 181.972nm for sulphate and 285.213nm for magnesium.	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1: 1990 TRL 447 Sulphate Specification for Structural Backfills 2005 BRE SD1:2005 Concrete in Aggressive Ground 2005	10mg/L	**Sulphate:** UKAS MCERTS(Soils) **Magnesium:** Not Accredited
DETSC 2084	**Total Organic Carbon by PrimacATC Analyser**	Soil samples are treated with phosphoric acid to expel any inorganic carbonates. The samples are then heated at high temperature in a continuous flow of air so that any organic carbon is oxidised to carbon dioxide. The gas is then allowed to cool and analysed by an infra-red detector.	PrimacsATC Analyser – User Manual, Skalar	0.47%	MCERTS(Soils)
DETSC 2085	**Total and Dissolved Organic Carbon in Water**	**Direct TOC Analysis** The sample is acidified, stirred and purged to remove the IC before the sample is injected and handled as in the TC Analysis. The sample is filtered before acidification for DOC. **TC Analysis** The sample is injected by an automated septum less rotary port into a high temperature reactor. In the reactor, at a temperature of 750 - 950°C all organic and inorganic carbon is oxidized to the gaseous carbon dioxide (CO2). The catalyst that is present in the reactor catalysis the oxidation to completion. A flow of air transports these oxidation products to the detectors. The oxygen required for reaction is taken from the airflow. The products are led into the non-dispersive infrared detector where the carbon dioxide is determined. The carbon dioxide is measured at a wavelength of 4.2 µm by NDIR detection.	Standard Methods for the Examination of Water and Wastewater Section 5310 B 21st Edition 2005 APHA, AWWA, WEF HMSO Methods for the Examination of Waters and Associated Materials – The Instrumental Determination of Total Organic Carbon and Related Determinands 1995	lmg/l as C	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2119	**Exchangeable Ammonia in Soil**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	MAFF/ADAS Reference Book 427 – the Analysis of Agricultural Materials – Method 53, Ammonium, Nitrate and Nitrite-Nitrogen, Potassium Chloride Extractable	0.5mg/kg	UKAS MCERTS(Soils)
DETSC 2120	**Ammonia in Water by Spectrophotometry**	An intense blue-green complex, related to indophenol blue, is formed by the reaction of ammonia with hypochlorite and sodium salicylate, with sodium nitroprusside acting as a catalyst. The complex is measured at 655nm and is related to the ammonia concentration by means of a calibration curve. Sodium citrate is added to overcome interfering ions.	Environment Agency Ammonia in Waters 1981 ISBN 0117516139 Methods for the Examination of Waters and Associated Materials	20µg/l	UKAS
DETSC 2121	**Total Kjeldahl Nitrogen Content of Soils and Waters**	The sample is digested with sulphuric acid and a mixture of catalysts to convert organic nitrogen to ammonia. The sample is then distilled under alkaline conditions, and the distilled ammonia is absorbed in sulphuric acid. The ammonia content of the distillate is then determined colorimetrically either using the UV/vis spectrophotometer or the Konelab 60i. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm	The Analysis of Agricultural Materials – MAFF/ADAS Reference Book 427 – HMSO BS 3882: 2007 Specification for topsoil Standard Methods for the Examination of Water and Wastewater Part 4500-N. 21st Edition 2005 APHA, WWA, WEF	**Soil:** 0.01% **Water:** 2mg/l	Not Accredited
DETSC 2123	**Water Soluble Boron in Soil & Boron in Water**	Boron in soil is extracted in boiling saline water. Waters are filtered prior to analysis to remove any particulates in suspension. The water soluble boron in the extract or filtrate reacts with azomethine–H to produce a yellow coloured complex. The resulting colour absorbance is measured at 420nm using a suitable visible spectrophotometer.	SecondSite Property (now National Grid Property Holdings) - Guidance for assessing and managing potential contamination on former gasworks and associated sites (Part I) (Version 3) Method 17.12 The analysis of Agricultural materials MAFF/ADAS – reference book 427	**Soil:** 0.2mg/kg **Water:** 100ug/L	UKAS MCERTS(Soils)

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Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2130	**Cyanides & Monohydric Phenols by Skalar**	Water samples are filtered through a 0.45µm syringe filter and solid samples are extracted with 1M caustic soda prior to analysis on the automated flow analyser. The method determines total cyanide, easily liberated cyanide, complex cyanide, thiocyanate and monohydric phenols	Skalar methods: I295-001 w/r+P7 I295-002 w/r+P7 293-902 w/r+P7 497-001	**Soils mg/kg:** Total & Free CN=0.1, Thio=0.6, Phenol=0.3 **Waters ug/L:** Total CN=40, Free CN=20, Thio=20, Phenol=100	UKAS MCERTS(Soils)
DETSC 2140	**Sugar in Mixing Water for Cement**	Waters are filtered prior to analysis to remove any particulates in suspension. The sugar in the filtrate reacts with phenol and sulphuric acid to produce a yellow-orange coloured complex. The resulting colour absorbance is measured at 490nm using a suitable visible spectrophotometer.	Colorimetric Method for Determination of Sugars and Related Substances MICHEL DUBOIS, K. A. GILLES, J. K. HAMILTON, P. A. REBERS, and FRED SMITH - Division of Biochemistry, University of Minnesota, St. Paul, Minnesota.	10mg/l	Not Accredited
