SOLMEK



Phase 2: Site Investigation

Stockton Riverside College

Stockton Riverside College

S230207/SI

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PHASE 2 SITE INVESTIGATION REPORT

STOCKTON RIVERSIDE COLLEGE

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Final	April 2023	D Simpson Geotechnical Engineer	
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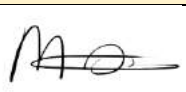
		M Atkins *Senior Geotechnical Engineer*	
		Approved by	
		R Woods Principal Geotechnical Engineer	

1 EXECUTIVE SUMMARY

Site Address	• Stockton Riverside College, Harvard Avenue, Thornaby, Stockton-on-Tees TS17 6FB.
Proposed Development	• The proposed development is outlined to be for educational purposes with a new Training Centre for the plot on the existing carpark as well as a carpark expansion onto the land west of the college.
Fieldwork	• 6no cable percussive boreholes (BH01 to BH06 inclusive) to 5.00mbgl with selective rotary core follow on (BH01, BH02, BH05 and BH06) to a maximum depth of 31.00m. • 3no monitoring pipes in BH02, BH03 and BH06. • 7no machine excavated trial pits (TP01 to TP07) to a maximum depth of 2.50mbgl. • 2no hand excavated foundation exposure trial pits (TP08 & TP09) to 1.20mbgl.
Ground Conditions	**Proposed Car Park** • Sandy slightly gravelly clay topsoil covered the entire area to depths of between 0.10mbgl and 0.20mbgl. Made ground was relatively uniform comprising very gravelly sand fill with a low to medium cobble content and was encountered to depths of between 2.00mbgl and 2.50mbgl. Within TP07, a suspected service trench was encountered at 0.70mbgl. ***Proposed Training Centre*** • Made ground was proven to depths of between 2.53mbgl and 7.00mbgl. The made ground comprised tarmac surfacing over a sand sub-base which in turn overlay sandy gravel fill of dolomite with a low-medium cobble content. Locally a layer of organic soft locally very soft peat was encountered to depths of 5.40mbgl and 7.40mbgl then natural ground generally comprised soft and very soft silty slightly sandy organic low strength clay to depths of between 11.50mbgl and 12.10mbgl. This was underlain with dense, locally slightly silty, gravelly sand or very sandy gravel to depths of between 15.20-18.00mbgl. This layer of gravel was interbedded with a layer of stiff slightly sandy slightly gravelly medium to high strength clay at ca. 13.00mbgl. Stiff to very stiff sandy slightly gravelly high strength clay was proven to underlie the granular strata to depths of between 17.80mbgl and 20.00mbgl. Dense to very dense silty slightly gravelly sand underlay the clay to depths of between 19.60mbgl and 21.50mbgl. • Inferred sandstone rockhead was encountered at depths between 19.60mbgl and 21.50mbgl within the cable percussive boreholes. Within the four rotary follow on boreholes which were drilled to a maximum depth of 31.00mbgl bedrock was proven to generally comprise sandstone. • Groundwater was encountered within the boreholes at depths of between 2.80mbgl and 4.40mbgl with deeper strikes between 9.30mbgl and 12.10mbgl.
Contamination Analysis	• Given the site's proposed land use the levels of contamination recorded on site are unlikely to pose a risk to the current and future users of the site. • If any zones of odorous, brightly coloured or suspected contaminated ground or groundwater are encountered then work should cease in that area until the material has been investigated. The results of the investigation will therefore determine whether or not remediation will be required. • PPE for workers. Damping down of site during dry windy conditions. • Basic clean cover system required for all proposed areas of soft landscaping, to a depth of 0.60m. • Controlled waters unlikely to be at risk. • With respect to utilities pH was elevated; as a minimum all services should be laid in clean trenches. • Sub surface concrete should be designed to DS-1 ACEC (Class AC-1).
Geotechnical Analysis & Foundation Recommendations	• Piled foundations should be adopted. Information provided in this report should be made available to a competent piling contractor who can design appropriate foundations. • Where made ground present, a conservative equilibrium CBR of 2% should be adopted for design purposes. • Normal earthworks plant for excavations.

2 INTRODUCTION

2.1 Authorisation

The site investigation described in this report was carried out by Solmek to the instructions of Billinghurst George and Partners on behalf of Stockton Riverside College, on land located within Stockton Riverside College, Harvard Avenue, Thornaby, Stockton-on-Tees TS17 6FB (Appendix A, Figure 1).

Sources of information, including previous work undertaken at the site, are detailed below:

- *Solmek Phase 1 Desk Study (S230207) March 2023.*

Reference should be made to the above report for details of the site's history and environmental setting.

2.2 Scope of Works

The proposed development is outlined to be for educational purposes with a new Training Centre for the plot on the existing carpark as well as a carpark expansion onto the land west of the college.

The following steps may be required in the investigation and remediation of potentially contaminated land:

- Phase 1: Desk Study
- Phase 2: Intrusive Investigation
- Phase 3: Remediation Statement
- Phase 4: Validation Reports

Phases 1 and 2 are generally required in the redevelopment of most sites. Phases 3 and 4 are subject to the findings of the initial stages.

A geotechnical and environmental (Phase 2) investigation including a ground gas risk assessment was requested. The fieldwork and testing was generally carried out according to:

- BS 5930:2015+A1:2020 Code of Practice for Ground Investigations
- BS 10175:2011+A1:2013 Investigation of Potentially Contaminated Sites – Code of Practice.
- CIRIA C665:2007 Assessing Risks Posed by Hazardous Ground Gas to Buildings
- BS 8485:2015+A1:2019 Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments
- Rock and soil descriptions shall be in accordance with BS EN ISO 14689-1:2003, BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004

This report forms part of a Stage 1 Risk Assessment (Generic Quantitative Risk Assessment) with respect to the Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*.

The information provided in this report is based on the investigation fieldwork and is subject to the comments and approval of the various regulatory authorities. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

3 SITE DESCRIPTION

A site inspection, as recommended in BS 5930 and BS 10175, was undertaken on 15th February 2023.

The site is an irregular shaped parcel of land located within the grounds of Stockton Riverside College.

The site comprises the main college building to the north with a two-storey building to the centre of the site. Car parking is generally located to the northwest, east and south east of the site with an access road running across the north of the site and through the eastern car park.

An area of grassed land is noted to the west of the site with a slope up to a road (Harvard Avenue) on the western boundary by approximately 1.00-1.50m. A culvert/ditch runs along the northern boundary of the field.

The topography of the site is relatively level throughout and surfaced with tarmac, paving or grass. Access was gained from the north west off Harvard Avenue and south east off Princeton Drive.

No obvious signs of surface contamination were noted at the time of the walkover however, a number of services were located on and surrounding the site including drainage, manhole covers, streetlighting, CCTV and overhead cables.

The surrounding area generally comprises college facilities to the north and east of the site with roads running along the west (Harvard Avenue) and south (Princeton Drive) of the site. Additionally, a number of office buildings with associated car parking are recorded immediately south west of the site.

4 FIELDWORK

The fieldwork was carried out commencing on 20th February 2023. The extent of the investigation was:

- 4no cable percussive boreholes (BH01, BH02, BH05 and BH06) to maximum depth of 22.50mbgl with rotary open-hole/cored follow on to a maximum depth of 31.00m below ground level (bgl).
    - The boreholes were evenly spread around the site to achieve maximum site coverage.
    - The follow on boreholes were drilled to retrieve rock-core to provide geological information for pile design.
- 2no small percussive boreholes (BH03 & BH04) drilled to a maximum depth of 5.00mbgl.
    - The boreholes were targeted to provide coverage in the area of the proposed footprint of the development to allow foundation design to take place and to provide samples for geotechnical and shallow contamination testing and analysis.
- Gas monitoring wells were installed in BH's 02, 03 & 06.
    - The wells were spaced at <25m centres evenly around the site in accordance with CIRIA C665.
- 9no machine/hand excavated trial pits (TP01 to TP09 inclusive) were dug to a maximum depth of 2.50mbgl.
    - The trial pits were spaced to locate potential deeper areas of made ground from the former use and other potential obstructions.
    - TP08 and TP09 were also utilised as foundation exposure pits adjacent to the eastern and southern elevations of the existing building on site.
- In-situ testing in the exploratory positions as California Bearing Ratio (CBR) and Standard Penetration Tests (SPTs).
- Retrieval of samples for geotechnical and chemical testing.

The boreholes were backfilled with bentonite/grout and/or monitoring installations upon completion. Trial pits were backfilled in layers with arisings. Selected plates of the trial pits are presented in Appendix A.

A plan showing the location of the boreholes and trial pits can be found in Appendix A (Figure 2).

5 GROUND CONDITIONS

A summary of the ground conditions encountered is given below. The exploratory hole logs are presented in Appendix B.

Proposed Western Car Park

5.1 Topsoil

Sandy slightly gravelly clay topsoil covered the entire area to depths of between 0.10mbgl and 0.20mbgl. The gravel component comprised brick, mudstone and quartz.

5.2 Made Ground

Made ground was relatively uniform across the proposed car park area comprising very gravelly sand fill with a low to medium cobble content and was encountered to depths of between 2.00mbgl and 2.50mbgl. Within TP07, a suspected service trench was encountered at 0.70mbgl.

The gravel component comprised ash, brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. The cobbles comprised dolomite. At the base of TP04 at 2.00mbgl, very gravelly sand with a low to medium cobble content was proven to 2.40mbgl. The gravel component was less varied and comprised ash, dolomite, mudstone, sandstone and quartz.

Proposed Training Centre

5.3 Made Ground

Within the foundation exposure pits, made ground comprised a 0.10m thick surface layer of decorative gravel overlying slightly clayey gravelly sand with a low cobble content to a depth of 1.20mbgl. The gravel component comprised brick, ash, concrete, dolomite, timber, plastics and glass. The cobbles comprise bricks.

In the boreholes, made ground was proven to depths of between 2.53mbgl (BH03) and 7.00mbgl (BH06). The made ground comprised tarmac surfacing over a sand sub-base which in turn overlay sandy gravel fill of dolomite with a low-medium cobble content. The cobbles were of dolomite.

5.4 Existing Foundations

Two Foundation Exposure Pits were undertaken. Sketches are provided in Appendix B, whilst a summary is provided below in Table 1.

TABLE 1: SUMMARY OF EXISTING FOUNDATIONS

Hole Reference	Foundation	Top of Foundation (m below ground)	Outstand from Face of Wall (m)	Thickness (m)
TP08	Inferred Pile Cap	0.36	0.14	Not Proven
TP09	Inferred Pile Cap	0.36	0.135	Not Proven

5.5 Natural Deposits

Within BH's 01 and 06 a layer of organic soft locally very soft peat was encountered to depths of 5.40mbgl and 7.40mbgl respectively. Proven to underlie the made ground deposits elsewhere and the peat locally, natural ground generally comprised soft and very soft silty slightly sandy organic low strength clay to depths of between 11.50mbgl and 12.10mbgl. This was underlain with dense, locally slightly silty, gravelly sand or very sandy gravel to depths of between 15.20mbgl (BH06) and 18.00mbgl (BH02). The gravel comprised mudstone, sandstone and quartz. This layer of gravel was interbedded with a layer of stiff slightly sandy slightly gravelly medium to high strength clay at ca 13.00mbgl.

Stiff to very stiff sandy slightly gravelly high strength clay was proven to underlie the granular strata to depths of between 17.80mbgl (BH05) and 20.00mbgl (BH02). The gravel component comprised sandstone and quartz. Dense to very dense silty slightly gravelly sand underlay the clay to depths of between 19.60mbgl (BH05) and 21.50mbgl (BH02).

5.6 Solid Geology

Inferred sandstone rockhead was encountered at depths between 19.60mbgl and 21.50mbgl within the cable percussive boreholes.

Within the four rotary follow on boreholes (BH's 01, 02, 05 and 06) which were drilled to a maximum depth of 31.00mbgl, bedrock was proven to generally comprise sandstone. Within BH01 a thin band of mudstone was recorded between 26.20mbgl and 26.50mbgl.

5.7 Groundwater

Groundwater strikes, where encountered, are presented on the exploratory logs (Appendix B) and are summarised below in Table 2:

TABLE 2: SUMMARY OF GROUNDWATER STRIKES

Exploratory Position	Depth Encountered (mbgl)	Depth after 20 minutes (mbgl)	Strata
BH01	2.8	2.76	MADE GROUND- Dolomite
	12.10	3.42	Sand Horizon
BH02	3.10	2.90	MADE GROUND- Dolomite
	12.00	-	Sand Horizon
BH04	3.05	2.85	MADE GROUND- Dolomite
BH05	3.60	3.24	MADE GROUND- Dolomite
	9.30	4.47	Organic Clay
BH06	4.40	3.80	MADE GROUND- Dolomite
	11.50	4.62	Gravel Horizon

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

6 CONTAMINATION TESTING RESULTS

The proposed development is outlined to be for educational purposes with a new Training Centre for the plot on the existing carpark as well as a carpark expansion onto the land west of the college. The chemical samples were generally retrieved in line with BS ISO 18400-105:2017 *Soil Quality. Sampling*. The chemical results are presented in Appendix C.

6.1 Site Characterisation

Within the Solmek Phase 1 Desk Study, a preliminary conceptual model was formed based on the information obtained. The initial risk was based on the site history which recorded an iron works and other industrial uses throughout the site's history.

An overall moderate risk was provided for various receptors:

- Human Health – Moderate
- Controlled Water – Moderate
- Current Site Users (on-site workers/visitors) – Moderate
- Vegetation – Moderate

- Construction Materials – Moderate/Low

6.2 Contamination Testing and Rationale

To provide information upon the possibility of ground contamination eight samples of made ground were selected for shallow contamination testing. A Moderate overall contamination risk was highlighted in the Phase 1 Desk Study due to previous land uses. This coupled with the end use being residential without homegrown produce land use means that eight samples are considered appropriate for testing. The samples selected are detailed below:

- BH01 – 0.10-0.20m (Made ground – granular)
- BH02 – 0.60-0.70m (Made ground – granular)
- BH03 – 1.20-165m (Made ground – granular)
- BH06 – 0.40-0.60m (Made ground – granular)
- TP01 – 0.10-0.20m (Made ground – topsoil)
- TP03 – 0.50-0.60m (Made ground – granular)
- TP05 – 0.50-0.60m (Made ground – granular)
- TP06 – 0.10-0.20m (Made ground – granular)

The samples selected are considered to provide coverage of the made ground from across the site that would be most likely to be exposed during future site works. The samples were tested for the following contaminant suites:

- 8no Metals, semi-metals, non-metals, inorganic determinants
- 8no Asbestos identification screenings
- 8no Speciated Polyaromatic Hydrocarbons (PAHs)
- 4no Total Petroleum Hydrocarbon Criteria Working Group fractions (TPH CWG)

In addition, two samples were sent for Waste Acceptance Criteria (WAC) Testing:

- BH06 – 0.40-0.60m (Made ground – granular)
- TP05 – 0.50-0.60m (Made ground – granular)

6.3 Test Results

Based on the proposed development at the site, the test results have been compared to a series of Land Quality Management (LQM) Suitable for Use Levels (S4UL) based on a residential without homegrown produce land use. These are the most up to date thresholds published in December 2014.

The value for lead has been compared with the Category 4 Screening Level (March 2014) developed by Contaminated Land: Applications In Real Environments (CL:AIRE).

The test results are presented in Appendix C, and a summary is provided below in Tables 3 & 4.

TABLE 3: SUMMARY OF INORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Residential without HGP Threshold Value	Number of Results Exceeding Threshold Value
Metals						
Cadmium	mg/kg	7	<0.1	2.5	85	0
Chromium	mg/kg	8	1.4	60	910	0
Copper	mg/kg	8	3.7	3700	7100	0
Lead	mg/kg	8	18	470	310*	2
Mercury	mg/kg	1	<0.05	0.21	56	0
Nickel	mg/kg	8	1.9	53	180	0
Zinc	mg/kg	8	21	1600	40000	0
Semi metals and non-metals						
Arsenic	mg/kg	8	0.8	6.9	40**	0
Boron	mg/kg	8	0.4	5.4	11000	0
Selenium	mg/kg	0	<0.5	-	430	0
Inorganic chemicals						
Cyanide (Total)	mg/kg	2	<0.1	0.2	73.8**	0
Sulphate (2:1 Water Soluble)	mg/l	8	12	320	2000^	0
Other						
pH	pH	-	7.5	10.9	5.5^	0

* Category 4 Screening Levels, March 2014
** CLEA Software Version 1.06 (pH7 and 1%SOM)
^ EA Threshold Values
HGP Home Grown Produce

6.4 Metals, Semi Metals and Non Metals

Elevated concentrations of lead were encountered in TP03 (0.50-0.60m) and in TP05 (0.50-0.60m), in the proposed car park area of the site. No other samples indicated significant raised levels of contamination above the S4UL threshold values, based on the eight samples tested.

6.5 Inorganic Chemicals

Soluble sulphates (potentially aggressive to foundation concrete) were recorded between 12 and 320mg/l. None of the samples were elevated above levels affecting human health, or the BRE Special Digest 1 500mg/l limit for the sulphate classification of concrete.

The results of the pH testing were between 7.5 and 10.9. These pH levels are consistent with slightly alkaline to highly alkaline conditions.

6.6 Organic Chemicals

The organic thresholds vary depending on the levels of soil organic matter (SOM).

The average SOM recorded across the site was 1.56% therefore a SOM of 1.00% has been used to determine the S4UL thresholds. Table 4, below, summarises the results.

