



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

MORGAN SINDALL

Star Academy, Radcliffe

Phase II Geo-Environmental Assessment Report

PH/C5394/12387 Rev C

BIM Ref. FS1013-BSL-XX-XX-T-O-1000 Rev P04

January 2024

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site is located off Spring Lane, Radcliffe, M26 2SZ. It is situated approximately 0.5 km north of Radcliffe Town Centre, centred on National Grid Reference 378700, 407630. The site currently consists of a school and leisure centre in the south-east of the site, with the north-west being occupied by a disused playing field.
Ground Conditions	Generalised ground conditions from the BSL ground investigation comprise (top down): • Made ground generally comprising sandy gravelly clay and gravelly sand from ground level to between 0.15m and 2.00m bgl. • Natural superficial deposits comprising sandy gravelly clay, clayey gravelly sand and sandy gravel proven to depths between 1.20m and 20.50m bgl. • Solid geology comprising mudstone, siltstone and sandstone proven to depths of 45.00m bgl. • Groundwater levels ranging between 0.80m and 14.40m bgl during site works, with groundwater strikes commonly encountered within the top 3.0m bgl. • Groundwater levels are recorded to be between 68.07m AOD in the SE corner of the site (DS06) and 74.61m AOD in the NW corner of the site (TP01S) noted within the red line boundary.
Human Health - Soils Contamination	Testing on soils and comparison against the relevant screening criteria has revealed: • Exceedances of PAHs and heavy metals within made ground soils. The above pose a risk to human health and require mitigation.
Controlled Waters – Surface and Groundwater Contamination	The following have been identified: • Exceedances of heavy metals, PAHs and a singular minor exceedance of petroleum hydrocarbons have been detected as part of the testing undertaken by Geotechnics. However, based on the assessments carried out, the risk to controlled waters is considered to be low and no further action is required.
Ground Gas	Based on the monitoring, the site is classified as CS1 with no protection required, subject to the removal of the organic made ground material encountered locally within the vicinity of WS101 in the building footprint, during the earthworks programme. No radon protection is required.
Outline Remedial Strategy	Subject to regulatory approval, the following outline remedial strategy is recommended: • Cover system with 450mm thick of ‘clean’ validated topsoil/subsoil in soft landscaping areas. • Verification of the above with validation reports produced.
Waste	One sample of made ground from WS106 has been classified as Hazardous due to pH level. However, the remainder of the made ground and natural soils have been classified as non-hazardous. The granular ashy made ground prevalent in the eastern areas is likely to be accepted at a non-hazardous landfill site, whereas the cohesive made ground is likely to be accepted at an inert landfill site. Whilst the testing to date suggests site-won topsoil may be chemically suitable, topsoil is considered unsuitable for re-use given the saturation of the material and duration required for stockpiling and the limited storage space present onsite.
Foundations and Floor Slabs	Ground improvement by methods such as vibro ground improvement and/or vibro piling is considered suitable for structures. Reinforced pad and strip foundations could be used bearing onto the improved ground, at depths of circa 600mm bgl. Allowable bearing capacities of the order of 150kN/m ² can typically be achieved. Suspended floor slabs supported by vibro piles or ground bearing floor slabs onto improved ground may be adopted.
Concrete Classification	DS1 AC-2s conditions prevail in the made ground. DS1 AC-1 conditions prevail in the natural superficial strata.
Highways Design	Made Ground CBR – 2% Superficial Strata CBR – cohesive/fine soils – 2% Superficial Strata CBR – granular/coarse soils – 5% The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Drainage	Drainage to soakaways is unlikely to be suitable for this site due to the high groundwater table.
Mining Risk	The risk from shallow unrecorded mine workings is considered to be low and treatment by drilling and grouting is not required. Geogrid installation would be prudent within external areas, such as car parking, located in the Coal Authority Development High Risk Area where borehole coverage is limited.
Further Work	The following further works will be required to progress to the construction phase: • Demolition Asbestos survey.

EXECUTIVE SUMMARY

- Tree survey by qualified arboriculturist.
- Detailed foundation design by a structural engineer.
- Production of Earthworks Specification.
- Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required.
- Implementation of the Earthworks Specification, Remedial Strategy and verification of the works.

This executive summary should be read in conjunction with the full report, reference PH/C5394/12387 Rev C and not as a standalone document. Report template version 4.2.