DETSC 2201	**Nitrite in Waters and Leachates by Konelab 60i**	Nitrite is determined colorimetrically using the Konelab60i autoanalyser. The nitrite colour reaction occurs at pH 2.0 to 2.5 by coupling diazotized Sulphanilamide with N-1-naphthyl-ethylenediamine. The absorbance of this compound is measured spectrophotometrically at 520nm.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B – 21st Edition 2005 APHA, AWWA, WEF Aquakem Method Nitrite in Waters Iss No 2 Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981.	0.04mg/l (as N)	UKAS

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			EPA Method 354.1 Nitrite, spectrophotometric (Approved at 40 CFR Part 136, not approved at Part 141)		

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2202	**Total Oxidised Nitrogen in Waters and Leachates by Konelab 60i**	Nitrate is reduced to nitrite by hydrazine under alkaline conditions. The total nitrite ions are then reacted with sulphanilamide and N-1-naphthylethylenediamine dihydrochloride under acidic conditions to form a reddish purple azo-dye. The absorbance of this compound is measured spectrophotometrically at 540 nm using the Konelab 60i autoanalyser.	Standard Methods for the Examination of Water and Wastewater Part 4500-NO2 B and Part 4500-NO3 H – 21st Edition 2005 APHA, AWWA, WEF Aquakem Method Total Oxidised Nitrogen. Methods for the Examination of Water and Associated Materials Oxidised Nitrogen in Waters 1981. EPA Method 353.1 Nitrate, Nitrite Colorimetric Automated Hydrazine Reduction (Approved at 40 CFR Part 136, Not approved at Part 141)	0.7mg/l (as N)	UKAS
DETSC 2203	**Hexavalent Chromium in Waters and Leachates by Konelab 60i**	Hexavalent Chromium is determined colorimetrically using the Konelab 60i autoanalyser. Hexavalent chromium reacts with diphenylcarbizide in acid solution and produces a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm.	Standard Methods for the Examination of Water and Wastewater Part 3500-Cr – 21st Edition 2005 APHA, AWWA, WEF USEPA 7196-A Aquakem Method. Hexavalent Chromium	10µg/l	UKAS
DETSC 2204	**Hexavalent Chromium in Soil by Konelab 60i**	Hexavalent Chromium is determined colorimetrically using the Konelab 60i autoanalyser. Hexavalent chromium reacts with diphenylcarbizide in acid solution and produces a red-violet colour. The absorbance of this compound is measured spectrophotometrically at 540nm.	Aquakem Method. Hexavalent Chromium	1mg/kg	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2205	**Reactive & Total Phosphorus in Waters and Leachates by Konelab 60i**	Phosphate is determined colorimetrically using the Konelab60i autoanalyser. The orthophosphate ion reacts with ammonium molybdate and antimony potassium tartrate under acidic conditions to form a 12-molybdophosphoric acid complex. The complex is then reduced with ascorbic acid to form a blue heteropoly compound. The absorbance of this compound is measured spectrophotometrically at wavelength 880nm.	Standard Methods for the Examination of Water and Wastewater Part 4500-P E– 21st Edition 2005 APHA, AWWA, WEF Aquakem Method. Phosphate in Waters Issue 2	0.01mg/l	**Reactive Phosphorus:** UKAS MCERTS (Waters-Trade Effluent only) **Total Phosphorus:** Not Accredited
DETSC 2206	**High Level Ammonia in Waters and Leachates by Konelab 60i**	Ammonia is determined colorimetrically using the Konelab60i autoanalyser. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm.	Methods for the Examination of Waters and Associated Materials Ammonia in Waters 1981 ISBN 0117516139. Aquakem Method. Ammonia in Waters Issue 2	0.8mg/l	UKAS
DETSC 2207	**Low Level Ammonia in Waters and Leachates by Konelab 60i**	Ammonia is determined colorimetrically using the Konelab60i autoanalyser. Ammonia reacts with hypochlorite ions generated by the alkaline hydrolysis of sodium dichloroisocyanurate to form monochloramine. Monochloramine reacts with salicylate ions in the presence of sodium nitroprusside at around pH 12.6 to form a blue compound. The absorbance of this compound is measured spectrophotometrically at wavelength 660nm.	Methods for the Examination of Waters and Associated Materials Ammonia in Waters 1981 ISBN 0117516139. Aquakem Method. Ammonia in Waters Issue 2	0.015mg/l	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2208	**Sulphide in Waters and Leachates by Konelab 60i**	Sulphide is determined colorimetrically using the Konelab60i autoanalyser. Potassium Dichromate converts N-N-Diethyl-p-phenylenediamine to the free radical which reacts rapidly with sulphide to produce the coloured 'DPD Blue' or 'Ethylene Blue'. The absorbance can then be measured at wavelength 660nm.	The determination of sulphide in waters and associated materials (2007) - SCA - Draft (March 2007) Aquakem Method. Sulphide SP001 Issue 2 Standard Methods for the Examination of Water and Wastewater, 21st Edition 2005, Part 4500. ISBN0-87553-223-3	10µg/l	UKAS
DETSC 2210	**Ferrous Iron in Waters and Leachates by Konelab 60i**	Three molecules of phenanthroline chelate with each atom of ferrous iron to form an orange/red complex. The intensity of the coloured solution is stable between pH3 to pH9. Rapid colour development occurs between pH2.9 and pH3.5 in the presence of excess phenanthroline. The resulting colour absorbance is measured at 510nm	Aquakem Method Ferrous Iron FIR001 Issue 2	0.1mg/l	Not Accredited