TABLE 4: SUMMARY OF ORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	Residential without HGP Threshold Value at 1% SOM	Number of Results Exceeding Threshold Value
TPH Aliphatic Fractions						
Aliphatic (C5-C6)	mg/kg	0	<0.01	-	42	0
Aliphatic (C6-C8)	mg/kg	0	<0.01	-	100	0
Aliphatic (C8-C10)	mg/kg	0	<0.01	-	27	0
Aliphatic (C10-C12)	mg/kg	0	<1.5	-	130	0
Aliphatic (C12-C16)	mg/kg	0	<1.2	-	1100	0
Aliphatic (C16-C35)	mg/kg	1	<3.4	296	65000	0
TPH Aromatic Fractions						
Aromatic (C5-C7)	mg/kg	0	<0.01	-	370	0
Aromatic (C7-C8)	mg/kg	0	<0.01	-	860	0
Aromatic (C8-C10)	mg/kg	0	<0.01	-	47	0
Aromatic (C10-C12)	mg/kg	1	<0.9	3.4	250	0
Aromatic (C12-C16)	mg/kg	1	<0.5	5.0	1800	0
Aromatic (C16-C21)	mg/kg	1	<0.6	21	1900	0
Aromatic (C21-C35)	mg/kg	1	<1.4	630	1900	0
Speciated PAH						
Naphthalene	mg/kg	0	<0.1	-	2.3	0
Acenaphthylene	mg/kg	0	<0.1	-	2900	0
Acenaphthene	mg/kg	1	<0.1	0.2	3000	0
Fluorene	mg/kg	1	<0.1	0.4	2800	0
Phenanthrene	mg/kg	3	<0.1	3.7	1300	0
Anthracene	mg/kg	1	<0.1	1.5	31000	0
Fluoranthene	mg/kg	5	<0.1	7.6	1500	0
Pyrene	mg/kg	5	<0.1	6.7	3700	0
Benzo(a)anthracene	mg/kg	3	<0.1	3.2	11	0
Chrysene	mg/kg	3	<0.1	3.0	30	0
Benzo(b)fluoranthene	mg/kg	3	<0.1	2.2	3.9	2
Benzo(k)fluoranthene	mg/kg	3	<0.1	1.5	110	0
Benzo(a)pyrene	mg/kg	3	<0.1	3.1	3.2	2
Indeno(123cd)pyrene	mg/kg	2	<0.1	1.8	360	0
Dibenz(ah)anthracene	mg/kg	2	<0.1	0.6	0.31	1
Benzo(ghi)perylene	mg/kg	2	<0.1	1.9	45	0
PAH	mg/kg	3	<1.6	37	50*	1
Phenols	mg/kg	4	<0.3	0.8	750	0
* EA Threshold Values						

From the eight samples tested for organic determinants, no exceedances were recorded.

6.7 Asbestos

From the eight samples subject to asbestos screening, no asbestos fibres were recorded.

6.8 Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to “identify and remove unacceptable risks to human health and the environment” and to “seek to ensure that contaminated land is made suitable for its current use”. Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as “the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land” and by “the scale and seriousness of such harm or pollution if it did occur”.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *"for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters."*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include "land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health." Categories 3 and 4 "encompass land which is not capable of being determined on such grounds".

See Appendix E for additional notes on contamination guidelines.

7 CONCEPTUAL MODEL AND CONTAMINATION ANALYSIS

The contamination conceptual model in Table 5 identifies the potential pollution linkages present on site based on source – pathway – receptor relationships.

TABLE 5: CONCEPTUAL MODEL

Source	Pathway	Receptor	Risk Rating	Comments
Asphyxiating or explosive ground gases • Made ground (<7.00m) • Landfills within 250m • Not in Radon Affected Area	**Ground gas migration** • Migration through permeable soils • Inhalation	**Future site users** • Transient users	Moderate	Gas monitoring in progress, source risk rating subject to change.
		Users during development • Construction workers	Moderate/ Low	
Areas of contamination hazardous to human health (Residential Thresholds) • 8no samples tested • No significantly elevated organic determinants • No significantly elevated inorganic determinants • No Asbestos detected	• Inhalation • Dust ingestion • Dermal contact	**Future site users** • Transient users	Low	Mitigated by proposed structure and hardstanding.
		Users during development • Construction workers	Moderate /Low	Mitigation measures required during construction. Consideration to be given to Health and Safety Executive: *Protection of Workers and the General Public During the Development of Contaminated Land.*
	• Inhalation • Dust ingestion	**Users of surrounding sites** • Transient adult workers	Moderate /Low	Potential moderate risk during remediation/construction from dust generation. Consideration to be given to dust suppression, in line with BRE: *The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance.*
	• Leaching of mobilised contaminants	**Drift geology** • Secondary Aquifer-Undifferentiated	Low	The low permeability and the relatively low sensitivity aquifer is not considered to be a sensitive receptor.
		Solid geology • Principal Aquifer	Moderate	Leachable contamination overlying a sensitive aquifer (Principal Aquifer but not in a groundwater Source Protection Zone). Limited availability of contaminants in soil analysis.
	• Drainage • Lateral migration • Accumulation of contaminated sediment	**Solid geology** **Surface water features** • Waterway immediately northwest	Moderate/ Low	The surface water is unlikely to be impacted by the low contamination levels recorded.
Areas of phytotoxic contamination • Locally phytotoxic lead	• Uptake via roots and leaf surfaces	**Vegetation** • None on site or proposed	Low	No potential for Vegetation impact as no vegetation is present or proposed.
Areas of contamination above service fabric or BRE Special Digest 1 thresholds • Elevated pH	• Direct contact	**Construction Materials** • Concrete	Moderate /Low	Mitigation through use of sulphate resistant concrete where in contact with made ground.
		Construction Materials • Service Fabric	Moderate /Low	Copper piping to be avoided and prudent to lay any service within a clean bedding.

In general terms, construction workers and construction materials are **potentially most** at risk as pollution linkages may be present for each of these receptors. Users of the site, users of the surrounding sites, and construction materials are considered to be **potentially** at risk from contamination in the soils on site. Vegetation is considered to be at **potentially less** of a risk.

Mitigation measures to reduce the risks identified for reach receptor are discussed in the following sections.

7.1 Users of the Site Once Development is Complete

The users of the site, particularly construction workers, are likely to be exposed to contaminants present in the soils beneath the site during redevelopment work. **Potential** exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatised compounds, and inadvertent soil ingestion. Moreover a risk to ground/surface water receptors exists through leaching of contaminants.

To establish if the levels of contaminants present on site may pose a significant risk to the health of the future users of the site the results of the contamination testing have been compared to a series of LQM/CIEH S4UL based on residential without home grown produce land use.

In terms of metals, semi-metals, non-metals and inorganic determinants generally none of the eight samples subject to testing returned any values above relevant threshold values considered to cause long term harm to human health apart from elevated concentrations of lead in TP03 (0.50-0.60m) and in TP05 (0.50-0.60m), in the proposed car park area of the site.

In terms of TPH and Speciated PAH, all the levels recorded were below the relevant threshold values to cause harm to human health.

Based on the **shallow** soil contamination testing to date, it is considered that the levels of contamination are unlikely to pose a risk to future users of the site, as the lead can be safely encapsulated below the proposed car park.

7.2 Construction Workers and Users of Surrounding Sites

Short term human exposure to contaminants present in soils can occur via several pathways during the construction and ground works phase of the development. These include dermal absorption after contact with contaminated ground, inhalation of soil or dust (including windblown dust), inhalation of volatised compounds, inadvertent soil ingestion and contact with contaminated groundwater.

It is considered that levels of contamination will not pose risk to construction workers and users of surrounding sites. As good practice, full PPE must be employed in accordance with HSE guidance and safeguards should be taken to limit dust during ground works, and access to the public should be restricted. Construction workers should use gloves as a precaution when handling any fill materials. Provision of suitable hygiene facilities are needed for site workers.

Although asbestos was not detected from the soil samples subjected to testing within this investigation, the possibility still exists that asbestos containing materials may still be present on site and currently lie undetected. It is therefore advised that a ‘watching brief’ is undertaken during the initial site strip and any excavation works and advice sought if asbestos is found or suspected.

During dry weather, any excavations may require clean water to be sprinkled at shallow depth to prevent excess dust escaping to off-site receptors. Monitoring of dust concentrations during construction should be given careful consideration to ensure occupational exposure levels are not exceeded.

7.3 Vegetation

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, nickel, and zinc.

To establish if the levels of contaminants present on site may pose a risk to vegetation the results of the contamination testing have been compared to a series of threshold values published in *Code of Good Agricultural Practice for the Protection of Soil*. Concentrations of the phytotoxic determinant lead are shown

as elevated locally. However, for this development, as no new soft landscaping is proposed, it is not considered to be a sensitive receptor.

7.4 Ground and Surface Water

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology.

Groundwater was encountered within the boreholes at depths of between 2.80mbgl and 4.40mbgl and then again between 9.30mbgl and 12.10mbgl during the intrusive investigation as summarised in Table 1.

Given the generally low soil contamination concentrations tested to date; the development is considered to represent a low risk to groundwater or surface water receptors.

7.5 Construction Materials

Materials at risk from potential soil contamination include inorganic matrices such as cement and concrete and also organic material; e.g. plastics and rubbers. Acid ground conditions and elevated levels of sulphates can accelerate the corrosion of building materials. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum-based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

6.5.1 Concrete Classification

BRE Special Digest One: *Concrete in Aggressive Ground*: 2005 3rd Edition has been used to assess the risks posed to underground concrete and to establish the design measures required to mitigate the risks. The results of the pH and water-soluble sulphate tests (when converted to total potential sulphate) fall into Class DS-1 ACEC (Class AC-1) requirements for concrete protection. This assumes mobile groundwater conditions.

6.5.2 Water Supply Pipes Material Selection

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication *Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites* (January 2011). A Brownfield Site is defined in the document as “Land or premises that have previously been used or developed that may be vacant or derelict”. It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer.

Based on the samples tested during the site investigation, levels of slightly alkaline to highly alkaline pH (7.5 to 10.9) were recorded across the site at depths of between 0.10mbgl and 1.65mbgl within the made ground samples.

The concentrations of the selected determinants should be compared to the pipe material selection table in Appendix E, and consultation with the appropriate utility supply company is required to identify the most suitable service fabric. However, the pH levels may preclude the use of copper pipes depending on the depth of proposed service corridors.

7.6 Unexpected Contamination

If during the initial site strip or subsequent ongoing construction activities, any zones of odorous, brightly coloured or suspected contaminated ground are encountered, then the following procedure should be followed:

- Stop work in the affected area
- Contact Solmek and provide pictures of the affected area
- Solmek can visit site to investigate the material and provide guidance
- If required – Solmek can sample and test the material

- Once test results are returned, this will determine whether or not remediation will be required

7.7 Waste Classification

The current legislation on waste involves the categorisation of materials into Inert Waste, Non-Reactive Hazardous Wastes and Hazardous Wastes. The determination of the category depends on DEFRA landfill directive WAC. Material taken off site may be subject to WAC testing by the appropriate waste disposal company.

Two samples were sent for WAC testing. The results show that the determinants to generally fall within the Inert Waste category with the exception of Total Organic Carbon in the sample from BH06 which exceeds the Hazardous Waste threshold.

The decision of the waste category is purely down to the discretion of the particular waste company used to remove the spoil.

If any zones of odorous, brightly coloured or suspected contaminated ground are encountered then work should cease in that area until the material has been tested. The results of the tests will determine whether or not remediation will be required.

8 GROUND GAS ASSESSMENT

The proposed development is outlined to be for educational purposes with a new Training Centre for the plot on the existing carpark as well as a carpark expansion onto the land west of the college.

Ground gases such as carbon dioxide (CO_2), methane (CH_4), carbon monoxide (CO) and volatile organic compounds (VOCs) can be classed as a form of contamination where there is a potential risk to human health.

For this report, gas monitoring is via measuring emissions from three standpipes (BH02, BH03 & BH06) that were installed during the sitework. The gas monitoring will consist of six visits over a period of three months.

The gas monitoring results will be presented as an addendum to this report.

9 GEOTECHNICAL TESTING AND ANALYSIS

Samples taken from the boreholes underwent a series of geotechnical tests at a UKAS accredited laboratory to aid foundation design and soil description. In addition, in-situ Standard Penetration Tests (SPTs) were undertaken at regular intervals during drilling. The geotechnical results are presented in Appendix D.

9.1 Strength and Density

9.1.1 *Undisturbed Triaxial Tests*

Six U100 samples were subjected to quick undrained triaxial testing, Three in the shallow clay layer and three in the deep clay. Within the shallow clay results ranged from 12kPa to 29kPa (very low to low strength). Within the deeper clay results ranged from 63kPa to 249kPa (medium to very high strength).

9.1.2 *SPT N Values*

Standard Penetration Tests undertaken within the natural granular deposits at yielded N values of between 36 and 50+, indicative of dense to very dense deposits.

9.2 Moisture Contents

Nine samples recovered from the boreholes have been subject to moisture content tests to determine the moisture profile at depths of between 6.00 and 19.50mbgl. Moisture levels were between 7.2% and 97%.

9.3 Atterberg Limit Determinations

Three Atterberg Limit Determination tests were carried out on samples of shallow cohesive material to classify the fine grained soils. The results were compared to the Casagrande Chart published in BS 5930 and showed the samples to generally be silt of high to extremely high plasticity.

The Plasticity Indices ranged from 19 to 51 with moisture contents recorded above the corresponding plastic limits. The cohesive material can be assessed as having a **high** shrinkage potential in relation to NHBC Guidance Chapter 4.2.

9.4 Particle Size Distribution Testing

Two samples from the boreholes were subject to Particle Size Distribution (PSD) tests in accordance with BS1377 Part 2 to aid soil descriptions. The results have been used to prepare precise soil descriptions in accordance with BS5930:2015 Section 6 and are presented in Appendix D.

9.5 Rock Strength Testing

24no samples of rock core from the boreholes were sent for Point Load Testing (both axial and diametral) to provide an indication of the strength of the rock. The corrected results ranged between 0.12 and 1.74 $Is_{(50)}$MPa, which can approximately be converted to UCS values of 2.88 to 41.76MPa.

A series of six rock core samples taken were subjected to UCS testing, ranging in depth from 21.70mbgl to 26.90mbgl and comprised six samples of Sandstone.

All the samples exhibited an axial cleavage failure mode and produced UCS results between 16.8 and 28.5MPa.

9.6 pH and Sulphate Results

Five samples of natural soil from the boreholes were tested for acidity and soluble sulphate content to assess whether the material may be potentially aggressive to building fabric. The results of the testing for pH ranged from 7.4 to 8.4 indicating slightly alkaline to alkaline conditions. Soluble sulphates were recorded at levels ranging from 47mg/l to 690mg/l.

9.7 CBR Tests

CBR testing was undertaken within the **made ground** in TP01 to TP07 inclusive, over the proposed car park. The in-situ CBR results are detailed below in Table 6.

TABLE 6: SUMMARY OF CBR TESTING RESULTS

Trial Pit	0.30mbgl result (%)	0.60mbgl result (%)
TP01	12.5	10.2
TP02	10.5	13.5
TP03	9.5	15.0
TP04	13.8	12.5
TP05	11.0	12.0
TP06	13.7	9.2
TP07	9.8	10.3

Where made ground was present, a conservative equilibrium CBR of 2% should be adopted for design purposes.

9.8 Foundations

9.8.1 *Piled Foundations*

For the proposed structure the shallow ground conditions are not suitable to support traditional foundations. Instead, piled foundations should be adopted. Information provided in this report should be made available to a competent piling contractor who can design appropriate foundations in accordance with Section 7: Pile foundations of BS EN 1997 – 1:2004 which applies to end-bearing piles, friction piles, tension piles and transversely loaded piles installed by driving, by jacking, and by screwing or boring. The piling contractor will need to take into consideration the possible effects of negative skin friction from made ground and very soft to soft organic silty clay deposits. Allowance should be made for breaking through known and unknown buried obstructions.

The precise method of pile installation and the applicability of proprietary systems, diameters and depths required would need to be determined by a specialist piling contractor.

9.8.2 *General Foundation Comments*

Prior to placing foundation concrete, obvious soft or loose spots should be removed and replaced with suitably recompacted hardcore or lean mix concrete. In addition, all excavations should be inspected to ensure that they fully penetrate areas of disturbed ground.

Further advice should be sought from Solmek if unexpected ground conditions are encountered during redevelopment.

9.8.3 *Car Parking*

Where made ground is present, a conservative equilibrium CBR of 2% should be adopted for design purposes.

For the access roads and parking areas, if imported granular material is laid down and compacted in accordance with the Specification for Highways Works (approximately 450mm total), this may yield an adequate CBR value. This should be verified with in-situ CBR testing.

9.9 Excavation

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant although breaking out of surfacing and other obstructions should be anticipated. Stability of excavations will be poor in the made ground. Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97: “Trenching Practice”.

9.10 Groundwater

Groundwater was encountered within the boreholes at depths of between 2.80mbgl and 4.40mbgl and then again between 9.30mbgl and 12.10mbgl during the intrusive investigation as summarised in Table 1.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

Appendix A

SOLMEK
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Figure Title

Site Location Plan

Project Number

S230207

Project Name

Stockton Riverside College

Client

BGP

Date

April 2023

DRG Number

Figure 1

Scale

1:5000 @ A4 [DO NOT SCALE]

Legend Key

- Locations By Type - Empty
- Locations By Type - BH
- Locations By Type - CP+RC
- Locations By Type - TP
- Project Bounds - Project Bounds

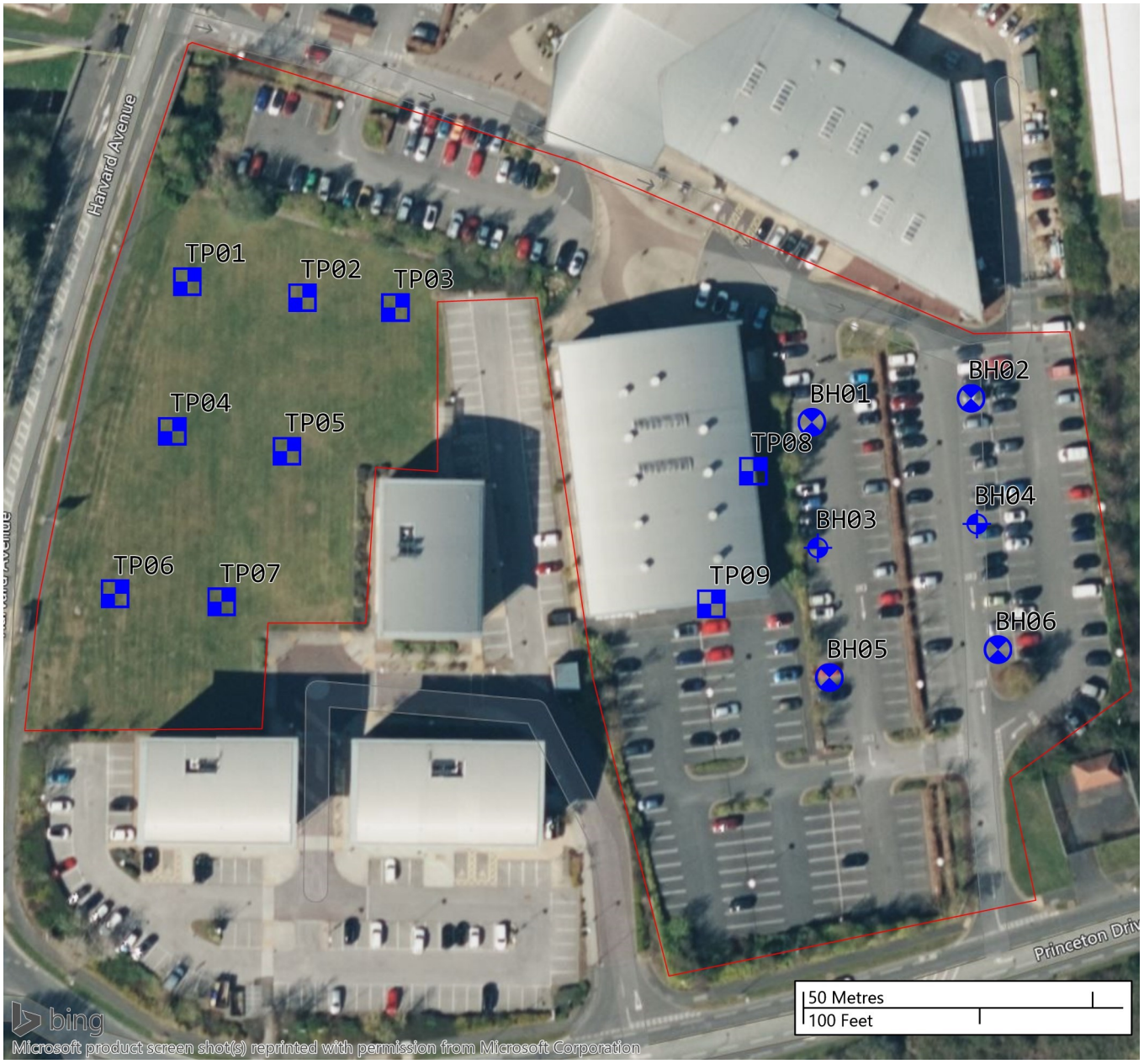

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Figure Title

Exploratory Location Plan

Project Number

S230207

Project Name

Stockton Riverside College

Client

BGP

Date

April 2023

DRG Number

Figure 2

Scale

1:1100 @ A4 [DO NOT SCALE]