PROJECT QUALITY CONTROL DATA SHEET

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DRAWINGS

Drawing Number	Rev	Title
FS1013-REN-XX-XX-D-CS-5100-P02	P02	Site Constraints Plan
C5394/01	-	Site Location Plan
C5394/02	A	Exploratory Hole Location Plan
C5394/02A	A	Exploratory Hole Location Plan
C5394/03	-	Coal Authority Interactive Map Extract
C5394/04	-	Geological Map Extract
C5394/05	-	Proposed Development Footprint Bedrock Profile
C5394/06	-	Site Features Plan
C5394/07	-	WS101 Organic Matter Plan
C5394/08		Groundwater Contour Plan (m AOD)
C5394/09		Groundwater Contour Plan (m BFL)

APPENDICES

Appendix	Title
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Chemical Testing Results
Appendix D	Geotechnical Testing Results
Appendix E	Monitoring Results
Appendix F	Waste Assessment Report

APPENDICES

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Appendix G	BGS Radon Report

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for Morgan Sindall as instructed by the Department of Education on a site off Spring Lane, Radcliffe and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.

Definitions of terms and acronyms used within this report is presented in Section 11.0.

1.2 Proposed Development

The proposed development involves the construction of a 'super teaching block' with a sports hall annexe and extensive MUGA / Sports Pitches as shown on the Site Constraints Plan, drawing No. FS1013-REN-XX-XX-D-CS-5100-P02 provided to BSL by Renaissance Associates Ltd.

1.3 Previous Reports

The following reports have been produced for the site and should be read in conjunction with this assessment (in date order):

- Geotechnics, Desk Study Report, reference PC228400, dated May 2022.
- Geotechnics, Preliminary Ground Investigation Report with Interpretive Chapter, reference PN224390, dated August 2022.
- BSL Coal Mining Risk Assessment, ref: PH/C5394/12312, issued August 2023.

BSL understand that the client has reliance on the above reports and we have assumed reliance is or will be obtained prior to detailed design and that the information provided in the above reports is reliable and representative of the ground conditions and is used in good faith within this assessment.

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

This report has been produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Following and Coal Mining Risk Assessment (CMRA) and previous Phase II Investigation undertaken by Geotechnics, a supplementary intrusive investigation was undertaken to confirm the findings of the preliminary CSM and risk assessment and meet any objectives that had not been satisfied. The exploratory investigation was undertaken using trial pitting, window sampling, rotary drilling, gas and groundwater monitoring, laboratory chemical and geotechnical testing, with reporting on the findings.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, Morgan Sindall. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

The recommendations in this report assume that ground levels will remain as existing, unless stated otherwise within the report. If there is to be any re-profiling (e.g. to create development platforms or flood defences) then the recommendations may not apply.

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Spring Lane, Radcliffe, M26 2SZ. It is situated approximately 0.5 km north of Radcliffe Town Centre, centred on National Grid Reference 378700, 407630 as shown on the Site Location Plan, Drawing No. C5394/01.

2.2 Site Description

The main site features and potential issues identified are detailed below and are shown on the Site Features Plan, Drawing No. C5394/06:

Feature	Description
Site Area	The site covers approximately 6.4 hectares.
Site Access	Access to the site is gained off Spring Lane to the south.
Current Land Use and Site Features	The north section of the site consists of an overgrown playing field and a sports court surfaced in hardstanding in the north-easternmost section. The lower south section of the site is comprised of a secondary school (Spring Lane School) and leisure centre (Radcliffe Leisure Centre) with associated hardstanding car parking areas. A public footpath runs along the south-west border of the site (Banana Path). There are several manholes and services present in the proximity of the secondary school and leisure centre. Service plans provided by the client also show an intermediate pressure gas main trending north-south across the derelict playing field. Multiple services are also shown to be present within the area of the old sports courts / new car parking areas in the north-east section of the site.
Potential Mining Related Features	No potential mining related features have been observed onsite.
Potential Sources of Gross Contamination	Potential sources of gross contamination included the boiler house associated with the school development. There is also a chimney associated with the boiler house, although BSL understand this is disused and new gas boilers were installed in 2015 and 2019 for the school and leisure centre.
Vegetation	Mature / semi-mature trees are present along the north and east borders of the site. Small clusters of trees are also present near the entrance to the site off Spring Lane, to the west of the school / leisure centre building and in the far north-west corner of the site. A wooded area is also present to the west of the school building.
Topography	The site generally appears to gently slope to the south-east. A slope is present between the field in the west and the school car parks in the east and has a change of 2m elevation. Based on currently provided topography plans, there is a 7m difference between the east and west extents of the site.
Site Boundaries	The site is enclosed by steel palisade fencing along the eastern border of the site, a wooded area to the north of the site, steel railings to the west and Spring Lane to the south.
Surrounding Area	The site is set within a mixed commercial and residential area, with a park and ride car park present to the south, residential properties to the west, a railway to the east, the disused Manchester Bolton and Bury Canal to the north-west and a wooded area to the north.