DETSC 2211	**Silicate in Waters and Leachates by Konelab 60i**	Reactive forms of silicon in acid solution, below pH2, react with ammonium molybdate ions to form a yellow silicomolybdate. Ascorbic acid reduces the yellow silicomolybdate to produce a blue silicomolybdate complex. Oxalic acid is added to destroy any molybdophosphoric acid formed.	ASTM D7126 - 10 Standard Test Method for On-Line Colorimetric Measurement of Silica Aquakem Method Silica SIL Issue 2	0.1mg/l	Not Accredited
DETSC 2301	**Metals in Soil by ICP-OES** As, Ba, Be, Cd, Cr, Co, Cu, Fe, Mn, Mo, Ni, Pb, Se, V, Zn	Metals in soil are extracted using aqua regia and their concentrations are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Any metals not listed can be determined but are not accredited under UKAS or MCERTS for soils.	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005, AWWA, WEF	**mg/kg:** As, Be Cu, Ni =0.2, Ba=1.5, Cd=0.1, Cr=0.15, Co=0.7, Mn=20, Mo=0.4, Pb=0.3, Fe=1200, Se=0.5, V=0.8, Zn=1.0	UKAS (all listed) MCERTS (All soils listed except Fe)

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2302	**Metals in Waters by ICP-OES** Al, As, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Se, Zn	Concentrations of metals in water are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Any metals not listed can be determined but are not accredited under UKAS or MCERTS for waters	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005 APHA, AWWA, WEF	**µg/l:** Al=6.5, As= 7.1, Ca=100, Cd=0.3, Cr=0.75, Cu=0.75, Fe=70, K=20, Mg=5, Na=12, Ni=2.7, Pb=4, Se=11.3, Zn=3.8	**Dissolved:** UKAS (all listed) MCERTS(Waters)-Trade Effluent only (Al, Cd, Cr, Cu, Ni, Pb, Zn) **Total:** Not Accredited
DETSC 2303	**Total Hardness (By Calculation)**	The concentrations of calcium and magnesium are determined using the appropriate methodologies. The hardness is a measure of the sum of the calcium and magnesium concentration expressed as calcium carbonate.	Standard Methods for the Examination of Water and Wastewater Part 3120 B – 21st Edition 2005 APHA, AWWA, WEF	n/a	UKAS
DETSC 2304	**Zinc Equivalent in Soil (By Calculation)**	The concentrations of copper, nickel and zinc concentrations are determined using the appropriate methodologies. The zinc equivalent is a measure of the combined toxicity of the three metals, relative to the toxicity of zinc.	n/a	n/a	Not Accredited
DETSC 2306	**Metals in Waters by ICP-MS** Ag, Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, V, Zn	Concentrations of metals in water are determined by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Any metals not listed can be determined but are not accredited under UKAS.	Standard Methods for the Examination of Water and Wastewater Part 3125 B – 21st Edition 2005 APHA, AWWA, WEF	**µg/l:** Ag=0.13, Al=10.0, As=0.16, Ba=0.26, Ca=90, Cd=0.03, Co=0.16, Cr=0.25, Cu=0.40, Fe=5.50, Hg=0.01, K=80, Mg=20, Mn=0.22, Mo=1.1, Na=70, Ni=0.50, P=18.0, Pb=0.09, Sb=0.17, Se=0.25, Sn=0.40, V=0.60, Zn=1.3	**Dissolved:** UKAS (all listed) **Total:** Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2320	**Total Sulphur in Soil by ICP**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia.	TRL 447 Sulphate Specification for Structural Backfills 2005 BRE SD1 Concrete in Aggressive Ground 2005	0.01%	UKAS
DETSC 2321	**Total Sulphate content of Soil by ICP-OES**	The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1 : 1990	0.01%	UKAS MCERTS(Soils)
DETSC 2322	**Total Potential Sulfate and Total Oxidisable Sulphur (By Calculation)**	Sulphur compounds in soil are extracted using aqua regia and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The wavelength used for identification and quantification of sulphate is 181.972nm. The sulphate in the soil is extracted in dilute hydrochloric acid and the insoluble residue is removed by filtration. The filtrate is made up to volume and the concentration of sulphate in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The wavelength used for identification and quantification of sulphate is 181.972nm. The two results obtained from the above tests may then be combined to calculate the Total Potential Sulphate and Total Oxidisable Sulphur content	BS1377 : Part 3: 1990 Method 5 BS1377 : Part 1 : 1990	0.01%	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2324	**Mercury in Waters by Atomic Fluorescence Spectroscopy**	Waters and aqueous samples are preserved by fixing with concentrated nitric acid. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry.	Standard Methods for the Examination of Water and Wastewater Part 3112 B – 21st Edition 2005 APHA, AWWA, WEF PSA Method – Millennium Merlin Method for Total Mercury in Drinking, Surface, Ground, Industrial and Domestic Wastewaters and Saline Waters	0.05µg/l	UKAS
DETSC 2325	**Mercury in Soil Atomic Fluorescence Spectroscopy**	The mercury is extracted from soil in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments	0.05 mg/kg	UKAS MCERTS(Soils)