Legend Key

- Locations By Type - Empty
- Locations By Type - BH
- Locations By Type - CP+RC
- Locations By Type - TP
- Project Bounds - Project Bounds

Figure 3: Photo showing TP01

Title
Trial Pit Photos
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
April 2023
Fig No.
Figure 3
Scale
Do Not Scale
Key

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Figure 4: Photo showing TP02

Title
Trial Pit Photos
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
April 2023
Fig No.
Figure 4
Scale
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Figure 5: Photo showing TP03

Title
Trial Pit Photos
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
April 2023
Fig No.
Figure 5
Scale
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Key

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Figure 6: Photo showing TP04

Title
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Project
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Client
Stockton Riverside College
Date
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Fig No.
Figure 6
Scale
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Figure 7: Photo showing TP05

Title
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Client
Stockton Riverside College
Date
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Fig No.
Figure 7
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Figure 8: Photo showing TP06

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Client
Stockton Riverside College
Date
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Figure 8
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Figure 9: Photo showing TP07

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Project
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Client
Stockton Riverside College
Date
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Fig No.
Figure 9
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Figure 10: BH01, 22.50-25.50m

Title
Rotary Core Photo
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
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Fig No.
Figure 10
Scale
Do Not Scale
Key

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Figure 11: BH01, 25.50-28.50m

Title
Rotary Core Photo
Project
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Client
Stockton Riverside College
Date
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Fig No.
Figure 11
Scale
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Key

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Figure 12: BH01, 28.50-30.00m

Title
Rotary Core Photo
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
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Fig No.
Figure 12
Scale
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Key

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Figure 13: BH02, 22.00-25.00m

Title
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Project
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Client
Stockton Riverside College
Date
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Fig No.
Figure 13
Scale
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Key

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Figure 14: BH02, 25.00-28.00m

Title
Rotary Core Photo
Project
Stockton Riverside College
Client
Stockton Riverside College
Date
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Fig No.
Figure 14
Scale
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Key

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Figure 15: BH02, 28.00-31.00m

Title
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Project
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Client
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Date
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Figure 15
Scale
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Figure 16: BH05, 20.00-23.00m

Title
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Project
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Client
Stockton Riverside College
Date
April 2023
Fig No.
Figure 16
Scale
Do Not Scale
Key

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Figure 17: BH05, 23.00-26.00m

Title
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Project
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Client
Stockton Riverside College
Date
April 2023
Fig No.
Figure 17
Scale
Do Not Scale
Key

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Figure 18: BH06, 21.00-24.00m

Title
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Project
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Fig No.
Figure 18
Scale
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Figure 19: BH06, 24.00-27.00m

Title
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Project
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Fig No.
Figure 19
Scale
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Appendix B

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Cable Percussive with Rotary Core Follow-on Log

Scale 1:100 Sheet 1 of 2

BH01

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	02/03/2023
Client:	BGP			**Ended:**	03/03/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	03/03/2023

GL (AOD):	
Easting:	445457
Northing:	518683
Logged:	SM
Status:	FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results
		0.05		MADE GROUND: Tarmacadam	0.10 - 0.20	B	
		0.20		MADE GROUND: Black very gravelly sand. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of ash, red-brick, slag, dolomite, mudstone and quartz.	0.20 - 0.30	B	
					0.30 - 0.40	B	
					1.20 - 1.65	SPT (S)	N=20 (4,4/4,5,5,6)
					1.20 - 1.65	D	
				MADE GROUND: Light creamish yellow sandy gravel with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite.	2.00 - 2.45	SPT (S)	N=21 (5,6/5,5,5,6)
					2.00 - 2.45	B+D	
					3.00 - 3.45	SPT (S)	N=29 (6,5/6,7,8,8)
					3.00 - 3.45	B+D	
		3.80			3.80 - 3.90	B	
		4.00		Soft dark grey silty, slightly sandy, slightly gravelly low strength CLAY. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of mudstone, sandstone and quartz.	4.00 - 4.45	U	26 blows [450mm]
					4.45 - 4.50	B	
					5.00 - 5.45	SPT (S)	N=2 (0,1/0,1,0,1)
		5.40			5.00 - 5.45	B+D	
				Soft, locally very soft, dark brown spongy, pseudofibrous PEAT with frequent sandy, slightly gravelly organic Clay inclusions. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to medium of sandstone and quartz.	6.00 - 6.45	U	22 blows [450mm]
					6.45 - 6.50	B	
				Soft, locally very soft, dark grey and locally grey, silty, slightly sandy, organic low strength CLAY of high plasticity. Sand is fine to coarse grained.	7.50 - 7.95	SPT (S)	N=2 (0,0/0,0,1,1)
					7.50 - 7.95	B+D	
					9.00 - 9.45	U	17 blows [450mm]
					9.45 - 9.50	B	
		10.50		Firm black and dark grey silty, slightly sandy medium strength organic CLAY, with a low gravel content. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of chalk, sandstone and quartz.	10.50 - 10.95	SPT (S)	N=11 (2,3/3,2,3,3)
					10.50 - 10.95	B+D	
		12.10			12.00 - 12.45	SPT (S)	N=43
				Dense yellowish brown gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone, mudstone, coal and quartz.	12.00 - 12.45	B+D	(4,7/11,10,11,11)
					12.00 - 12.45	U	15 blows [NR]
		13.50		Dense dark reddish brown silty, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to medium of sandstone, coal and quartz.	13.50 - 13.95	SPT (S)	N=46 (6,8/9,12,12,13)
					13.50 - 13.95	B+D	
					13.50 - 13.95	U	
		15.00		Dense dark reddish brown gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone and quartz	15.00 - 15.45	SPT (S)	N=49
					15.00 - 15.45	B+D	(7,8/11,12,13,13)
					16.50 - 16.95	SPT (S)	N=50+
		16.90		Stiff becoming very stiff, dark brown, locally reddish brown, sandy, slightly gravelly high strength CLAY. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of sandstone and quartz.	16.50 - 16.95	B+D	(10,11/13,14,14,9)
					18.00 - 18.45	SPT (S)	N=50+
					18.00 - 18.45	B+D	(11,12/12,15,17,6)
					19.50 - 19.95	SPT (S)	N=50+
		19.90			19.50 - 19.95	B+D	(13,12/15,17,18)

Hole Diameter

Depth Base (m)	Diameter (mm)
4.50	203
21.00	153

Casing Depths

Depth Base (m)	Diameter (mm)
4.50	203
21.00	153

General Remarks

1.2m Hand excavated inspection pit dug.
Groundwater encountered at 2.80m and 12.10m.
Casing pulled and left for rotary follow on.

Chiselling

From (m)	To (m)	Time (hr)
21.50	22.50	01:00

Ground Water

Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
2.80	2.80	4.00	20	2.76
12.10	12.00		20	3.42

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Cable Percussive with Rotary Core Follow-on Log

Scale 1:100 Sheet 2 of 2

BH01

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	02/03/2023
Client:	BGP			**Ended:**	03/03/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	03/03/2023

GL (AOD):		
Easting:	445457	
Northing:	518683	
Logged:	SM	
Status:	FINAL	

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results			
				Very dense, dark brown and reddish brown silty, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-angular, fine to coarse of sandstone, coal and quartz.	21.00 - 21.45 21.00 - 21.10	SPT (S) D	N=50+ (25/50)			
		21.00		Dark reddish brown moderately weathered arenaceous SANDSTONE. (bedrock)						
		22.50		Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Partially Un weathered. Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean with some FeO staining noted.			80	76	45	NI 90 360
							100	97	55	NI 70 220
		26.20		Weak thinly laminated red MUDSTONE. Weathering: Partially Un weathered Fracture Sub-set: Non intact			93	63	40	NI 70 290
		26.50		Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Un weathered. Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean.			100	97	64	NI 90 400
							85	66	45	NI 60 200
		30.00		End of Borehole at 30.000m						

Hole Diameter		Casing Depths		General Remarks
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	
4.50 21.00	203 153	4.50 21.00	203 153	1.2m Hand excavated inspection pit dug. Groundwater encountered at 2.80m and 12.10m. Casing pulled and left for rotary follow on.

Chiselling		
From (m)	To (m)	Time (hr)
21.50	22.50	01:00

Ground Water				
Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
2.80 12.10	2.80 12.00	4.00	20 20	2.76 3.42

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Cable Percussive with Rotary Core Follow-on Log

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BH02

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	20/02/2023
Client:	BGP			**Ended:**	22/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	22/02/2023

GL (AOD):	
Easting:	445484
Northing:	518687
Logged:	SM
Status:	FINAL

Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
			Depth (m)	Type	Results
0.10		MADE GROUND: Tarmacadam.	0.10	B	
0.30		MADE GROUND: Black very gravelly Sand. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of ash, red-brick, and concrete.	0.10 - 0.15	ES	
0.50			0.15	D	
			0.30 - 0.40	B	N=18 (4,4/4,5,4,5)
			0.60 - 0.70	ES	
		MADE GROUND: Greenish brown sandy Gravel with a low cobble content. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite.	0.70 - 0.80	B	
			1.10 - 1.20	ES	N=20 (5,5/5,4,5,6)
			1.20 - 1.65	SPT (S)	
			1.20 - 1.65	B+D	
			1.60 - 1.70	ES	
		MADE GROUND: Light creamish yellow very sandy Gravel. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of dolomite and quartz.	2.00 - 2.45	SPT (S)	N=49 (15,8/7,14,14,14)
			2.00 - 2.45	B+D	
			2.10 - 2.20	ES	
		Becoming slightly clayey.	3.00 - 3.45	SPT (S)	N=50+ (10,10/12,13,13,42)
		Material saturated	3.00 - 3.45	B+D	
			3.10 - 3.20	ES	
			4.00 - 4.45	SPT (S)	N=42 (10,9/9,12,9,12)
			4.00 - 4.45	B+D	
5.60			4.10 - 4.20	ES	
		Soft, locally firm brown, locally black and grey sandy, slightly gravelly low strength organic thinly laminated CLAY of extremely high plasticity with rare black spongy fibrous peat inclusions and frequent timber fragments noted. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to medium of sandstone, mudstone and quartz.	5.00 - 5.45	SPT (S)	20 blows [450mm]
			5.00 - 5.45	B+D	
6.70			5.50	B+D	
			5.50 - 5.60	ES	
			6.00 - 6.45	U	
			6.45 - 6.50	D	N=2 (0,0/1,0,1,0)
			6.50 - 6.60	ES	
8.00			7.50 - 7.95	SPT (S)	
		Very soft dark brown silty, sandy, slightly gravelly spongy highly organic low strength CLAY with frequent amorphous peat inclusions noted. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of sandstone and mudstone. Frequent timber fragments noted.	7.50 - 7.95	B+D	
			9.00 - 9.45	U	14 blows [450mm]
			9.45 - 9.50	D	
		Soft locally very soft, dark grey locally grey, silty, sandy thinly laminated low strength CLAY. Sand is fine to coarse grained.	10.50 - 10.95	SPT (S)	N=6 (0,1/1,1,2,2)
			10.50 - 10.95	B+D	
12.00			12.00 - 12.45	U	12 blows [250mm]
		Dark grey silty, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is sub-rounded, fine to medium of quartz.			
13.00		Firm, locally stiff dark reddish brown sandy, slightly gravelly medium strength CLAY (boulder clay). Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to medium of mudstone, sandstone and quartz and coal.	13.50 - 13.95	SPT (S)	N=15 (2,2/3,4,4,4)
			13.50 - 13.95	B+D	
14.00		Very dense dark reddish brown slightly silty, slightly gravelly very thinly laminated SAND. Sand is fine to coarse grained. Gravel is sub-rounded, fine to medium of coal and quartz.	15.00 - 15.45	SPT (S)	N=50+ (7,7/15,20,15,40)
			15.00 - 15.45	B+D	
			16.50 - 16.95	SPT (S)	N=50+ (9,10/10,12,21,7)
			16.50 - 16.95	B+D	
			16.50 - 16.95	U	150 blows [NR]
18.00		Firm locally stiff dark reddish brown sandy, slightly gravelly high strength thinly laminated high strength CLAY. Sand is fine to coarse grained. Gravel is fine to medium of sandstone, mudstone, coal and quartz.	18.00 - 18.45	SPT (S)	N=50+ (8,13/30,20,10)
			18.00 - 18.45	B+D	
			19.50 - 19.95	U	200 blows [450mm]
20.00					

Hole Diameter

Depth Base (m)	Diameter (mm)
6.00	203
22.00	153

Casing Depths

Depth Base (m)	Diameter (mm)
6.00	203
24.50	153

General Remarks

1.2m Hand excavated inspection pit dug.
Groundwater encountered at 3.10m and 12.00m.
5.5 Hours slow progress/chiselling1.20m-5.50m (20/02/2023)
3 Hours Chiselling (21/02/2023)
Casing installed for rotary follow on.

Chiselling

From (m)	To (m)	Time (hr)
1.20	3.00	03:00
3.00	5.50	05:50
22.00	24.50	01:00

Ground Water

Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
3.10	3.00	5.00	20	2.90
12.00	6.00			

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Cable Percussive with Rotary Core Follow-on Log

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BH02

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	20/02/2023
Client:	BGP			**Ended:**	22/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	22/02/2023

GL (AOD):	
Easting:	445484
Northing:	518687
Logged:	SM
Status:	FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results			
				Very dense dark reddish brown, locally brown, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone and quartz.	21.00 - 21.45	SPT (S)	N=50+			
					21.00 - 21.45	B+D	(7,7/12,18,15,15)			
		21.50		Extremely weak dark reddish brown arenaceous SANDSTONE. (SHERWOOD SANDSTONE	21.50 - 21.95	SPT (S)	N=50+ (25/70)			
					21.50 - 21.95	D				
				GROUP) Weathering: partially unweathered						
		24.50		Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Partially Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean with some FeO staining noted.			100	84	70	NI
		25.60		Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean.			70	68	49	20 110 130
							100	100	89	40 160 260
							41	41	0	30 70 90
							100	98	39	30 90 190
		31.00		End of Borehole at 31.000m						

Hole Diameter		Casing Depths		General Remarks
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	
6.00 22.00	203 153	6.00 24.50	203 153	1.2m Hand excavated inspection pit dug. Groundwater encountered at 3.10m and 12.00m. 5.5 Hours slow progress/chiselling1.20m-5.50m (20/02/2023) 3 Hours Chiselling (21/02/2023) Casing installed for rotary follow on.

Chiselling		
From (m)	To (m)	Time (hr)
1.20 3.00 22.00	3.00 5.50 24.50	03:00 05:50 01:00

Ground Water				
Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
3.10 12.00	3.00 6.00	5.00	20	2.90

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Borehole Log

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BH03

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	20/02/2023
Client:	BGP			**Ended:**	20/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	20/02/2023

GL (AOD):	
Easting:	445458
Northing:	518661
Logged:	SM
Status:	FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results
		0.05		MADE GROUND: Tarmacadam			
		0.15		MADE GROUND: Black very gravelly sand. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of ash, red-brick, concrete, dolomite, slag and quartz.	0.20 - 0.30	B	
		0.45			0.20 - 0.30	ES	
				MADE GROUND: Light greenish yellow, very sandy gravel with an inferred low cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are angular to sub-angular of dolomite.	0.70 - 0.80	B	
					0.70 - 0.80	ES	
					1.00 - 1.20	B	
					1.20 - 1.65	SPT (S)	N=19 (2,3/4,4,5,6)
					1.20 - 1.30	B	
					1.20 - 1.40	D	
					1.20 - 1.65	ES	
				MADE GROUND: Light creamish yellow, slightly clayey, very sandy gravel with an inferred low-medium cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite.	1.70 - 1.80	ES	
					1.80 - 2.00	B	N=50+ (5,8/22,26,5)
					2.00 - 2.45	SPT (S)	
					2.00 - 2.30	B	N=50+ (4,21/55,31,19,20)
					2.00 - 2.30	D	
		2.53		End of Borehole at 2.530m	2.30 - 2.75	SPT (S)	
					2.30 - 2.53	D	

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	1.2m Hand excavated inspection pit dug. No groundwater encountered.	From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)

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Borehole Log

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BH04

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	20/02/2023
Client:	BGP			**Ended:**	20/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	20/02/2023

GL (AOD):		
Easting:	445486	
Northing:	518665	
Logged:	SM	
Status:	FINAL	

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing		
					Depth (m)	Type	Results
		0.05		MADE GROUND: Tarmacadam	0.10 - 0.15	ES	
		0.20		MADE GROUND: Black very gravelly sand. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of ash, red-brick, concrete, dolomite, slag and quartz.	0.20	D	
					0.40	D	
					0.40 - 0.50	ES	
					0.50 - 0.60	B	
				MADE GROUND: Light creamish yellow, slightly clayey, very sandy gravel with an inferred low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite. Localised sub-angular, medium to coarse slag gravel noted. Material saturated from 3.05mbgl.	0.90 - 1.00	ES	
					1.00 - 1.10	B	
					1.20 - 1.65	SPT (S)	N=18 (4,4/4,5,5,4)
					1.20 - 1.40	B	
					1.20 - 1.65	D	
					1.40 - 1.50	ES	
					1.80 - 2.00	B	
					1.90 - 2.00	ES	N=35 (4,6/6,5,9,15)
					2.00 - 2.45	SPT (S)	
					2.00 - 2.45	D	
					2.20 - 2.40	B	N=50+
					2.40 - 2.85	SPT (S)	(6,8/14,17,17,2)
					2.40 - 2.85	D	
					2.80 - 3.00	B	
					2.90 - 3.00	ES	N=35 (5,4/6,7,12,10)
					3.00 - 3.45	SPT (S)	
					3.00 - 3.45	D	
					3.80 - 4.00	B	
					3.90 - 4.00	ES	N=28 (2,4/5,5,6,12)
					4.00 - 4.45	SPT (S)	
					4.00 - 4.45	D	
		5.00		End of Borehole at 5.000m	5.00 - 5.45	SPT (S)	N=23 (3,4/5,6,5,7)
					5.00 - 5.45	D	

Hole Diameter		Casing Depths		General Remarks	Chiselling			Ground Water				
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)		From (m)	To (m)	Time (hr)	Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
				1.2m Hand excavated inspection pit dug. Groundwater encountered 3.05m.				3.05			20	2.85

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Cable Percussive with Rotary Core Follow-on Log

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BH05

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	27/02/2023
Client:	BGP			**Ended:**	01/03/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	01/03/2023

GL (AOD):	
Easting:	445460
Northing:	518638
Logged:	SM
Status:	FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results
		0.10		MADE GROUND: Tarmacadam.	0.30	B	
				MADE GROUND: Light creamish yellow sandy Gravel with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite.	0.80	B	
					1.20 - 1.65	SPT (C)	N=50+
					1.20 - 1.65	B	(9,9/11,12,18,9)
					2.00 - 2.45	SPT (C)	N=50+ (25/50)
					2.00 - 2.45	B	
					3.00 - 3.45	SPT (C)	N=50+ (25/50)
					3.00 - 3.45	B	
					4.00 - 4.45	SPT (C)	N=50+ (5,6/10,23,17)
					4.00 - 4.45	B	
					5.00 - 5.45	SPT (C)	N=35 (7,7/8,8,9,10)
					5.00 - 5.45	B	
		5.60			5.60	B	
				Soft dark greyish brown slightly sandy, slightly gravelly organic low strength CLAY with frequent dark brown, spongy pseudofibrous peat inclusions. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to medium of sandstone, mudstone, coal and quartz. Frequent wood fragments noted.	6.00 - 6.45	U	
					6.45 - 6.50	B	N=6 (1,1/2,1,1,2)
					6.50 - 6.95	SPT (S)	
					6.50 - 6.95	D	
					7.50 - 7.95	U	
					7.95 - 8.00	B	N=6 (1,1/1,1,2,2)
					8.00 - 8.45	SPT (S)	
					8.00 - 8.45	B+D	
					9.00 - 9.45	SPT (S)	N=8 (2,3/2,2,2,2)
					9.00 - 9.45	B+D	
					10.50 - 10.95	SPT (S)	N=8 (2,3/3,2,1,2)
					10.50 - 10.95	B+D	
		11.50		Dense dark grey very sandy GRAVEL, with an inferred low cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of mudstone, sandstone, coal and quartz. Cobbles are sub-angular of sandstone.	11.50 - 11.60	B	
					12.00 - 12.45	SPT (S)	N=41 (6,8/8,8,11,14)
					12.00 - 12.45	B+D	
		12.70			12.70 - 12.80	B	
		13.40		Stiff dark reddish brown slightly sandy, slightly gravelly CLAY. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to medium of mudstone, sandstone, coal and quartz.	13.40 - 13.50	B	N=36 (4,4/7,9,9,11)
					13.50 - 13.95	SPT (S)	
					13.50 - 13.95	B+D	
				Dense reddish brown very sandy GRAVEL, with an inferred low cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of mudstone, sandstone, coal and quartz. Cobbles are sub-angular of sandstone.	15.00 - 15.45	SPT (S)	N=41 (3,6/9,10,10,12)
					15.00 - 15.45	B+D	
		15.50			15.50 - 15.60	B	
					16.50 - 16.95	U	300 blows [200mm]
				Firm to stiff dark reddish brown sandy, slightly gravelly medium strength CLAY. Sand is fine to coarse grained. Gravel is angular to sub-rounded fine to coarse of sandstone, mudstone and quartz.	16.95 - 17.00	B	
		17.80			18.00 - 18.45	SPT (S)	N=50+
				Dense becoming very dense dark reddish brown gravelly SAND, with a low cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone, coal and quartz.	18.00 - 18.45	B+D	(7,8/10,15,15,10)
		19.60			19.50 - 19.95	SPT (S)	N=50+ (20,5/30,20)
		20.00			19.50 - 19.95	B	

Hole Diameter

Depth Base (m)	Diameter (mm)
13.50	203
19.50	153

Casing Depths

Depth Base (m)	Diameter (mm)
13.50	203
19.50	153

General Remarks

1.2m Hand excavated inspection pit dug.
Groundwater encountered at 3.60m and 9.30m.

Chiselling

From (m)	To (m)	Time (hr)
1.20	4.50	04:50
19.50	20.00	01:00

Ground Water

Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
3.60	3.60	5.90	20	3.24
9.30	7.50		20	4.47

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Cable Percussive with Rotary Core Follow-on Log

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BH05

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	27/02/2023
Client:	BGP			**Ended:**	01/03/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	01/03/2023

GL (AOD):
Easting: 445460.19
Northing: 518638.25
Logged: SM
Status: FINAL

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results	Coring / Fractures: TCR (%)	SCR (%)	RQD (%)	Fracture
				Dark reddish brown arenaceous SANDSTONE. (bedrock)	20.10 - 20.55	SPT (S)	N=50+ (25/50)				
				Moderately strong very thin to medium bedded red moderately cemented SANDSTONE. Weathering: Partially Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean with some FeO staining noted.	20.10 - 20.55	D		92	83	21	NI 40 200
		20.90		Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean.				100	100	92	10 180 350
								76	65	49	NI 100 290
								95	95	92	40 190 300
		26.00		End of Borehole at 26.000m							

Hole Diameter		Casing Depths		General Remarks
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	
13.50	203	13.50	203	1.2m Hand excavated inspection pit dug. Groundwater encountered at 3.60m and 9.30m.
19.50	153	19.50	153	

Flush Returns			
From (m)	To (m)	Flush Type	Flush (%)

Ground Water				
Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
3.60	3.60	5.90	20	3.24
9.30	7.50		20	4.47

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Cable Percussive with Rotary Core Follow-on Log

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BH06

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	23/02/2023
Client:	BGP			**Ended:**	25/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	25/02/2023

GL (AOD):	
Easting:	445489
Northing:	518643
Logged:	SM
Status:	FINAL

Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results
0.10		MADE GROUND: Tarmacadam	0.10 - 0.20	B	
0.20		MADE GROUND: Black very gravelly sand. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of ash, red-brick, slag, dolomite, mudstone and quartz.	0.40 - 0.50	B	
			1.20 - 1.65	SPT (S)	N=20 (4,4/4,5,6,5)
			1.20 - 1.65	B+D	
		MADE GROUND: Light creamish yellow sandy gravel with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of dolomite and quartz. Cobbles are sub-angular of dolomite.	2.00 - 2.45	SPT (S)	N=24 (5,5/6,5,6,7)
			2.00 - 2.45	B+D	
			3.00 - 3.45	SPT (S)	N=46
			3.00 - 3.45	B+D	(10,13/14,12,10,10)
			4.00 - 4.45	SPT (S)	N=44
			4.00 - 4.45	B+D	(8,9/10,12,12,10)
			5.00 - 5.45	SPT (S)	N=50+
			5.00 - 5.45	B+D	(12,10/15,15,15,5)
			6.00 - 6.45	SPT (S)	N=15 (5,5/3,3,4,5)
			6.00 - 6.45	B+D	
7.00			7.00 - 7.10	B	
7.40		Soft dark brown clayey, slightly sandy, spongy pseudofibrous PEAT, with frequent organic clay inclusions and frequent wood fragments noted. Sand is fine to coarse grained.	7.50 - 7.95	U	14 blows [450mm]
			7.95 - 8.00	D	
		Soft dark grey very silty, sandy, slightly gravelly low strength thinly laminated organic CLAY of extremely high plasticity. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to medium of mudstone, sandstone and quartz. Occasional timber fragments noted.	9.00 - 9.45	SPT (S)	N=1 (0,0/0,0,1,0)
			9.00 - 9.45	B+D	
			10.50 - 10.95	U	24 blows [400mm]
			10.95 - 11.00	D	
11.50		Dense grey, very gravelly SAND, with an inferred low cobble content. Sand is fine to coarse grained. Gravel is angular to sub-rounded fine to coarse of mudstone, sandstone coal and quartz. Cobbles are sub-angular to sub-rounded of sandstone. Organic based aroma and possible free-phase hydrocarbons noted within groundwater.	12.00 - 12.45	SPT (S)	N=32 (5,6/7,7,8,10)
			12.00 - 12.45	B+D	
			12.50 - 12.60	B	
13.00			13.50 - 13.95	SPT (S)	N=32 (6,7/7,7,8,10)
			13.50 - 13.95	B+D	
14.00		Stiff dark reddish brown and locally dark grey sandy, slightly gravelly high strength CLAY. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of mudstone, sandstone, coal and quartz.	14.00 - 14.10	B	
			15.00 - 15.45	SPT (S)	N=47
15.20			15.00 - 15.45	B+D	(10,12/12,12,11,12)
15.60		Dense dark brown, locally reddish brown, slightly clayey, slightly silty, gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone, coal and quartz.			
16.50			16.50 - 16.95	U	200 blows [300mm]
		Stiff dark reddish brown and locally dark grey sandy, slightly gravelly high strength CLAY. Sand is fine to coarse grained. Gravel is sub-angular to sub-rounded, fine to coarse of mudstone, sandstone, coal and quartz.	18.00 - 18.45	SPT (S)	N=50+
			18.00 - 18.45	B+D	(6,7/11,13,15,21)
		Firm locally stiff, reddish brown sandy, slightly gravelly thinly laminated CLAY. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to medium of mudstone, sandstone, coal and quartz.			
19.40			19.50 - 19.95	SPT (S)	N=50+ (9,9/12,18,50)
			19.50 - 19.95	B+D	
			20.00 - 20.10	B	

Hole Diameter

Depth Base (m)	Diameter (mm)
13.50	203
21.00	150

Casing Depths

Depth Base (m)	Diameter (mm)
13.50	203
21.00	150

General Remarks

1.2m Hand excavated inspection pit dug.
Groundwater encountered at 4.40m and 11.50m.
Casing installed for rotary follow on.

Chiselling

From (m)	To (m)	Time (hr)
2.50	5.50	03:00

Ground Water

Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
4.40	4.40		20	3.80
11.50	11.50		20	4.62

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Cable Percussive with Rotary Core Follow-on Log

Scale 1:100 Sheet 2 of 2

BH06

Contract no:	S230207	**Site:**	Stockton Riverside College	**Driller:**	Bainbridge Brothers Ltd
				Plant used:	Dando 2000 & Beretta T41
				Started:	23/02/2023
Client:	BGP			**Ended:**	25/02/2023
Method:	Cable Percussive with Rotary Core follow on			**Backfilled:**	25/02/2023

GL (AOD):		
Easting:	445489	
Northing:	518643	
Logged:	SM	
Status:	FINAL	

Backfill / Installation	Legend	Depth (m)	Level (m AOD)	Stratum Description	Samples and Insitu Testing: Depth (m)	Type	Results			
		20.60		Very stiff dark reddish brown slightly sandy, slightly gravelly high strength CLAY. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to medium of mudstone, sandstone, coal and						
		21.00		quartz.	21.00 - 21.45	SPT (S)	N=50+ (25/50)			
		21.34			21.00 - 21.45	B+D				
		21.60		Very dense dark reddish brown very gravelly SAND. Sand is fine to coarse grained. Gravel is angular to sub-rounded, fine to coarse of sandstone, coal and quartz.			77	77	73	20 110 370
				Dark reddish brown moderately unweathered arenaceous SANDSTONE.			99	99	51	30 70 270
				NO RECOVERY						
				Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Partially Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean with some FeO staining noted.			80	80	50	20 90 170
				Moderately strong thin to medium bedded red moderately cemented SANDSTONE. Weathering: Un weathered Fracture Sub-set: Sub-horizontal to bedding, moderately spaced, rough, undulating fractures, open and clean.			97	90	71	NI 110 250
		27.00		End of Borehole at 27.000m						

Hole Diameter		Casing Depths		General Remarks
Depth Base (m)	Diameter (mm)	Depth Base (m)	Diameter (mm)	
13.50 21.00	203 150	13.50 21.00	203 150	1.2m Hand excavated inspection pit dug. Groundwater encountered at 4.40m and 11.50m. Casing installed for rotary follow on.

Chiselling		
From (m)	To (m)	Time (hr)
2.50	5.50	03:00

Ground Water				
Depth Strike (m)	Depth Casing (m)	Depth Sealed (m)	Time Elapsed (min)	Water Level (m)
4.40 11.50	4.40 11.50		20 20	3.80 4.62

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Trial Pit Log

TrialPit No
TP01
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445348E - 518706N Level:
Plant Used:	8.5T Tracked Excavater	Dimensions (m): Depth 2.45	2.75 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10 - 0.20	B+ES		0.20			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	12%				
	0.60 - 0.70	B+ES					MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.60	CBR	10%				
				2.45			End of Pit at 2.450m

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Remarks: No groundwater encountered.
No visual or olfactory contamination noted.

Stability: Pit wall open with areas of instability from 0.90mbgl.

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Trial Pit Log

TrialPit No
TP02
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445368E - 518703N Level:
Plant Used:	8.5T Tracked Excavater	Dimensions (m): Depth 2.50	2.60 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.05 - 0.10	B+ES		0.10			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	10%				MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.60 - 0.70 0.60	B+ES CBR	 13%				
	1.00 - 1.10	B+ES					
	1.50 - 1.60	B+ES					
	2.10 - 2.20	B+ES					
				2.50			End of Pit at 2.500m

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Remarks: No groundwater encountered.
No visual or olfactory contamination noted.

Stability: Pit wall open with areas of instability from 1.00mgbl.

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Trial Pit Log

TrialPit No
TP03
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445384E - 518702N Level:
Plant Used:	8.5T Tracked Excavater	Dimensions (m): Depth 2.35	2.55 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	B		0.10			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	9.0%				
	0.50 - 0.60	B+ES					MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.60	CBR	15%				
	1.00 - 1.10	B+ES					
	1.50 - 1.60	B+ES					
	2.00 - 2.10	B+ES					
				2.35			End of Pit at 2.350m

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Remarks: No groundwater encountered.
Rate of progress significantly reduced. (Fused material)
No visual or olfactory contamination noted.

Stability: Pit wall open and stable on completion.

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Trial Pit Log

TrialPit No
TP04
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445345E - 518680N Level:
Plant Used:	8.5T Tracked Excavater	Dimensions (m): Depth 2.40	2.40 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	B+ES		0.10			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	13%				
	0.50 - 0.60	B+ES					MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.60	CBR	12%				
	1.00 - 1.10	B+ES					
	1.50 - 1.60	B					
	1.60 - 1.70	ES					
	2.10 - 2.20	B+ES		2.00			MADE GROUND: Dark brown locally black very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, dolomite, mudstone, sandstone and quartz. Cobbles are angular to subangular of dolomite.
				2.40			End of Pit at 2.400m

Remarks: No groundwater encountered.
No visual or olfactory contamination noted.

Stability: Pit wall open on completion with instability from 2.00m.

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Trial Pit Log

TrialPit No
TP05
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445365E - 518677N Level:
Plant Used:	8.5T Tracked Excavater	Dimensions (m): Depth 2.40	2.50 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	11%				
	0.50 - 0.60	B+ES					MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.60	CBR	12%				
	1.00 - 1.10	B+ES					
	1.50 - 1.60	B+ES					
	2.00 - 2.10	B+ES					
				2.40			End of Pit at 2.400m

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Remarks: No groundwater encountered.
No visual or olfactory contamination noted.

Stability: Pit wall open and stable on completion.

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Trial Pit Log

TrialPit No
TP06
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445336E - 518652N Level:
Plant Used:	85T Tracked Excavater	Dimensions (m): Depth 2.00	2.40 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	B+ES		0.20			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.30	CBR	13%				MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
	0.50 - 0.60	B+ES					
	0.60	CBR	9.0%				
	1.50 - 1.60	B+ES					
				2.00			End of Pit at 2.000m

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Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.

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Trial Pit Log

TrialPit No
TP07
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445354E - 518650N Level:
Plant Used:	85T Tracked Excavater	Dimensions (m): Depth 0.80	2.30 × 0.70
Client:	BGP		

Date: 22/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20 - 0.30 0.30	B+ES CBR	9.0%	0.10			MADE GROUND: Dark brown sandy slightly gravelly clayey topsoil with some fine to medium plant rootlets. Sand is fine to coarse grained. Gravel is subangular to subrounded, fine to coarse of red brick, mudstone and quartz.
	0.60 - 0.70 0.60	B+ES CBR	10%	0.70			MADE GROUND: Dark grey very gravelly sand with a low to medium cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of ash, red brick, slag, glass, ceramics, plastic, timber, dolomite and quartz. Cobbles are subangular of dolomite.
				0.80			MADE GROUND: Yellow brown building sand. (Suspected service trench backfill). End of Pit at 0.800m

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Remarks: No groundwater encountered.
Suspected services present at CAT scan from 0.60mbgl. Building sand parallel with pit. (Possible trench backfill)

Stability: Pit wall open and stable.

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Trial Pit Log

TrialPit No
TP08
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445447E - 518674N Level:
Plant Used:	85T Tracked Excavater	Dimensions (m): Depth 1.20	0.85 / 0.80
Client:	BGP		

Date: 27/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10			MADE GROUND: Decorative 20mm gravel.
	1.10 - 1.20	B+ES					MADE GROUND: Dark greyish brown slightly clayey, gravelly sand with a low cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of red brick, ash, concrete, dolomite, timber, plastics and glass. Cobbles are subangular of red brick.
				1.20			End of Pit at 1.200m

1
2
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Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

Stability: Pit wall open and stable on completion.