DETSC 2332	**Inorganic and Methyl Mercury Speciation**	Soils are air-dried and crushed before being subjected to a two-stage microwave extraction procedure for Inorganic (Hg(II)) and Methyl (MeHg) mercury. Waters and aqueous samples are filtered to remove particulates. An aliquot is separated via HPLC before treatment with bromate-bromide and tin (II) chloride to generate mercury and the mercury is determined by atomic fluorescence spectroscopy.	USEPA Method 3200 – Mercury Species Fractionation and Quantification by Microwave Assisted Extraction. PSA Application Note 053 – Mercury Speciation Using The Millenium Merlin Speciation System	**Soil:** 100µg/kg **Water:** 1µg/l	Not Accredited
DETSC 2333	**Elemental Mercury Speciation**	Soils, waters and aqueous samples are tested on an as-received bases. A known quantity of sample is extracted using argon and the released elemental mercury is trapped. The trapped mercury is released upon heating in a scarifier module and determined by atomic fluorescence spectroscopy.		**Soil:** 0.6µg/kg **Water:** 1µg/l	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 2400	**Unified Barge Bioaccessible Metals in Soils**	The Unified BARGE Method (UBM) is a an in vitro method for simulating the human digestive system. Synthetic digestive fluids are used to simulate the fluids present in the body. Both inorganic solutions (Containing inorganic salts such as KCl, NaCletc), and organic solutions (Containing organic compounds such as Urea, Glucose etc) are mixed with enzymes to produce 4 Synthetic digestive fluids saliva (S), Gastric fluid (G), duodenal fluid (D) and bile (B). These solutions are then used to mimic the effect of a sample passing through a human gastro intestinal tract by shaking portions of the sample at 37^0C, human body temperature (17.4).	EPA 9200.2-86 April 2012- Standard Operating Procedure for an In Vitro Bioaccessibility Assay for Lead in Soil BGS Chemical& Biological Hazards Programme Open Report OR/07/027 - Inter-laboratory Trial of a Unified Bioaccessibility Procedure	V = 1.0mg/kg Cr = 5.0mg/kg Co = 1.0mg/kg Ni = 5.0mg/kg As = 0.5mg/kg Se = 0.5mg/kg Cd = 0.5mg/kg Pb = 1.0mg/kg	Not Accredited
DETSC 3001	**Solvent Extractable Matter in Soil**	Soil samples are extracted with a water-immiscible solvent and filtered to remove the water. The solvent is evaporated and the amount of extractable matter in the sample is determined gravimetrically.	In-house method based on:- Problems Arising from the Redevelopment of Gas Works and Similar Sites - AERE Harwell Laboratory 1981. Environmental Agency The Determination of Material Extractable by Carbon Tetrachloride and of Certain Hydrocarbon Oil and Grease Components in sewage Sludge – 1978	40mg/kg	**Toluene & Cyclohexane:** UKAS **Other Solvents:** Not Accredited
DETSC 3002	**Oil & Grease/Solvent Extractable Matter in Waters**	A known volume of sample is acidified to pH<2 and extracted three times with an organic solvent, such as n-Hexane, in a separating funnel. The solvent is removed by evaporation and the amount of extractable matter in the sample is determined gravimetrically.	APHA 21st Edition, 2005 – Method 5520 B. Oil & Grease - Partition Gravimetric Method USEPA Method 1664, Revision A: n-Hexane Extractable Material (HEM: Oil & Grease) and Silica Treated N-Hexane Extractable Material (SGT-HEM; Non Polar Material) by Extraction and Gravimetry.	1mg/l for 500ml sample	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3049	**Elemental Sulphur in Soils and Waters by HPLC**	Soils are extracted in dichloromethane (DCM) by sonication. The elemental sulphur concentration is determined by high performance liquid chromatography (HPLC) with UV detection using a C_{18} (e.g. 250mm x 4.6mm) column and a mobile phase composed of 95% methanol and 5% water. Waters and aqueous extracts of soils are extracted using DCM in a separating funnel, filtered, and the concentration determined using HPLC.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis: Elemental Sulphur.	**Soil:** 0.75mg/kg **Waters:** 90ug/l	**Soil:** UKAS MCERTS(Soils) **Water:** UKAS
DETSC 3072	**Aliphatic / Aromatic TPH by GC-FID**	Aliphatic and aromatic petroleum hydrocarbons (C_{10}-C_{35}) are extracted from soil and water using n-Hexane. The fractions are separated by solid phase extraction using silica columns, whereby the aliphatic fraction is eluted first with n-Hexane and the aromatic portion is eluted second with dichloromethane. The total, aliphatic, and aromatic concentrations are determined by gas chromatography flame ionisation detection (GC-FID) using a capillary column and hydrogen as the carrier gas. The chromatographic data is further characterized by subdivision into approximate boiling point/carbon number ranges with respect to n-alkane retention time markers.	National Grid Property Holdings Limited, Methods for the Collection and Analysis of Samples from National Grid Sites, Version 1, September 2006. Section 3.12 Soil Analysis: Draft TNRCC Method 1006	**Soil mg/kg:** AL10-12 =1.5 AL12-16 =1.2 AL16-21 =1.5 AL21-35 =3.4 AR10-12 =0.9 AR12-16 =0.5 AR16-21 =0.6 AR21-35 =1.4 **Water:** 1ug/l	**Soil:** UKAS MCERTS(Soils) (C10-C35 only) **Water:** Not Accredited
DETSC 3301	**PAH in Soil by GC-FID**	Soils and associated materials are extracted in dichloromethane (DCM) using sonication. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.5 mg/kg each 1.6 mg/kg Total PAH	UKAS (16 PAH's only)