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Trial Pit Log

TrialPit No
TP09
Sheet 1 of 1

Project Name:	Stockton Riverside College	Project No. S230207	Co-ords: 445440E - 518651N Level:
Plant Used:	85T Tracked Excavater	Dimensions (m): Depth 1.20	0.85 / 0.80
Client:	BGP		

Date: 27/02/2023
Scale: 1:26
Logged: SM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.10			MADE GROUND: Decorative 20mm gravel.
	1.10 - 1.20	B+ES					MADE GROUND: Dark greyish brown slightly clayey, gravelly sand with a low cobble content. Sand is fine to coarse grained. Gravel is angular to subrounded, fine to coarse of red brick, ash, concrete, dolomite, timber, plastics and glass. Cobbles are subangular of red brick.
				1.20			End of Pit at 1.200m

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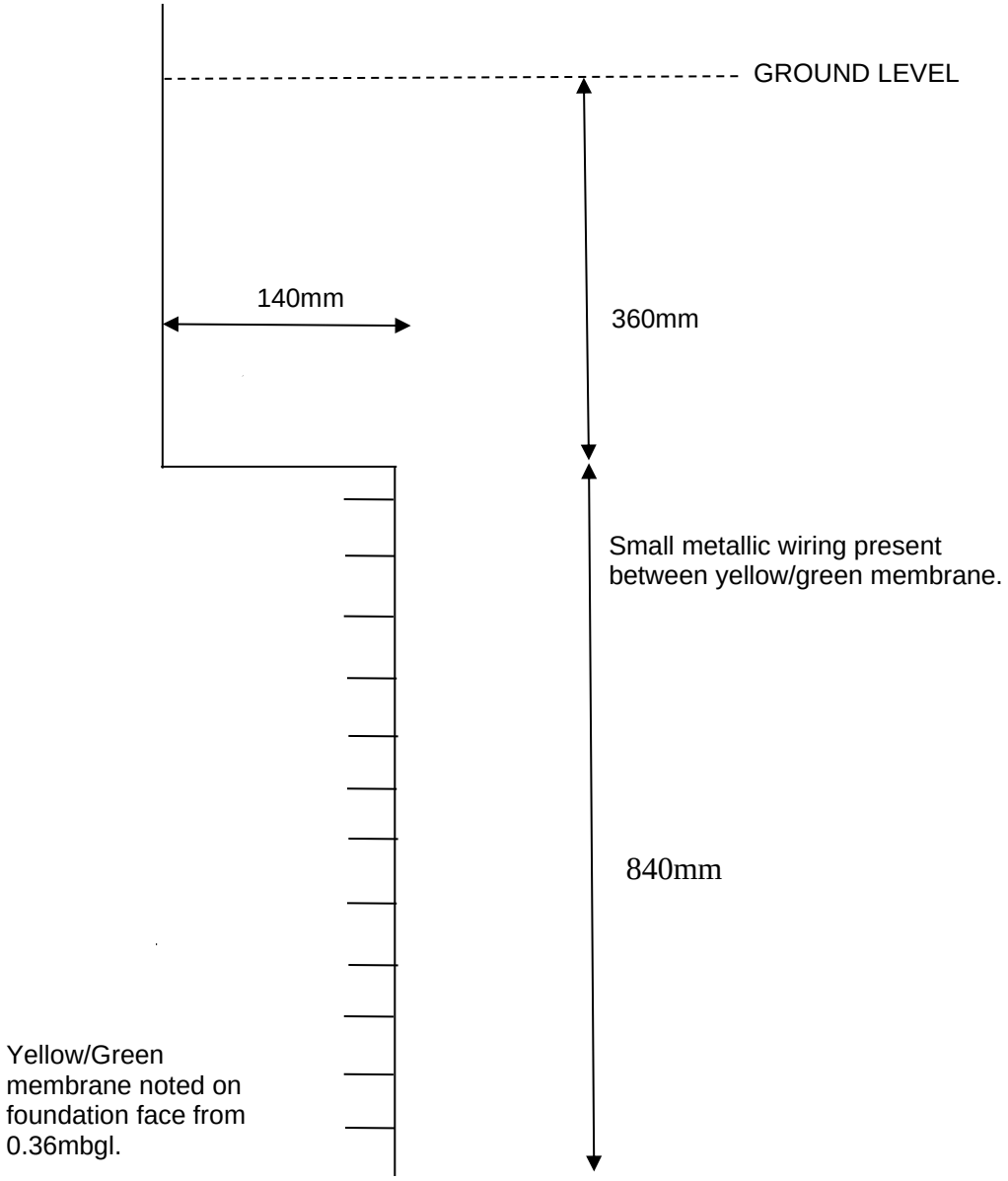
Remarks: No groundwater encountered.
No visual/olfactory contamination noted.

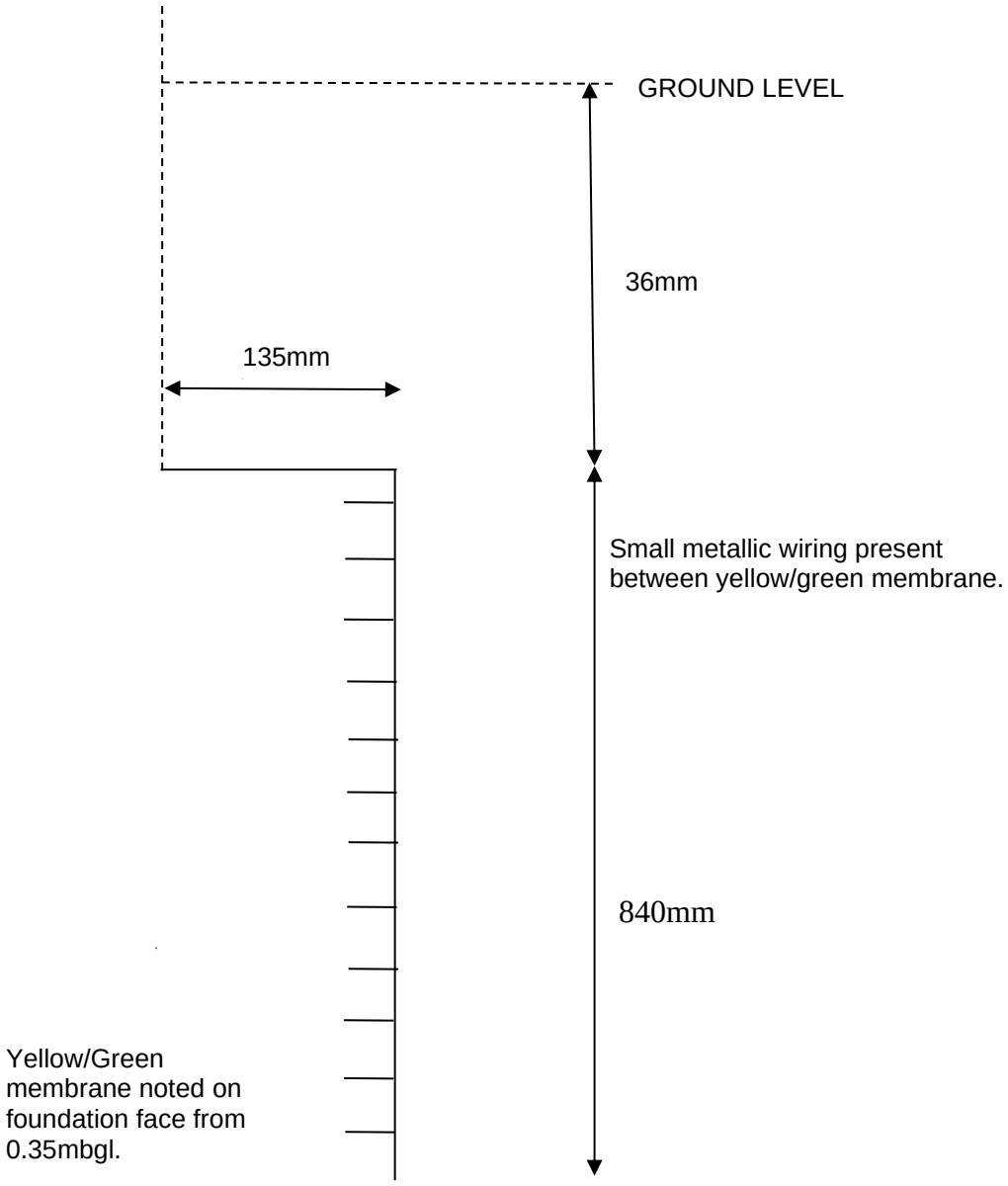
Stability: Pit wall open and stable on completion.

S230207
Stockton Riverside College
TP08



NTS

S230207
Stockton Riverside College
TP09



NTS

Appendix C

Certificate of Analysis

Certificate Number 23-06578 *Issued:* 27-Mar-23

Client SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference 23-06578

Client Reference S230207

Order No SOL7130

Contract Title South Riverside College

Description 8 Soil samples, 2 Leachate samples.

Date Received 20-Mar-23

Date Started 20-Mar-23

Date Completed 27-Mar-23

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

Kirk Bridgewood
General Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

ilac-MRA

UKAS TESTING 2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

Sample ID	Depth	Lab No	Completed	Matrix Description
BH01	0.10-0.20	2142903	27/03/2023	Brown very gravelly, sandy CLAY
BH02	0.60-0.70	2142904	27/03/2023	Light brown gravelly, sandy CLAY
BH03	1.20-1.65	2142905	27/03/2023	Light brown gravelly, sandy CLAY
BH06	0.40-0.60	2142906	27/03/2023	Light brown very gravelly, sandy CLAY
TP01	0.10-0.20	2142907	27/03/2023	Brown sandy CLAY
TP03	0.50-0.60	2142908	27/03/2023	Brown gravelly, sandy CLAY
TP05	0.50-0.60	2142909	27/03/2023	Brown gravelly, sandy CLAY
TP06	0.10-0.20	2142910	27/03/2023	Brown sandy CLAY including some rootlets

Summary of Chemical Analysis
Soil Samples

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

			Lab No	2142903	2142904	2142905	2142906	2142907	2142908
			.Sample ID	BH01	BH02	BH03	BH06	TP01	TP03
			Depth	0.10-0.20	0.60-0.70	1.20-1.65	0.40-0.60	0.10-0.20	0.50-0.60
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	3.2	1.3	0.8	2.2	6.9	3.8
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.2	0.4	0.6	0.8	0.6	5.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.0	< 0.1	0.1	0.2	0.2	2.5
Chromium	DETSC 2301#	0.15	mg/kg	32	1.6	1.4	3.3	23	60
Copper	DETSC 2301#	0.2	mg/kg	550	3.7	13	9.6	29	2000
Lead	DETSC 2301#	0.3	mg/kg	260	18	21	19	42	450
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	40	2.1	1.9	3.8	19	53
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	710	21	33	49	84	1400
Inorganics									
pH	DETSC 2008#		pH	9.6	9.2	9.4	9.5	7.5	9.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Organic matter	DETSC 2002#	0.1	%	3.9	0.4	0.2	0.3	3.1	0.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	66	33	14	80	12	65
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5			< 1.5	< 1.5	
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2			< 1.2	< 1.2	
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	6.3			< 1.5	< 1.5	
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	290			< 3.4	< 3.4	
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	290			< 10	< 10	
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01			< 0.01	< 0.01	
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	3.4			< 0.9	< 0.9	
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	5.0			< 0.5	< 0.5	
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	21			< 0.6	< 0.6	
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	630			< 1.4	< 1.4	
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	660			< 10	< 10	
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	950			< 10	< 10	
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	3.7	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.5	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

			Lab No	2142903	2142904	2142905	2142906	2142907	2142908
			.Sample ID	BH01	BH02	BH03	BH06	TP01	TP03
			Depth	0.10-0.20	0.60-0.70	1.20-1.65	0.40-0.60	0.10-0.20	0.50-0.60
			Other ID						
			Sample Type	ES	ES	ES	ES	ES	ES
			Sampling Date	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023	07/03/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.2	7.6	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.2	6.7	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.7	< 0.1	< 0.1	< 0.1	3.2	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.7	< 0.1	< 0.1	< 0.1	3.0	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	1.4	< 0.1	< 0.1	< 0.1	2.2	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	1.5	< 0.1	< 0.1	< 0.1	1.4	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.6	< 0.1	< 0.1	< 0.1	3.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.8	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.6	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.9	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	5.9	< 1.6	< 1.6	< 1.6	37	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.3	< 0.3	< 0.3	< 0.3	0.7	< 0.3

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

			Lab No	2142909	2142910
			.Sample ID	TP05	TP06
			Depth	0.50-0.60	0.10-0.20
			Other ID		
			Sample Type	ES	ES
			Sampling Date	07/03/2023	07/03/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	3.1	11
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.1	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.8	0.6
Chromium	DETSC 2301#	0.15	mg/kg	35	32
Copper	DETSC 2301#	0.2	mg/kg	3700	240
Lead	DETSC 2301#	0.3	mg/kg	470	150
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.21
Nickel	DETSC 2301#	1	mg/kg	26	30
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	1600	400
Inorganics					
pH	DETSC 2008#		pH	10.9	8.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	1.4	2.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	320	32
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	
Aliphatic C5-C35: EH_CU+HS_1D_AL	DETSC 3072*	10	mg/kg	< 10	
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	
Aromatic C5-C35: EH_CU+HS_1D_AR	DETSC 3072*	10	mg/kg	< 10	
TPH Ali/Aro Total C5-C35: EH_CU+HS_1D_Total	DETSC 3072*	10	mg/kg	< 10	
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.4
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

			Lab No	2142909	2142910
			.Sample ID	TP05	TP06
			Depth	0.50-0.60	0.10-0.20
			Other ID		
			Sample Type	ES	ES
			Sampling Date	07/03/2023	07/03/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Fluoranthene	DETSC 3301	0.1	mg/kg	0.1	1.3
Pyrene	DETSC 3301	0.1	mg/kg	0.2	1.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.8
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	0.7
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.5
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.3
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.8
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.5
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.2
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	0.4
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	7.1
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5	0.8

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College
Sample Id BH06 0.40-0.60

Sample Numbers 2142906 2142911
Date Analysed 27/03/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	7.2	3	5	6
DETSC 2003# Loss On Ignition	%	0.59	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	55.0	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	9.5	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.63	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	25	0.25	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	4.8	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	94	0.94	2	50	100
DETSC 2306 Mercury as Hg	0.019	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	9.7	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.79	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	3	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	13	0.13	0.06	0.7	5
DETSC 2306 Selenium as Se	0.32	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2	0.02	4	50	200
DETSC 2055 Chloride as Cl	1400	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	130	1.3	10	150	500
DETSC 2055 Sulphate as SO4	17000	170	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	65000	650	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	9.9
DETSC 2009 Conductivity uS/cm	93.4
* Temperature*	17.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.986
Volume of Eluate VE1*	0.936

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College
Sample Id TP05 0.50-0.60

Sample Numbers 2142909 2142912
Date Analysed 27/03/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.3	3	5	6
DETSC 2003# Loss On Ignition	%	5.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	10.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	1	0.01	0.5	2	25
DETSC 2306 Barium as Ba	7.5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	2.3	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	11	0.11	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	2.8	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.2	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	1.6	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.33	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	18000	180	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	27000	270	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	160000	1600	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	6000	60	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	10.8
DETSC 2009 Conductivity uS/cm	234.0
* Temperature*	17.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.968
Volume of Eluate VE1*	0.92

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-06578
Client Ref S230207
Contract Title South Riverside College

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2142903	BH01 0.10-0.20	SOIL	NAD	none	Darryl Fletcher
2142904	BH02 0.60-0.70	SOIL	NAD	none	Darryl Fletcher
2142905	BH03 1.20-1.65	SOIL	NAD	none	Darryl Fletcher
2142906	BH06 0.40-0.60	SOIL	NAD	none	Darryl Fletcher
2142907	TP01 0.10-0.20	SOIL	NAD	none	Darryl Fletcher
2142908	TP03 0.50-0.60	SOIL	NAD	none	Darryl Fletcher
2142909	TP05 0.50-0.60	SOIL	NAD	none	Darryl Fletcher
2142910	TP06 0.10-0.20	SOIL	NAD	none	Darryl Fletcher

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.

Information in Support of the Analytical Results

Our Ref 23-06578
Client Ref S230207
Contract South Riverside College

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2142903	BH01 0.10-0.20 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142904	BH02 0.60-0.70 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142905	BH03 1.20-1.65 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142906	BH06 0.40-0.60 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142907	TP01 0.10-0.20 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142908	TP03 0.50-0.60 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142909	TP05 0.50-0.60 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142910	TP06 0.10-0.20 SOIL	07/03/23	GJ 250ml x2, PT 1L	pH + Conductivity (7 days)	
2142911	BH06 0.40-0.60 LEACHATE	07/03/23	GJ 250ml x2, PT 1L		
2142912	TP05 0.50-0.60 LEACHATE	07/03/23	GJ 250ml x2, PT 1L		

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

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL

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

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.

End of Report

Appendix D

Laboratory Report Front Sheet

Site name	Job number
Stockton Riverside College	S230207

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

UKAS TESTING
10258

Client details:

Reference:	S230207
Name:	Solmek
Address:	12 Yarm Road, Stockton-on-tees, TS18 3NA
Telephone:	01642 607083
Email:	matkins@solmek.com
FAO:	Mark Atkins

Samples received:

Date commenced: 20/03/2023

Date reported: 11/04/2023

Observations and interpretations are outside of the UKAS Accreditiation

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

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the above reporting date the samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:	Approved Signitories:
JBrischuk.	☐ D.Anderson (Managing Director) ☑ J. Brischuk (Laboratory Manager) ☐ T. Finnimore (Quality/Technical Manager)

Summary of Classification Tests

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

UKAS TESTING

10258

Site name	Job number
Stockton Riverside College	S230207

Hole	Depth Top m	Depth Base m	Type	*w* %	Oven temp. oc	wa %	Pa %	Pr %	wL %	wP %	IP %	IL	Plasticity class	Preparation method
BH01	9.00		U	49	50	49	100	0	57-s	38	19	0.579	MH	Tested in natural condition
BH01	13.50		B	24	105									
BH02	6.00		U	89	50	105	85	15	134-s	83	51	0.431	ME	Tested after >425µm removed by hand
BH02	19.50		U	14	105									
BH05	12.00		B	7.2	105									
BH05	16.50		U	20	105									
BH06	7.50		U	97	50	97	100	0	124-s	85	39	0.308	ME	Tested in natural condition
BH06	10.50		U	51	50									
BH06	16.50		U	20	105									

All tests found in G2M Testing UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description	Category	BS Test Code
w	Moisture content		BS 1377:1990 Part 2 Clause 3.2
wa	Equivalent moisture content passing 425µm sieve		BS 1377:1990 Part 2 Clause 3.2
wL	Liquid limit — Single point	-s	BS 1377:1990 Part 2 Clause 4.4
	Liquid limit — Four point	-f	BS 1377:1990 Part 2 Clause 4.3
wP	Plastic limit		BS 1377:1990 Part 2 Clause 5.2
Pa	Percentage passing 425um sieve		
Pr	Percentage retained 425um sieve		
IP	Plasticity index		BS 1377:1990 Part 2 Clause 5.4
IL	Liquidity index		BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"	*	

Approved by	D Anderson
Approval date	04/04/2023 15:14
Date report generated	
Report Number	

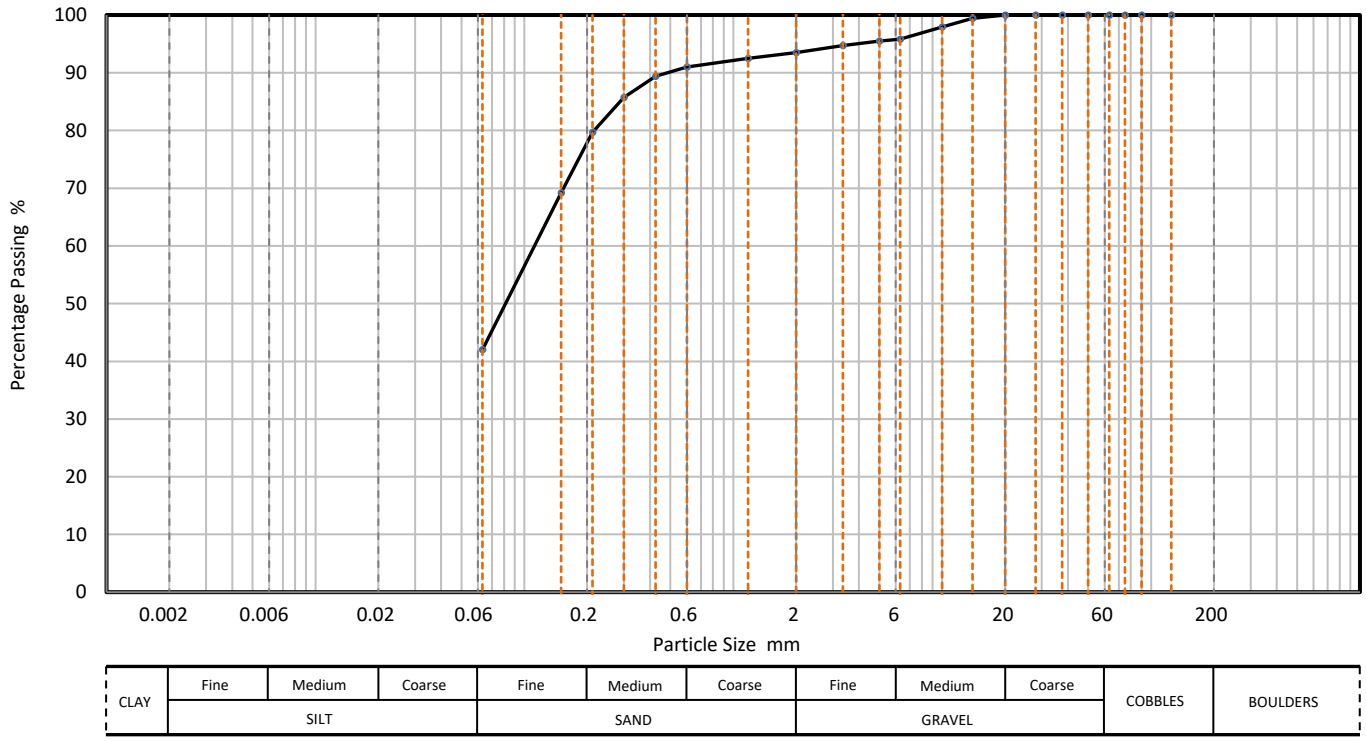
PARTICLE SIZE DISTRIBUTION

Site name	Job number
Stockton Riverside College	S230207

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

UKAS TESTING
10258

Hole	BH01	Lab sample ID	G2MT202303211
Depth (Top) m	13.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base) m		Soil Description	Gravelly Very Silty SAND
Sample type	B		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	98		
6.3	96		
5	96		
3.35	95		
2	94		
1.18	93		
0.6	91		
0.425	89		
0.3	86		
0.212	80		
0.15	69		
0.063	42		

Dry Mass of sample, g: 1033

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	6.5
Sand	51.5
Fines <0.063mm	42.0

Grading Analysis		
D100	mm	
D60	mm	0.112
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status
Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	28/03/2023 11:03

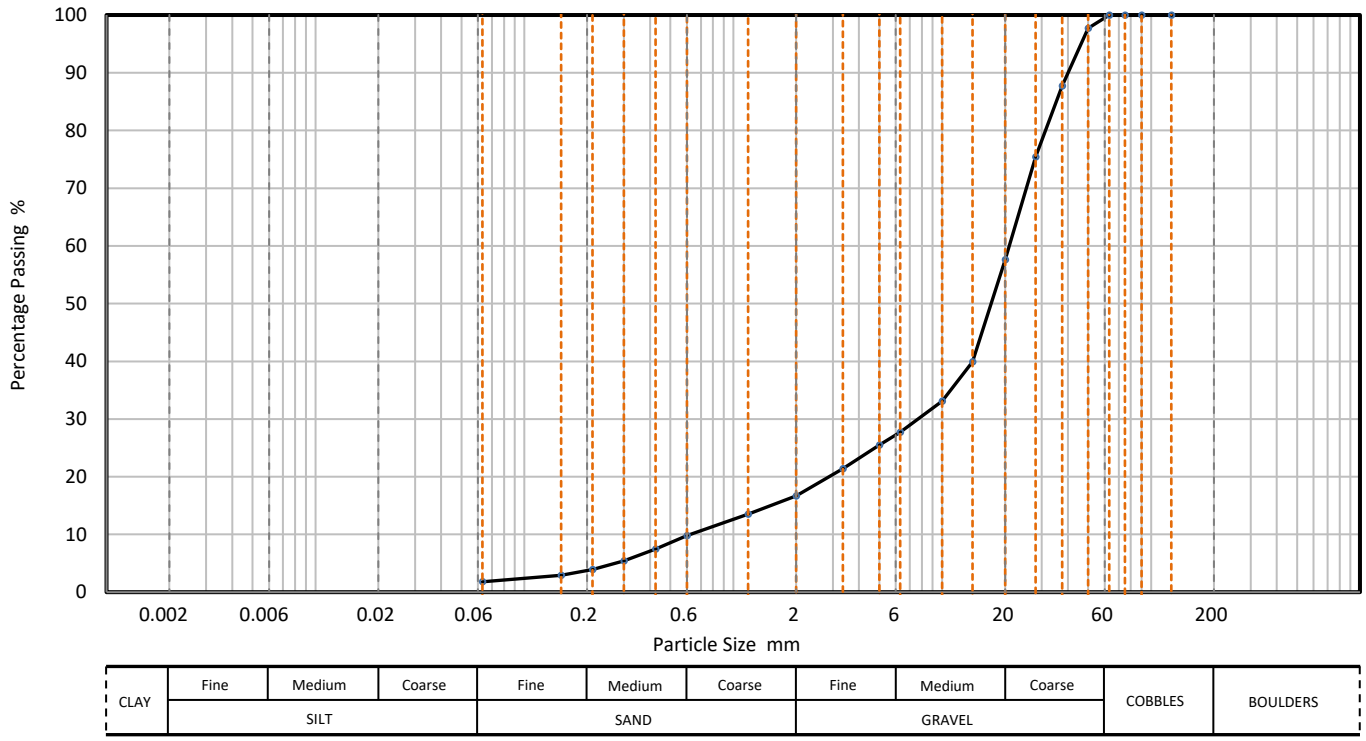
PARTICLE SIZE DISTRIBUTION

Site name	Job number
Stockton Riverside College	S230207

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

UKAS TESTING
10258

Hole	BH05	Lab sample ID	G2MT202303214
Depth (Top) m	12.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base) m		Soil Description	Slightly Silty, Sandy GRAVEL
Sample type	B		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	88		
28	75		
20	58		
14	40		
10	33		
6.3	28		
5	26		
3.35	21		
2	17		
1.18	14		
0.6	10		
0.425	8		
0.3	5		
0.212	4		
0.15	3		
0.063	2		

Dry Mass of sample, g: 6178

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	83.3
Sand	14.8
Fines <0.063mm	2.0

Grading Analysis		
D100	mm	
D60	mm	20.9
D30	mm	7.65
D10	mm	0.619
Uniformity Coefficient		34
Curvature Coefficient		4.5

Remarks

Preparation and testing in accordance with test method unless noted below

Sample tested was deviating in accordance with BS1377 test standard due to insufficient amount

Accreditation status

Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	JBrischuk
Approval date	29/03/2023 08:22

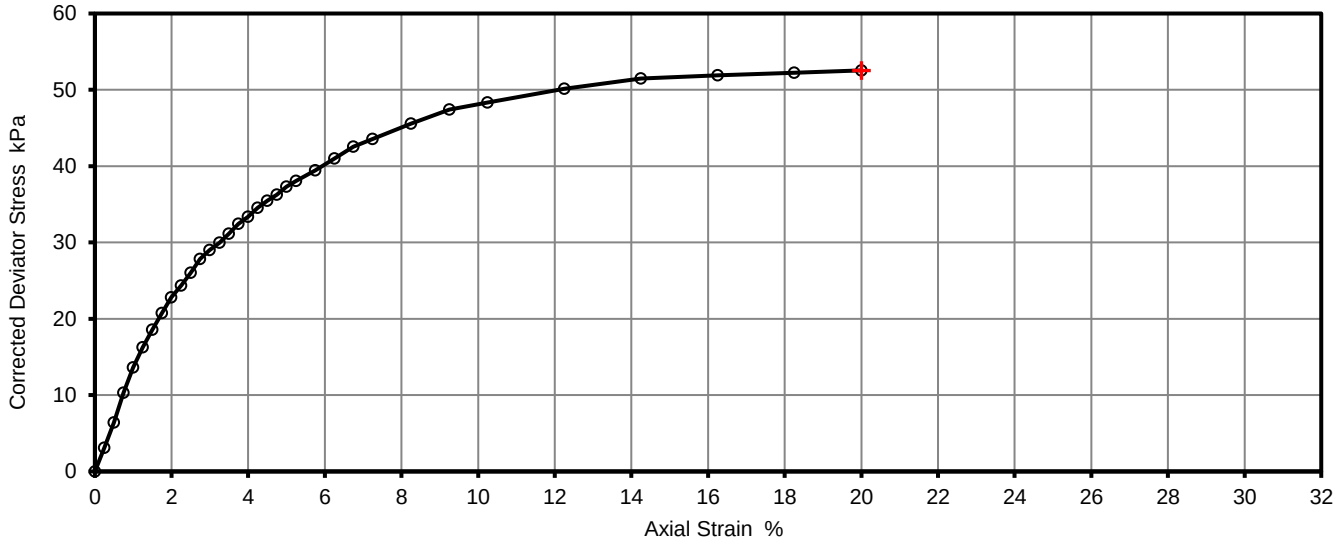
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH02
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	6.00
Specimen Reference	BH02	Specimen Depth	6.00 m	Sample Type	U
Specimen Description	Low strenght CLAY			KeyLAB ID	G2MT202303212
Test Method				Date of test	03/04/2023

Test Number	1	
Length	213.0	mm
Diameter	103.0	mm
Bulk Density	1.29	Mg/m3
Moisture Content	97.9	%
Dry Density	0.65	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	120	kPa
At failure: Axial Strain	20.0	%
At failure: Deviator Stress, (σ1 - σ3)f	53	kPa
At failure: Undrained Shear Strength, cu	26	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

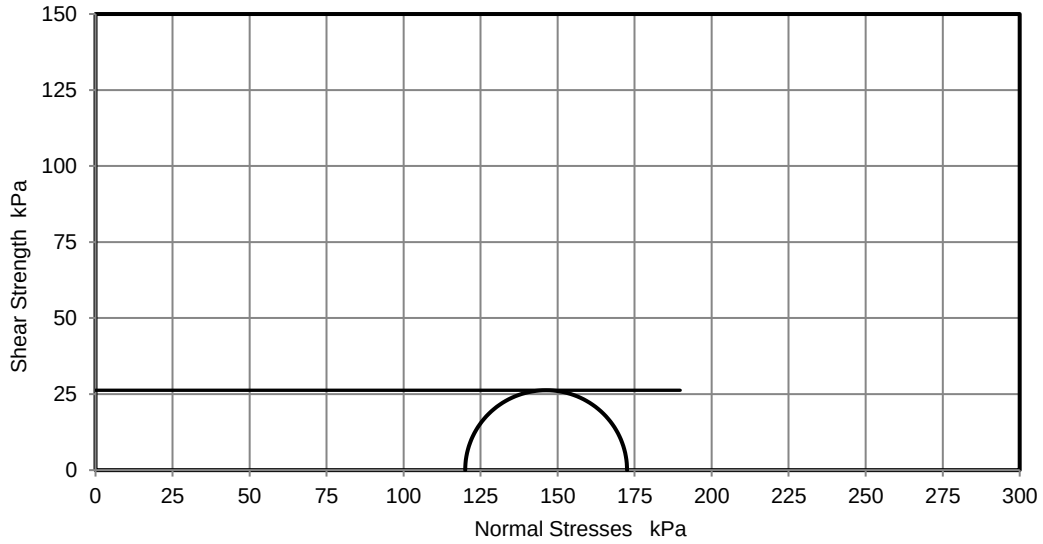
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

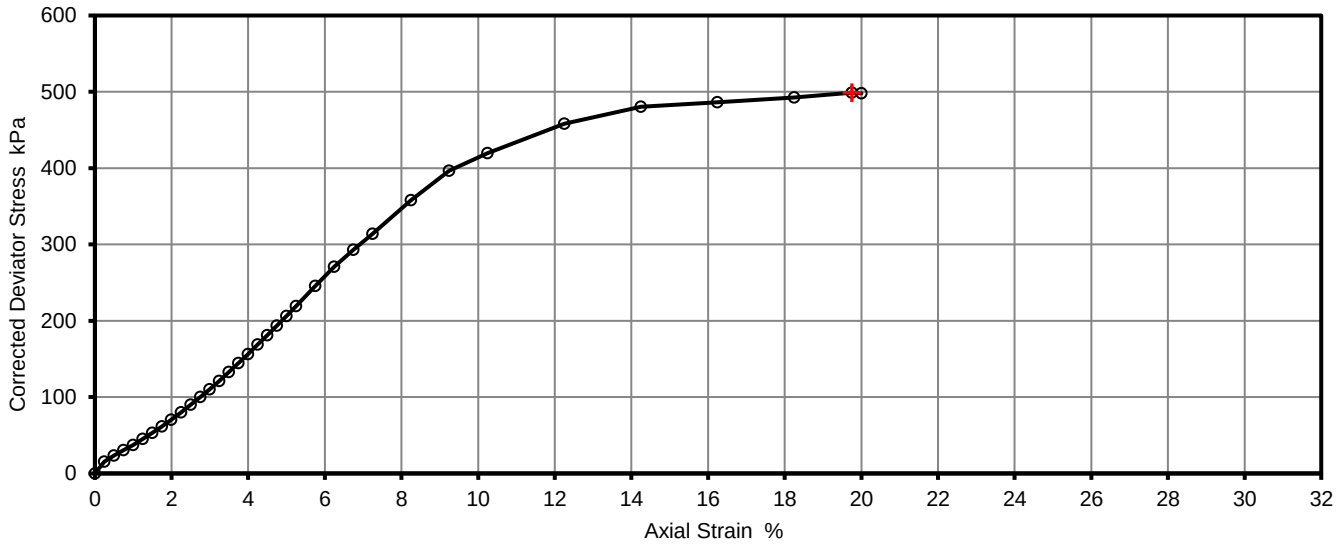
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH02
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	19.50
Specimen Reference	BH02	Specimen Depth	19.50 m	Sample Type	U
Specimen Description	Very High Strength CLAY			KeyLAB ID	G2MT202303213
Test Method				Date of test	06/04/2023

Test Number	1	
Length	207.0	mm
Diameter	100.0	mm
Bulk Density	2.34	Mg/m3
Moisture Content	14.7	%
Dry Density	2.04	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	390	kPa
At failure: Axial Strain	19.7	%
At failure: Deviator Stress, (σ1 - σ3)f	499	kPa
At failure: Undrained Shear Strength, cu	249	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

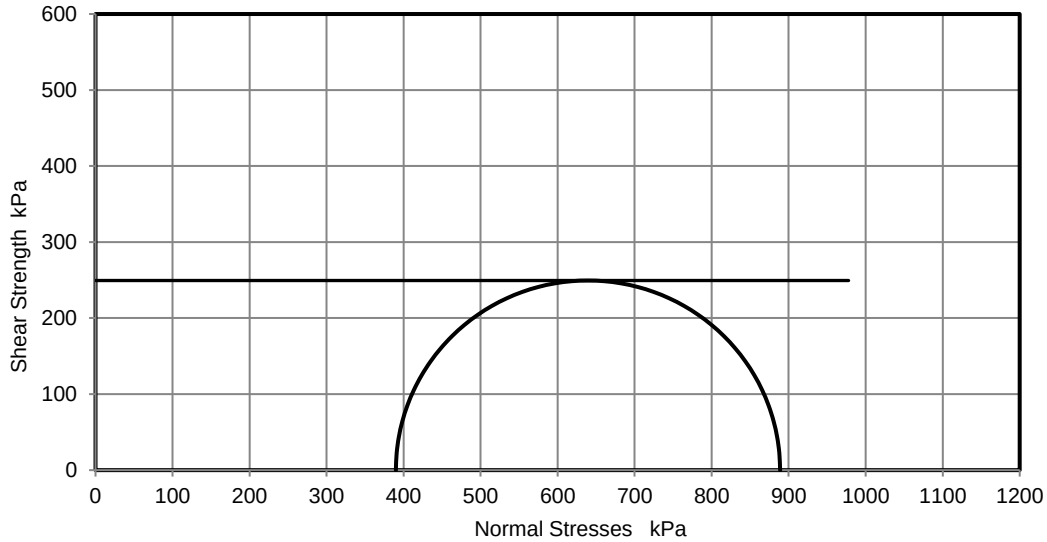
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 004
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