DETSC 3302	**Hexane / Acetone Extracted PAH in Soil by GC-FID**	Soils are extracted into hexane: acetone by shaking. The PAH concentration is recorded both as "Total PAH" and as "Speciated PAH", specified in terms of the 16 US EPA "Priority Pollutant" Polycyclic Aromatic Hydrocarbons. Concentrations are determined by gas chromatography using a BPX 50 (30m; 0.25µm ID; 0.25µm film) capillary column (or equivalent).	In-house method based on US EPA Method 8100, Polynuclear Aromatic Hydrocarbons	0.1 mg/kg each 1.6 mg/kg Total PAH	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3303	**Polyaromatic Hydrocarbons in Soils by GC-MS**	The PAHs in the soil sample are extracted into hexane: acetone by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision C, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	0.03 mg/kg each 0.10 mg/kg Total PAH	UKAS (All 16 PAH's) MCERTS (not Fluorene, Anthracene, Chrysene or Total)
DETSC 3304	**Polyaromatic Hydrocarbons in Waters by GC-MS**	The PAHs in the water sample are extracted into dichloromethane by shaking. The PAHs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each PAH is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the Instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semivolatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS) In-house method based on EPA Method 3510C- EPA Method 3510C, Revision 3, Separatory Funnel Liquid-Liquid Extraction	10 ng/l each	UKAS (16 PAH's only)
DETSC 3311	**Extractable Petroleum Hydrocarbons (EPH) in Soil, Ballast and Water**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid and aqueous matrices. This method uses a dichloromethane (DCM) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10-C24), and "mineral oil range" (C24-C40).	USEPA Method 3550C – Ultrasonic Extraction USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 10 mg/kg **Ballast:** 10mg/kg **Water:** 10µg/l	**Soil:** UKAS MCERTS(Soils) **Water:** UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3312	**Hexane Extractable Petroleum Hydrocarbons (HPH)**	This method is designed to determine total concentrations of extractable petroleum hydrocarbons (EPH) in solid matrices. This method uses a hexane: acetone (9.4) extraction followed by quantification using gas chromatography/flame ionisation detection (GC-FID) analysis using a 1:1 mixture of diesel and mineral oil as calibration standards and n-alkane markers to establish the boiling point ranges. This method is used for the quantitative analysis of "Total EPH" (C10-C40) and as "Speciated EPH", specified in terms of the "diesel range" (C10- C24) and "mineral oil range" (C24-C40).	USEPA Method 8015B – Non-Halogenated Organics Using GC/FID	**Soil:** 5 mg/kg	Not Accredited
DETSC 3321	**BTEX, MTBE & PRO in Soils by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	0.01 mg/kg	UKAS MCERTS(Soils) Not accredited for PRO range (C5-10)
DETSC 3322	**BTEX, MTBE & PRO in Waters & Leachates by Headspace GC-FID**	BTEX, MTBE and PRO in soils are determined via Headspace GC-FID. Individual aromatic compounds are quantified by external calibration against known standards. PRO range is banded using alkane markers to define retention time windows.	EPA Methods 5021 and 8015D	1 µg/l	UKAS
DETSC 3401	**PCBs in Soils by GC-MS**	An as-received soil sample is extracted in Hexane:Acetone (1:2) using sonication methodology. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the instrument software.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**µg/kg** PCB 28=1.25 PCB 52=1.12 PCB 101=1.32 PCB 118=1.43 PCB 153=2.08 PCB 138=1.35 PCB 180=1.42	UKAS MCERTS(Soils)

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3402	**Polychlorinated Biphenols in Waters by GC/MS**	The water sample is extracted in DCM on a reciprocal shaker. The sample is separated by gas chromatography and identified by mass selective detector. Quantification is carried out within the GC-MS software using an internal standard.	EPA Method 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography.	**ng/l** PCB 28=208 PCB 52=161 PCB 101=211 PCB 118+123=513 PCB 153=163 PCB 138=107 PCB 180=132 PCB 105=133 PCB 114=253 PCB 126=399 PCB 156=253 PCB 157=119 PCB 167=248 PCB 169=181 PCB 189=271 PCB 77=202 PCB 81=186	UKAS
DETSC 3432	**Volatile Organic Compounds in Waters by Headspace GC-MS**	The method covers the range of volatile organic compounds with boiling points up to 220°C. Water samples are heated and agitated in a crimp cap vial. This drives the volatile components in to the headspace. An aliquot of the headspace is taken and injected in to a gas chromatograph with mass selective detection (GC-MS).The detector operates in full scan mode and is calibrated with standards containing known concentrations of the compounds of interest.	USEPA Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 2, December 1996	1 ug/l except: DCM (27), 2,2-Dichloropropane (2), Bromochloromethane (4), Bromodichloromethane (4), m+p-Xylene (2), 1,3-Dichlorobenzene (2)	UKAS except: Trichlorofluoromethane, Methylene Chloride, 1,1,1-Trichloroethane,