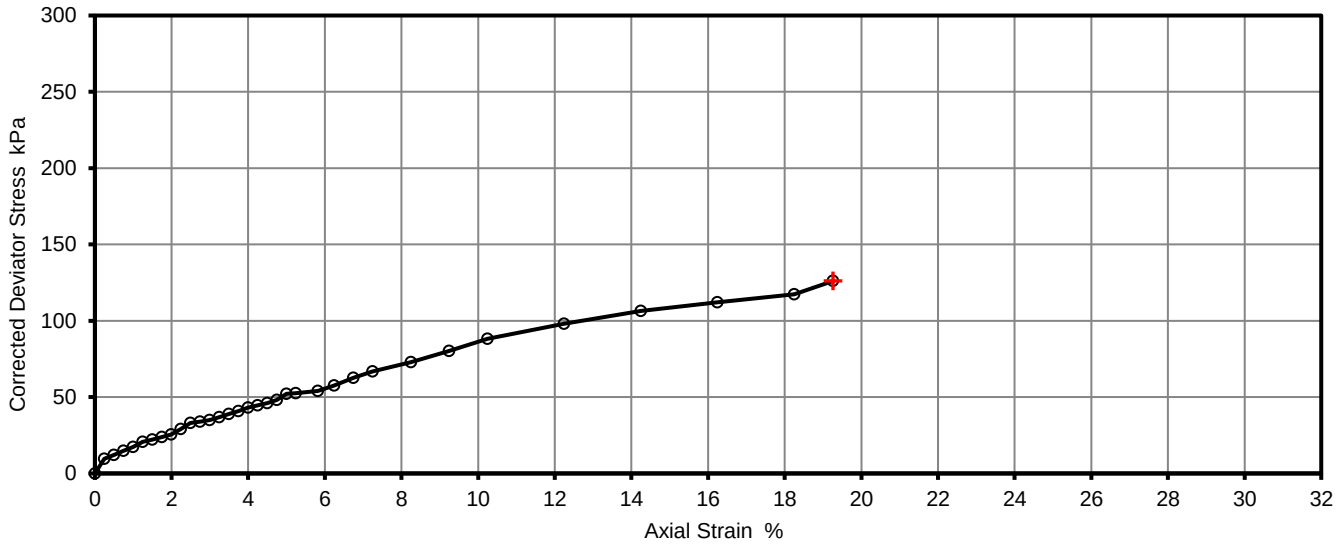
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH05
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	16.50
Specimen Reference	BH05	Specimen Depth	16.50 m	Sample Type	U
Specimen Description	Medium strength CLAY			KeyLAB ID	G2MT202303215
Test Method				Date of test	03/04/2023

Test Number	1	
Length	208.0	mm
Diameter	102.0	mm
Bulk Density	2.19	Mg/m3
Moisture Content	20.2	%
Dry Density	1.82	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	330	kPa
At failure: Axial Strain	19.3	%
At failure: Deviator Stress, (σ1 - σ3)f	126	kPa
At failure: Undrained Shear Strength, cu	63	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

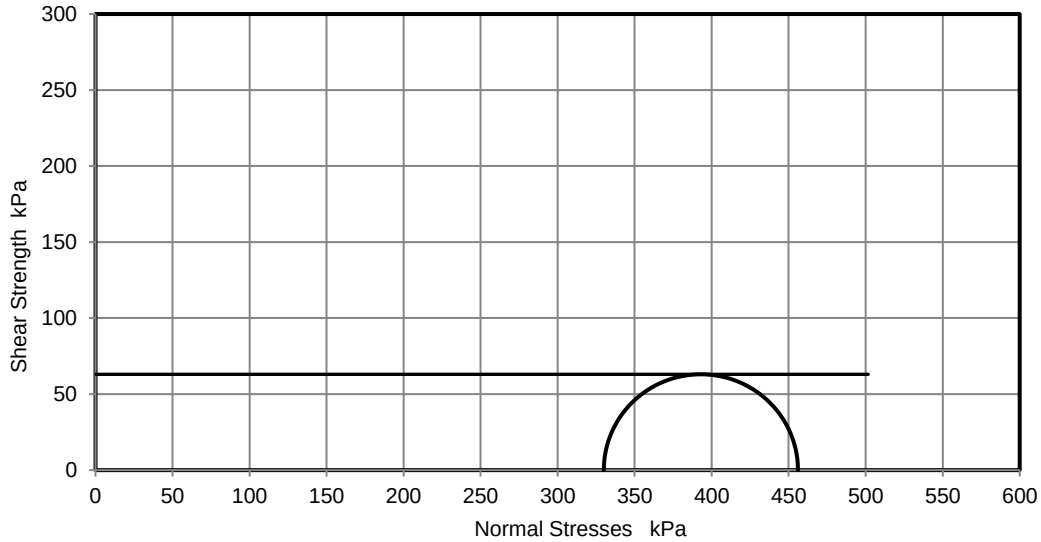
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

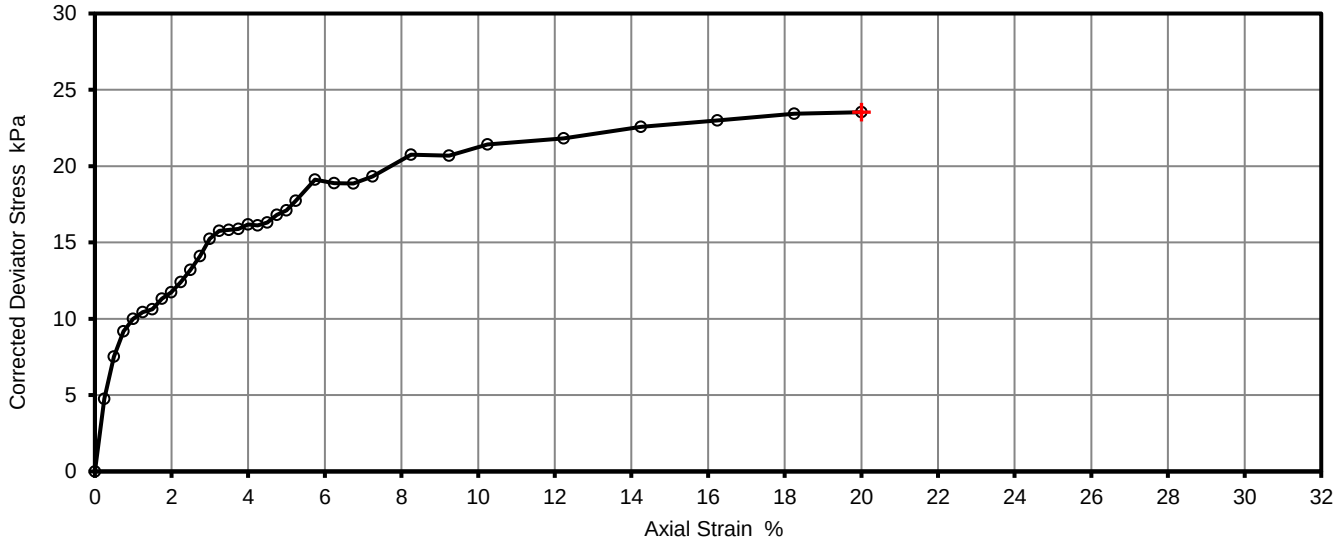
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH06
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	7.50
Specimen Reference	BH06	Specimen Depth	7.50 m	Sample Type	U
Specimen Description	Very low strength CLAY			KeyLAB ID	G2MT202303216
Test Method				Date of test	03/04/2023

Test Number	1	
Length	208.0	mm
Diameter	102.0	mm
Bulk Density	1.37	Mg/m3
Moisture Content	61.9	%
Dry Density	0.84	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	150	kPa
At failure: Axial Strain	20.0	%
At failure: Deviator Stress, (σ1 - σ3)f	24	kPa
At failure: Undrained Shear Strength, cu	12	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

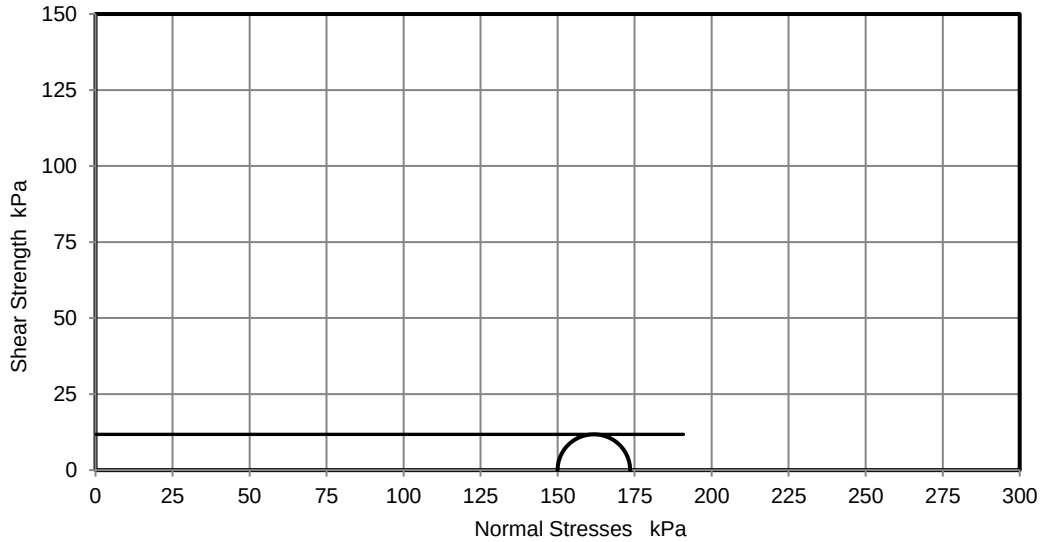
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

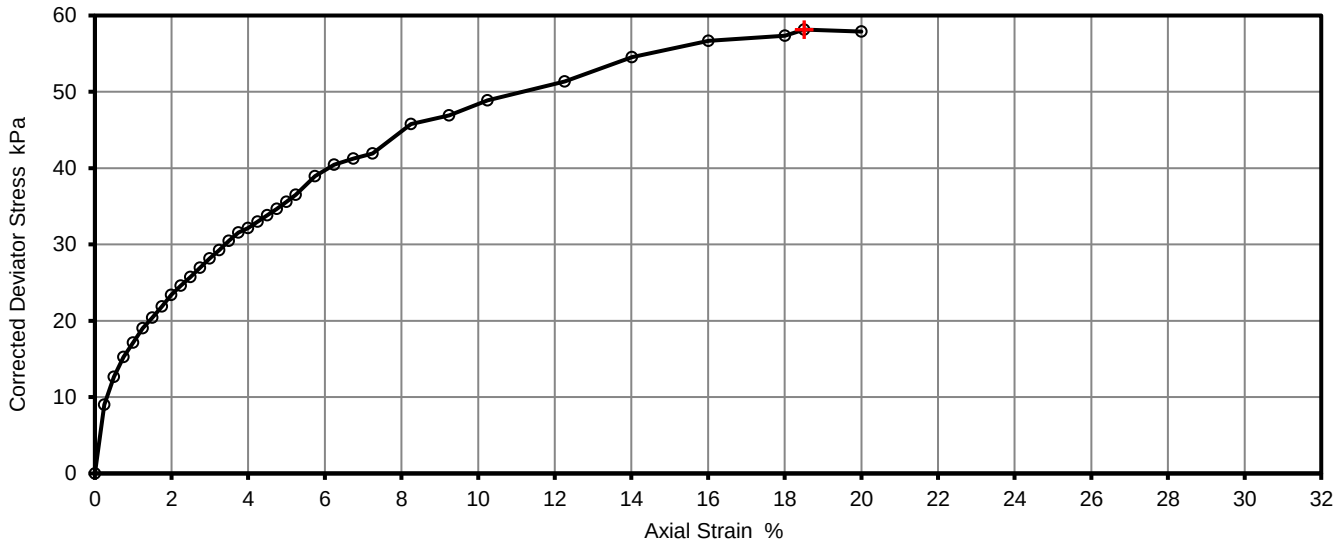
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH06
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	10.50
Specimen Reference	BH06	Specimen Depth	10.50 m	Sample Type	U
Specimen Description	Low strength CLAY			KeyLAB ID	G2MT202303217
Test Method				Date of test	03/04/2023

Test Number	1	
Length	208.0	mm
Diameter	102.0	mm
Bulk Density	1.61	Mg/m3
Moisture Content	50.8	%
Dry Density	1.07	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	210	kPa
At failure: Axial Strain	18.5	%
At failure: Deviator Stress, (σ1 - σ3)f	58	kPa
At failure: Undrained Shear Strength, cu	29	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

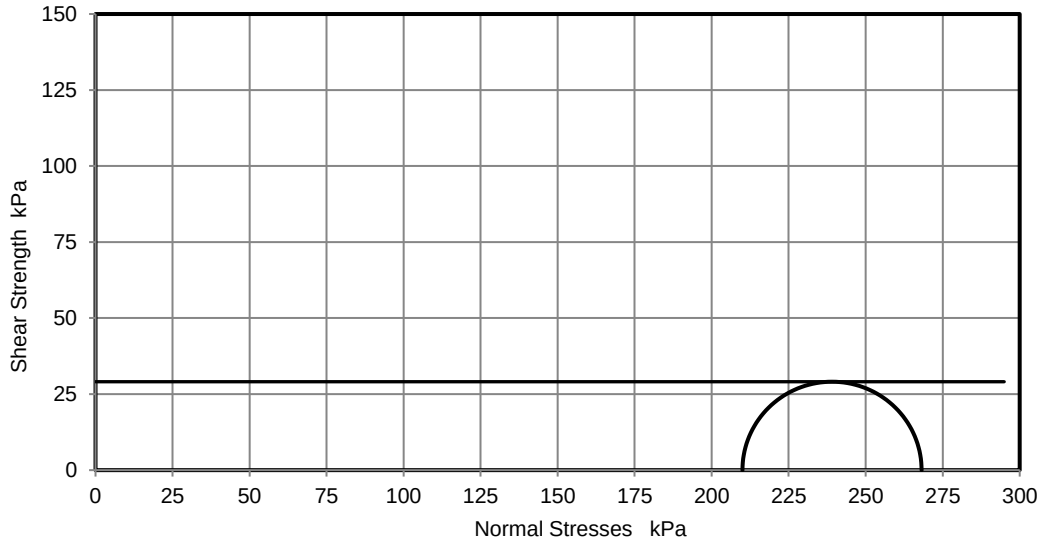
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

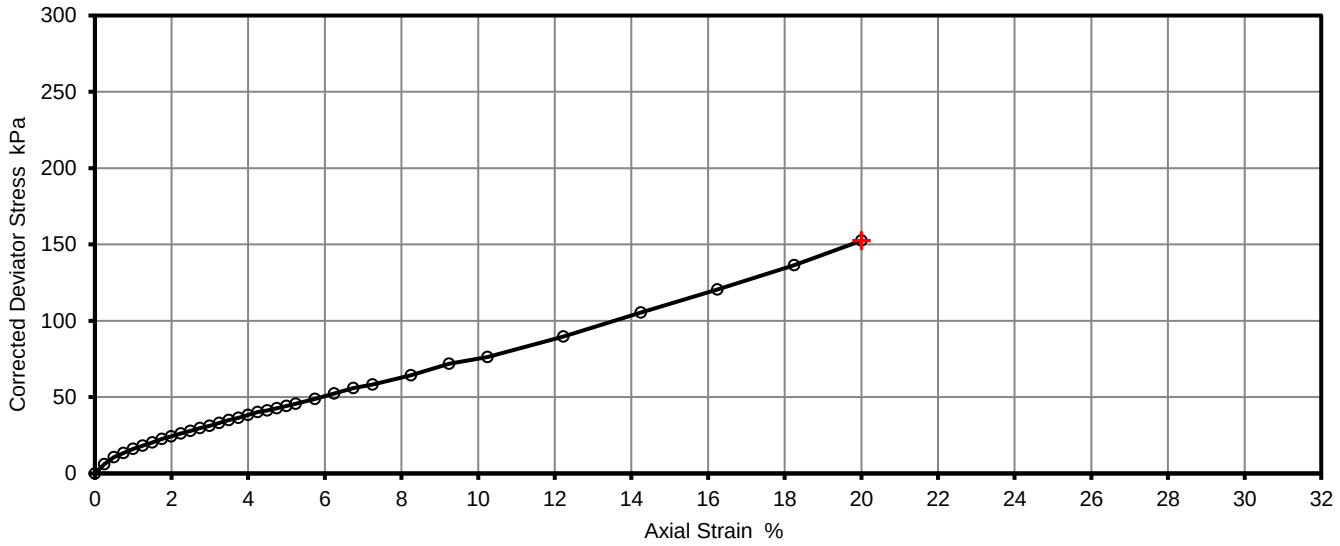
UKAS TESTING 10258	**Unconsolidated Undrained Triaxial Compression Test without measurement of pore pressure - single specimen**			Job Ref	S230207
				Borehole/Pit No.	BH06
Site Name	Stockton Riverside College			Sample No.	
Soil Description				Depth	16.50
Specimen Reference	BH06	Specimen Depth	16.50 m	Sample Type	U
Specimen Description	High strength CLAY			KeyLAB ID	G2MT202303218
Test Method				Date of test	03/04/2023

Test Number	1	
Length	208.0	mm
Diameter	102.0	mm
Bulk Density	2.19	Mg/m3
Moisture Content	20.3	%
Dry Density	1.82	Mg/m3
Rate of Strain	1.0	%/min
Cell Pressure	330	kPa
At failure: Axial Strain	20.0	%
At failure: Deviator Stress, (σ1 - σ3)f	152	kPa
At failure: Undrained Shear Strength, cu	76	kPa ½(σ1 - σ3)f
At failure: Mode of Failure	Plastic	

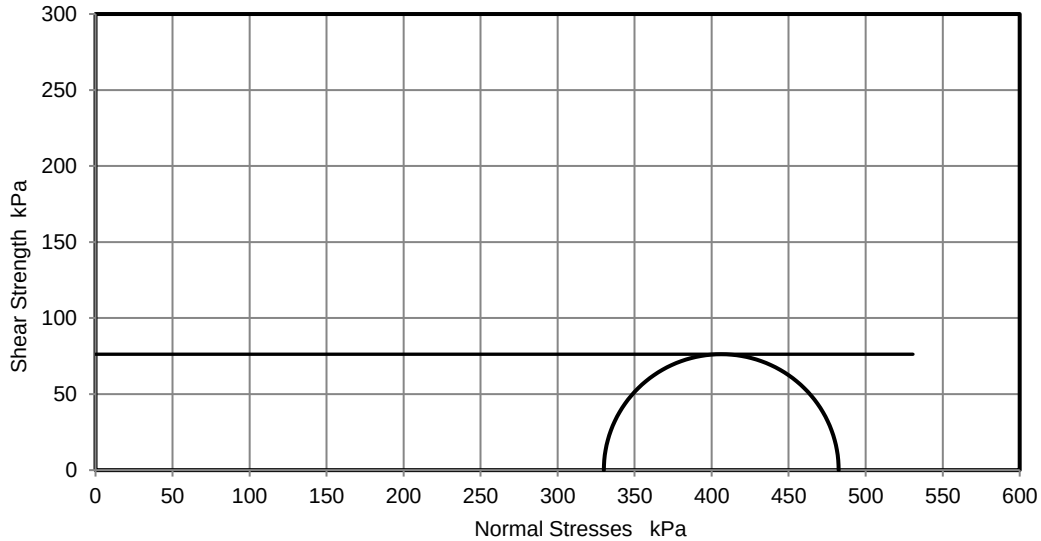
Tracable Equipment Record

Test Frame	TRI 004
Load Ring	LOAD CELL 003
Pressure Gauge	PRE 006
Digital Caliper	CAL-005
Balance	BAL-006

Deviator Stress v Axial Strain



Mohr Circles



Deviator stress corrected for area change and membrane effects

Mohr circles and their interpretation is not covered by BS1377 Part 8- 1990. This is provided for information only.