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 3433	**Semi-Volatile Organic Compounds in Soils by GCMS**	The SVOCs in the soil sample are extracted into DCM: Acetone by shaking. The SVOCs in the extract are separated by gas chromatography and identified by the mass selective detector. The concentration of each SVOC is determined by referencing individual mass peak areas to the appropriate internal standard mass peak area. Quantification is carried out within the instrument software.	In-house method based on EPA Method 8270- US EPA Method 8270, Revision 3, Semi volatile Organic Compounds by Gas Chromatography – Mass Spectrometry (GC/MS)	Individual SVOCs 0.1 mg/kg	UKAS
DETSC 5001	**Ash Content of Coal**	The ash content of the sample is determined gravimetrically. A known weight of the sample is placed in a prepared ash crucible and placed in a furnace. The furnace is heated to 750ºC ±10ºC where the temperature is maintained. Following combustion the crucible and sample are removed, cooled and reweighed.	ASTM D3174-11 BS 1016-104.4 1998 ISO 1171: 2010	0.1%	UKAS
DETSC 5002	**Ash & LOI Content of Solid Biomass & Solid Recovered Fuels**	The ash and LOI content of the sample is determined gravimetrically. A known weight of the sample is placed in a prepared ash crucible and placed in a furnace. The furnace is heated to 550ºC ±10ºC where the temperature is maintained. Following combustion the crucible and sample are removed, cooled and reweighed.	BS EN 14775:2009 BS EN 15403:2011	0.1%	UKAS
DETSC 5003	**Volatile Matter Content of Solid Biomass, Solid Recovered Fuels and Coal**	A known weight of the sample produced for volatile matter determination is placed in a suitable crucible fitted with a lid. The crucible and sample is weighed and heated in a furnace with a limited air through put at a temperature of 900ºC ±10ºC for 7 minutes. The sample and crucible are re-weighed and the volatile matter content determined by difference.	BSEN15148:2009 – Solid Biofuels Determination of the Content of Volatile Matter BS EN 15402:2011 - Solid Recovered Fuels - Determination of the Content of Volatile Matter	0.1%	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5004	**Total Moisture / Dry Solids Content of Solid Biomass & Solid Recovered Fuels & Coal**	The sample produced for general analysis is placed into a suitable prepared and weighed tray and reweighed. The sample is dried at 105ºC to constant weight and the total moisture / dry solids content is calculated from the reduction in weight.	BSEN 14774 Parts 1 & 2 2009 DD CEN/TS 15414 Parts 1 & 2: 2010	0.1%	UKAS
DETSC 5005	**Analysis Moisture Content of Solid Biomass, Solid Recovered Fuels & Coal**	The sample produced for total moisture determination in accordance with DETSC 5009 or DETSC 5010 is placed in a suitable pre-weighed tray and reweighed. The sample is then dried at 105°C ±2°C to constant weight and then weighed again. The analysis moisture content is calculated from the reduction in weight.	BS EN 14774-3 2009 BS EN 15414-3 2011 BS 1016-104.1 -1999 ISO 11722 – 1999	n/a	UKAS
DETSC 5007	**Calorific Value of Solid Biomass, Solid Recovered Fuels & Coal**	Calorific value of a material is determined in an Isoperbol calorimeter by burning it in pure oxygen in a combustion bomb. A known amount of sample is placed in a combustion bomb which is then pressurised to 30bar with oxygen. A calorimeter bucket is filled with a known amount of deionised water which is placed in the calorimeter and the bomb placed in the bucket. The system is allowed to equilibrate and the bomb fired by electrical connection. The difference in temperature of the water in the calorimeter bucket caused by the ignition of the material in the bomb is measured and the calorific value calculated	BS EN 14918: Solid biofuels – Determination of calorific value BS EN 15400: Solid recovered fuels - Determination of calorific value	1MJ/kg	UKAS
DETSC 5008	**Calorific Value of Soil**	A known amount of sample material is burnt in a combustion bomb that is immersed in water in a calorimeter and the difference in the water temperature before and after ignition measured. The calorific value of the sample material is calculated making any necessary corrections for heat generation not associated with the combusting sample. A gelatine capsule will be required to assist combustion which is also corrected for in the final calculations.	BS 1016-105 1992 ISO 19208 ASTM 5865	1MJ/kg	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5009	**Sample Preparation of Solid Biomass & Solid Recovered Fuels**	If analysis is required on the original material (i.e. Bulk Density) a sub-sample will be taken after initial mixing after which the sample is then reduced by cutting/chopping oversized pieces of material. The material is then mixed and subdivided by manual means during which process representative samples are taken for analysis i.e. total moisture. The remainder of the sample is dried and then reduced to <1mm and again mixed and subdivided to produce the sample for laboratory analysis.	BS EN 14780:2011 BS EN 15413:2011	n/a	Not Accredited
DETSC 5010	**Sample Preparation of Coal**	If required the sample received is first mixed and a sample taken for bulk density or bulk density is carried out on the whole initial sample. The remaining sample or the whole sample used for bulk density is then reduced to <10mm preferably by jaw crushing. The material is then mixed and subdivided by mechanical or manual means during which process representative samples are taken for any analysis required at this stage i.e. total moisture, The remainder of the sample is again mixed and subdivided to produce the sample for laboratory analysis which may require drying prior to crushing to <212 microns. If there is excessive water content a pre- drying stage of the whole sample may have to be carried out before sample blending and subdivision commences.	BS ISO 13909-4: 2001	n/a	Not Accredited
DETSC 5011	**Calculation of Fixed Carbon Content of Coal, SRF and Solid Biomass Fuels**	The total moisture, analysis moisture, ash and volatile matter content are determined by approved methods. The values obtained are deducted from 100 and this gives the fixed carbon value of the fuel.	DD CENT/S 15296:2006 BS 1016.100:1994 BS ISO 17246:2005	0.1%	Not Accredited

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5012	**Determination of Biomass Content of SRF**	Approximately 5g of the sample is dissolved in 150ml of 78% Sulphuric Acid for 16 hours ±2 hours after which 35ml of 30% Hydrogen Peroxide is added and the sample left for an additional 5 hours ±1 hour. At the end of this period 300ml of deionised water is added to the sample and the residue remaining filtered off using a glass fibre filter paper, washing the residue with an additional 300ml of deionised water. The filter paper and residue are placed in a pre-weighed crucible and dried at 1500C until completely dry. The filter paper is reweighed after drying and the non biomass residue determined. Corrections for carbonates content is made by determining the ash content of the original sample and the non biomass residue remaining. The result can also be expressed by percentage calorific value by performing a calorific valve on the solid captured on the filter paper.	BS EN 15440 Solid recovered fuels - Methods for the determination of biomass content	n/a	UKAS
DETSC 5013	**Determination Of Carbon, Hydrogen, Nitrogen & Oxygen In Solid Biomass, Solid Recovered Fuels & Coal**	A known mass of fuel is weighed into tin capsules which are dropped sequentially into the combustion reactor prior to the arrival of oxygen. The sample and tin capsule react with oxygen and combust at temperatures of 1700-1800 °C and the sample is broken down into its elemental components N2, CO2, and H2O. High performance copper wires absorb the excess oxygen not used for sample combustion. The gases flow through the gas chromatographic (GC) separation column which is kept at a constant temperature. As they pass through the GC column, the gases are separated and are detected sequentially by the thermal conductivity detector (TCD). The TCD generates a signal, which is proportional to the amount of element in the sample. The instrument software compares the elemental peak to a known standard material (after calibration) and generates a report for each element on a weight basis. The oxygen is calculated by deducting these quantities from 100 along with the moisture, ash, sulphur & chlorine contents determined by other methods.	BS EN 15104:2011 Solid biofuels - Determination of total content of carbon, hydrogen and nitrogen - Instrumental methods BS EN 15407:2011 Solid recovered fuels - Methods for the determination of carbon (C), hydrogen (H) and nitrogen(N) content BS EN 15296:2011 Solid biofuels - Conversion of analytical results from one basis to another	Carbon 0.10% Nitrogen 0.30% Hydrogen 0.30% Oxygen 3.55%	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5014	**Metals in Coal, SRF and Biomass by ICP**	Metals in coal, solid recovered fuel (SRF) and biomass samples are extracted by microwave using Hydrogen Peroxide (to oxidise and break down organic matter) and Aqua Regia (to dissolve the matrix and hold the metals in solution). Their concentrations are determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).	BS EN 15410 - Solid recovered fuels - Methods for the determination of the content of major elements (Al, Ca, Fe, K, Mg, Na, P, Si, Ti) BS EN 15411 - Solid recovered fuels - Methods for the determination of the content of trace elements (As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Mn, Ni, Pb, Sb, Se, Tl, V and Zn) BS EN 15290 - Solid biofuels - Determination of major elements - Al, Ca, Fe, Mg, P, K, Si, Na and Ti BS EN 15297 - Solid biofuels - Determination of minor elements - As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, V and Zn	**0.1 mg/kg:** As, Be, Cd, Co, Mn, Ni, P, Pb, Sb, Se, Sn, Ti, V, Zn **0.2mg/kg:** Cr, Cu, Tl **0.5mg/kg:** Mo **1mg/kg:** Al, Fe, K, Mg **5mg/kg:** Ca **10mg/kg:** Ag, Ba, Rh, Sr, Te	UKAS: Al, As (SRF only), Ca, Cd, Co, Cr, Cu, K, Mg, Mn, Na (SRF only), Ni, P, Pb, Se, Sn, Tl, V, Zn All other metals not accredited