No of membranes used
1
Total thickness (mm)
0.25
Membrane Correction
Membrane Type

Summary of Rock Point Load Tests

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

Site name	Job number
Stockton Riverside College	S230207

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is	Is(50)	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm	MPa	MPa	
BH01	23.90		C			Sandstone	D	L	Valid		71		0.28	0.33	
BH01	23.90		C			Sandstone	A	P	Valid	71	44		1.56	1.74	
BH01	27.20		C			Sandstone	D	L	Valid		73		0.33	0.39	
BH01	27.20		C			Sandstone	A	P	Valid	73	45		0.65	0.74	
BH01	29.10		C			Sandstone	D	L	Valid		70		0.24	0.28	
BH01	29.10		C			Sandstone	A	P	Valid	70	50		0.29	0.33	
BH02	24.90		C			Sandstone	D	L	Valid		67		0.39	0.44	
BH02	24.90		C			Sandstone	A	P	Valid	67	45		0.87	0.96	
BH02	27.60		C			Sandstone	D	L	Valid		68		0.44	0.51	
BH02	27.60		C			Sandstone	A	P	Valid	68	69		0.66	0.81	
BH02	30.20		C			Sandstone	D	L	Valid		69		0.25	0.29	
BH02	30.20		C			Sandstone	A	P	Valid	69	60		0.38	0.44	
BH05	20.50		C			Sandstone	D	L	Valid		71		0.10	0.12	
BH05	20.50		C			Sandstone	A	P	Valid	71	40		1.11	1.20	
BH05	22.00		C			Sandstone	D	L	Valid		70		0.42	0.48	
BH05	22.00		C			Sandstone	A	P	Valid	70	55		0.66	0.77	
BH05	24.20		C			Sandstone	D	L	Valid		69		0.50	0.57	
BH05	24.20		C			Sandstone	A	P	Valid	69	64		0.99	1.19	
BH06	22.70		C			Sandstone	A	P	Valid	69	50		1.01	1.14	
BH06	22.70		C			Sandstone	D	L	Valid		69		0.28	0.33	

Test not currently within the scope of G2M Testing UKAS accrediation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen seperation at start of test
	D'	Platen seperation at sample failure
	Is	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	
Approval date	28/03/2023 10:39
Date report generated	
Report Number	

Summary of Rock Point Load Tests

G2M Testing (Stockton)
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 033318
info@g2mtesting.co.uk

Site name	Job number
Stockton Riverside College	S230207

Hole	Sample			Specimen		Rock type and test condition	Test Type		Failure validity	Dimensions			Is	Is(50)	Remarks
	Depth m	Ref	Type	Depth m	Ref		Type	Dir.		W mm	D mm	D' mm	MPa	MPa	
BH06	25.00		C			Sandstone	D	L	Valid		68		0.22	0.26	
BH06	25.00		C			Sandstone	A	P	Valid	68	54		0.98	1.12	
BH06	26.60		C			Sandstone	D	L	Valid		71		0.21	0.25	
BH06	26.60		C			Sandstone	A	P	Invalid	71	57		0.39	0.46	

Test not currently within the scope of G2M Testing UKAS accrediation schedule

Column	Key	Description
Test Type	A	Axial
	B	Block
	D	Diametral
	I	Irregular lump
Test Direction	L	Parallel to planes of weakness
	P	Perpendicular to planes of weakness
	U	Unknown
Dimensions	W	Width
	D	Platen seperation at start of test
	D'	Platen seperation at sample failure
	Is	Point Load Index
	Is(50)	Corrected Point Load Index to equivalent 50 mm diameter

Approved by	
Approval date	28/03/2023 10:54
Date report generated	
Report Number	

UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Project No.	Project Name
S230207	Stockton Riverside College

Hole No.	Sample				Rock Type	Specimen Dimensions2			Bulk Density2	Water Content 1	Uniaxial Compression3				Remarks
	Ref	Top	Base	Type		Dia. mm	Length mm	H/D	Mg/m3	%	Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
BH01		22.50		C	Brown Sandstone	72.0	147.0	2.0	2.34		as received	0.0020	AC	25.9	
BH01		26.90		C	Brown Sandstone	72.0	152.0	2.1	2.24		as received	0.0020	AC	28.5	
BH02		21.70		C	Brown Sandstone	72.0	150.0	2.1	2.21		as received	0.0020	AC	19.4	
BH05		22.80		C	Brown Sandstone	72.0	148.0	2.1	2.24		as received	0.0020	AC	22.6	
BH05		24.80		C	Brown Sandstone	72.0	148.0	2.1	2.19		as received	0.0041	AC	16.8	
BH06		26.30		C	Brown Sandstone	72.0	150.0	2.1	2.19		as received	0.0041	AC	20.5	

Notes

1 ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear MS - multiple shear

AC - Axial cleavage F - Fragmented

Test Specification	Date Printed	Approved By	Table
International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007	04/11/2023 00:00	JBrischuk	1 sheet 1

SITE NAME: Stockton Riverside College
JOB NUMBER: S230207

Hole	Depth m	Type	Hand Vane (kPa)
BH01	9.00	U100	6 kPa

Checked & Approved by: J.Brischuk
Date: 29/03/2023

Certificate of Analysis

Certificate Number 23-06819 *Issued:* 28-Mar-23

Client SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference 23-06819

Client Reference S230207

Order No LAB1827

Contract Title STOCKTON RIVERSIDE COLLEGE

Description 5 Soil samples.

Date Received 22-Mar-23

Date Started 22-Mar-23

Date Completed 28-Mar-23

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

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-06819
Client Ref S230207
Contract Title STOCKTON RIVERSIDE COLLEGE

			Lab No	2144524	2144525	2144526	2144527	2144528
			.Sample ID	BH01	BH02	BH05	BH06	BH06
			Depth	9.00	19.50	12.00	7.50	10.50
			Other ID					
			Sample Type	D	D	D	D	D
			Sampling Date	06/03/2023	06/03/2023	06/03/2023	06/03/2023	06/03/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Inorganics								
pH	DETSC 2008#		pH	7.9	8.4	8.1	7.7	7.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	180	76	47	450	690

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 23-06819
Client Ref S230207
Contract STOCKTON RIVERSIDE COLLEGE

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2144524	BH01 9.00 SOIL	06/03/23	PT 1L	pH + Conductivity (7 days)	
2144525	BH02 19.50 SOIL	06/03/23	PT 1L	pH + Conductivity (7 days)	
2144526	BH05 12.00 SOIL	06/03/23	PT 1L	pH + Conductivity (7 days)	
2144527	BH06 7.50 SOIL	06/03/23	PT 1L	pH + Conductivity (7 days)	
2144528	BH06 10.50 SOIL	06/03/23	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

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

End of Report

Appendix E

♣Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2023)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2011 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.

SOLMEK NOTES ON CONTAMINATION GUIDANCE (REF: VERSION 1/2023)

UK BACKGROUND

Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to *"identify and remove unacceptable risks to human health and the environment" and* to *"seek to ensure that contaminated land is made suitable for its current use".*

Part 2A uses a risk based approach to defining contaminated land whereby the "risk" is interpreted as *"the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land"* and by *"the scale and seriousness of such harm or pollution if it did occur".*

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *"for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters."*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include *"land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health."*

Categories 3 and 4 *"encompass land which is not capable of being determined on such grounds".*

PRELIMINARY CONCEPTUAL MODEL

Preliminary Conceptual Models are undertaken in accordance with CIRIA C552. The Preliminary Conceptual Model assesses the consequence and the likelihood of a risk being realised to provide a risk classification, using the tables detailed below.

CONSEQUENCE OF RISK BEING REALISED (Based on C552 CIRIA, 2001)

Classification	Definition	Example
Severe	Short-term (acute) risk to human health, the environment, an element of the development or other aspect with is likely to result in *significant harm*, damage or both.	High concentrations of cyanide on the surface of an informal recreational area. Major spills of contaminants from site into controlled water. High concentrations of explosive gas in the subsurface environment that have a clear unobstructed pathway into buildings.
Moderate	Chronic damage to human health, a plausible chance that an event will occur, although the timeline is not immediate to be in the short-term.	Appreciable concentration of contamination that over the longer-term will cause significant harm i.e. high lead concentration in topsoil. Shallow mine workings that are potentially unstable but may remain in a satisfactory or stable conditions for a number of years.
Mild	Low level pollution of non-sensitive water, a feasible hazardous scenario although the timeline of such occurring can probably be considered in 10's of years.	The effect of high sulphate concentrations on structural concrete. Pollution of non-classified groundwater.
Minor	Harm, although not necessarily significant to human health, or with respect to other aspects of the development, which are considered implausible in terms of occurrence, or will have little consequential impact.	The presence of contaminants at such low concentrations that protective equipment is required during site works. Any damage to structures is minimal and will not be structural in characteristics.

PROBABILITY OF RISK BEING REALISED (C552 CIRIA, 2001)

Classification	Definition
High Likelihood	There is a viable pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence that the receptor has been harmed or polluted.
Likely	There is a viable pollutant linkage and all elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a viable pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a viable pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

RISK CLASSIFICATION MATRIX (C552 CIRIA, 2001)

Risk = Probability x Consequence		Consequence			
		Severe	Moderate	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

HUMAN RECEPTORS

Human exposure to contaminants present in soils can occur via several pathways. Direct exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatised compounds, and inadvertent soil ingestion (or deliberate soil ingestion in the case of some children). Other indirect pathways include human ingestion of plants grown in contaminated soil or contaminated ground or surface water. Contaminants associated with wind blown dust can affect humans on surrounding sites.

VEGETATION

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, lead, nickel, and zinc.

To establish if the levels of contaminants present on a site may pose a risk to vegetation the results of the contamination testing are compared to a series of threshold values published in 'Code of Good Agricultural Practice for the Protection of Soil'.

GROUNDWATER AND SURFACE WATER RECEPTORS

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology. Surface watercourses may also accumulate contamination as contaminated sediments are deposited within the water body.

Where the site investigated overlies major/principal aquifers (and in some cases minor/secondary aquifers depending on certain conditions), groundwater Source Protection Zones and areas in close proximity to groundwater abstractions, contamination test results have been compared with the Water Supply (Water Quality) Regulations 1989 and The Water Supply (Water Quality) Regulations 2000.

Should a surface water receptor, such as a fresh water environment (river, canal, stream, lake etc), or marine environment be considered sensitive in relation to a site, then test results are compared with DEFRA & SEPA Environmental Quality Standards (2004). Many of the Environmental Quality Standards are hardness ($CaCO_3$) depended. Where no hardness values are available, Solmek assume conservative values (of between 0 and 50mg/l).

In the absence of vulnerable ground and surface water environments, Solmek may compare any test results with the Environment Agency Leachate Quality Threshold Values.

DETAILED QUANTITATIVE RISK ASSESSMENT (DQRA)

In line with Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*, a DQRA for groundwater/human health may be required following a Phase 2 investigation and before the preparation of a Phase 3 Remediation Strategy. For human health DQRA, a site specific assessment criteria is undertaken using CLEA Software Version 1.06. For groundwater DQRA, the Environment Agency Remedial Targets Worksheet Version 3.1 is used.

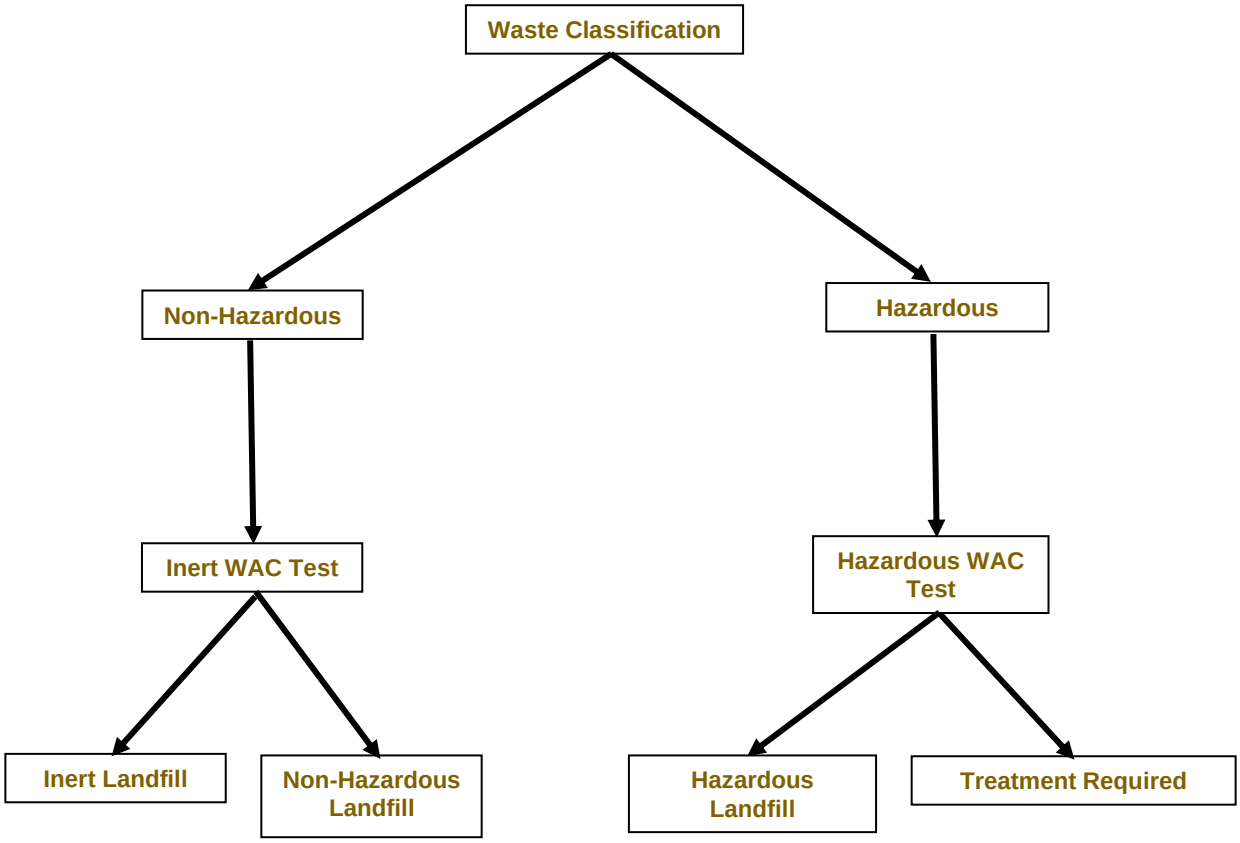
WASTE CLASSIFICATION AND WASTE ACCEPTANCE CRITERIA

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste (2015)*. This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste. The WAC testing relates to materials that are to be exported from a site/development to landfill, and do not directly relate to human health specifically. The testing results are generally presented as certificates which can be used by site owners/contractors etc, which should be presented to the accepting waste facility or waste contractor.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

The below flow chart provides further information on the waste classification process.



CONSTRUCTION MATERIALS

Materials at risk from possible soil contaminants include inorganic matrices such as cement and concrete and also organic material such as plastics and rubbers. Acid ground conditions and high levels of sulphates can accelerate the corrosion of building materials. Where pH and soluble sulphate analysis has been undertaken, Solmek compare the test results with the guidelines presented within BRE Special Digest 1, 2005 (3rd Edition) 'Concrete in Aggressive Ground'. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication "Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites" (January 2011). A Brownfield Site is defined in the document as "Land or premises that have not previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer. The table below outlines the pipe material selection threshold concentrations.

	Pipe Material (Threshold concentrations in mg/kg)					
Parameter group	**PE**	**PVC**	**Barrier pipe (PE-AL-PE)**	**Wrapped Steel**	**Wrapped Ductile Iron**	**Copper**
Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5	0.125	Pass	Pass	Pass	Pass
+ BTEX + MTBE	0.1	0.03	Pass	Pass	Pass	Pass
SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5-C10)	2	1.4	Pass	Pass	Pass	Pass
+ Phenols	2	0.4	Pass	Pass	Pass	Pass
+ Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
Mineral oil C11-C20	10	Pass	Pass	Pass	Pass	Pass
Mineral oil C21-C40	500	Pass	Pass	Pass	Pass	Pass
Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH <7 and conductivity >400µS/cm	Corrosive if pH <5, Eh not neutral and conductivity >400µS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suite identified as relevant following site investigation						
Ethers	0.5	1	Pass	Pass	Pass	Pass
Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
Ketones	0.5	0.02	Pass	Pass	Pass	Pass
Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
Amines	Fail	Pass	Pass	Pass	Pass	Pass

REQUIREMENTS OF PARTIES WITHIN THE DEVELOPMENT PROCESS

Interested parties involved in the development process may use the data in different ways and there may be varying views and interpretation of the factual data. Local Authority staff may have a view on contamination and human health and the wider environment. The Environment Agency are concerned principally with the protection of Controlled waters. Building insurers, funders and purchasers may be primarily concerned with issues of potential commercial blight. Purchasers are also not always fully informed, and perceptions on issues associated with risk can affect the decision to purchase. Developers and construction organisations will focus on financial aspects of dealing with the contamination in the context of the development and construction programme.

RISKS & LIABILITIES FROM CONTAMINATION

In simple terms, risks associated with contamination may be considered in terms of 1) statutory risks and 2) development related risks. If contamination is severe or forms a potential hazard based on its potential to affect groundwater, surface water or human health, a statutory risk may be present, and as such, if the risk is not reduced, criminal proceedings may be instigated by a government body or local authority.

If the contamination is less severe or not considered to be mobile, it may be considered a commercial liability which could, in theory remain untreated, but which may at a later date affect the value of the property, or, with changing legislation, become a statutory risk. Commercial liabilities could give rise to civil proceedings by third parties if there are grounds for action.