DETSC 5015	**Mercury in Coal, SRF and Biomass by Atomic Fluorescence Spectroscopy**	The mercury is extracted from coal, SRF and biomass in aqua regia with gentle refluxing. The extract is filtered to remove particulates and diluted to volume. Treatment of the resulting solution with tin (II) chloride reduces mercury (II) to mercury (0) vapour which is then quantitatively detected using atomic fluorescence spectrometry.	PSA Method – Millennium Merlin Method for Mercury in Sludge, Soils and Sediments.	0.055mg/kg	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5016	**Total Sulphur Content Of Coal, SRF And Biomass**	Sulphur compounds in SRF and biomass are extracted using aqua regia / hydrogen peroxide and the insoluble residue is removed by filtration. The concentration of sulphur in the filtrate is determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Loss of sulphur as H2S is prevented by oxidation of the sulphur compounds to sulphate by the aqua regia. The use of hydrogen peroxide enhances the oxidation properties of nitric acid especially in the digestion of organics. Sulphur compounds in coal are determined by ICP-OES from the aqueous washings of the combustion products after firing in a bomb calorimeter.	TRL Report TRL447 (Updated) - Sulphate specification for structural backfills 2005	0.001mg/kg	UKAS
DETSC 5017	**Sulphur, Chlorine, Fluorine & Bromine Content of Solid Biomass, Solid Recovered Fuels and Coal by IC**	A known weight of fuel is burnt in a pressurised bomb in pure oxygen. After firing of the bomb, it is stood for a minimum of five minutes to allow the combustion products to settle then the oxygen is slowly released over a period of at least three minutes. The bomb is then taken apart and the bomb electrodes rinsed with deionised water into the inside of the bomb. These washings are then decanted into a 50ml volumetric flask. The inside of the bomb is rinsed with deionised water and the washings added to those in the volumetric flask. The contents of the volumetric flask are made up to volume with deionised water and stored for the analysis of sulphur, chloride, fluoride and bromide by ion chromatography.	Operating Instruction Manual No. 442M 6200 Parr Oxygen Bomb Calorimeter Operating Instruction Manual No. 205M 1108 Oxygen Combustion Bomb Operating Instruction Manual No. 454M 6510 Water Handling System	0.01% Chlorine 0.01% Fluorine 0.01% Bromine 0.04% Sulphur (Coal only)	UKAS

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DETS INFO 001 – ANALYTICAL METHOD SUMMARY

Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5018	**XRF Analysis of Coal, Biomass, SRF and Cement**	When X-rays are targeted at a material they will cause electrons to be ejected from the component atoms (Ionisation). The ejection of electrons will cause the electronic structure of the component atoms to become unstable resulting in electrons from the higher energy outer orbitals "falling" into the inner orbitals to compensate. This causes a release of energy in the form of a photon equal to the energy difference between the two orbitals involved. Thus the material emits radiation which has energy characteristics of the atoms present. In energy dispersive X-ray fluorescence the fluorescent X-rays emitted are directed to a detector from which the data is processed by a multichannel analyser, producing a digital spectrum which is processed to obtain analytical data. The instrument analytical parameters are set up for the matrix type. A sample cell is prepared by placing a piece of prolene film over the outer cell and then inserting the inner cell. This gives a complete cell with a clear prolene base. A portion of the sample is placed into the cell and then analysed.	Rigaku NEX CG EDXRF instruction manual	**Cement:** 0.01% BaO, Cr_2O_3, CuO, PbO, Rb_2O, SrO, ZnO 0.02% Cl, V_2O_5 0.05% TiO_2 0.1% Mn_2O_3, P_2O_5, SO_3 0.5% K_2O 1% Al_2O_3, CaO, CdO, Co_2O_3, Fe_2O_3, MgO, Na_2O, NiO, SiO_2, Y_2O_3 **Fuel:** 0.01% Co, Cr, Cu, I, Li, Mn, Ni, P, Pb, Sn, Ti, V, Zn 0.02% Al, Ba, S, Si 0.1% Mg 0.2% Ca 0.5% As, Cd, Hg, Mo, Na, Sb, Se, Th, Tl 1% Ag	UKAS Al, As, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Sb, Si, Sn, Tl, Ti, V, Zn Al2O3, BaO, CaO, Cl, Cr2O3, CuO, Fe2O3, K2O, MgO, Mn2O3, Na2O, P2O5, PbO, Rb2O, SiO2, SO3, SrO, TiO2, V2O5, ZnO All other testing not accredited
DETSC 5019	**Determination of Biodegradable Municipal Waste Content (Compositional Analysis)**	The method is based on handpicking the BMW fraction from the municipal waste sample, and then weighing the amount of BMW sorted and expressing this as a percentage on a wet weight basis of the weight of the whole municipal waste sample.	ENVIRONMENT AGENCY: Guidance on monitoring of MBT and other treatment processes for the landfill allowances schemes (LATS and LAS) for England and Wales	n/a	Not Accredited
DETSC 5020	**Determination of Bulk Density in Solid Biomass and Solid Recovered Fuels**	The test portion is filled into a standard container of a given size and shape and weighed afterwards. Bulk density is calculated from the net weight per standard volume and reported for the moisture content.	BS EN 15103:2009 Solid Biofuels- Determination of bulk density BS EN 15401:2010 Solid Recovered Fuels- Determination of bulk density	0.5kg/m^3	Not Accredited

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Method Number	Title	Description	Reference	LOD	Accreditation Status
DETSC 5021	**Auto Ignition Temperature**	A quantity of the sample is placed into a metal tray or crucible and placed into an oven or furnace. The temperature of the oven / furnace is increased in predefined increments and the temperature in which the sample ignites is noted.	None	25°C	Not Accredited

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