3.0 SUMMARY OF PREVIOUS REPORTS

3.1 Geotechnics Desk Study Report

A summary of the relevant points from the Desk Study completed by Geotechnics (reference PC228400) is presented below:

- The site has been shown to have been developed from 1850, with a railway track transversing through the centre of the site. The site's features are generally related to railway development with associated goods yards and sidings, present until 1978. From 1987 a school is present onsite with associated playing fields and infrastructure.
- Mining has been evident on the historical maps from 1850 with a colliery (Whittaker's Bridge Colliery) being present from 1891 to 1909, 60m NW of the site.
- Superficial geology comprises glacial till (Secondary Undifferentiated Aquifer) comprising clay to sandy clay, unsorted, with common pebbles, cobbles and some boulders (Diamicton) is located within the northwest half of the site. In the southeast half of the site superficial deposits are shown to comprise Glaciofluvial Deposits described as undifferentiated sand and gravel with lenses of clay and stony clay.
- Solid geology is shown to be Upper Carboniferous (Pennsylvanian) (Secondary A Aquifer) strata of the Pennine Middle Coal Measures Formation which are described as mudstone and siltstone interbedded with fine- to medium grained sandstone, subordinate seatearths, marine bands and coal seams. The strata forms part of the Duckmantian (Westphalian B) Series.
- The site is not indicated to lie within a Source Protection Zone.
- Geological mapping show two coal seams are outcropping across the site from northeast to southwest.
- Geological mapping also shows another older coal seam outcropping with a similar strike is shown north of the Manchester, Bolton and Bury Canal. It is expected this seam runs below the site at depth.
- The site is in an area where the Coal Authority shows the site could be affected by past coal mining.
- A Coal Authority search carried out shows several coal seams are recorded to have been worked below the site.
- The nearest watercourse is the Manchester, Bolton and Bury Canal, 4m to the north.
- The site lies in an area with potential for groundwater flooding to occur at the surface.
- No radon protection measures are required.
- The risk to human health is considered to be medium to low.
- The risk to controlled waters is medium.
- The risk from ground gas is high to medium.

3.2 Geotechnics Preliminary Ground Investigation Report with Interpretive Chapter

A summary of the relevant points from the Preliminary Ground Investigation Report with Interpretive Chapter completed by Geotechnics (reference PN224390) is presented below:

- 5 No. Hand dug trial pits were excavated ranging in depths from 0.60m (HP02) and 1.20m BGL (HP05).
- 6.No Machine dug trail pits were excavated to 4.00m bgl.
- 3.No Soakaways (SA01 – SA03) tests were carried out within TP01 – TP03. SA01 and SA02 were carried out in adjacent pits to TP01 an TP02.
- 7 No. Dynamic Sample Boreholes (DS01 – DS07) were undertaken to depths between 3.45m to 5.45m bgl.
- 5 No. cable percussive boreholes with rotary follow-on boreholes (BH1 to BH4 including BH03A) to depth of between 2.45m and 51.50m bgl.
- Dynamic Cone Penetration Tests were carried out at 14 No. locations.
- 5 No. boreholes were installed for ground gas and groundwater monitoring.
- Made ground encountered included hardstanding of macadam, concrete, cobble setts and limestone gravel (sub base) from ground level to 0.10m to depths of 0.05m to 0.30m bgl.
- Topsoil was encountered from ground level to between 0.10m and 0.50m bgl.

- Granular made ground of sandy gravel was encountered across the majority of the eastern half of the site and north east from ground level to 0.30m bgl with thicknesses ranging from 0.40m to 2.60m.
- Cohesive made ground typically a sandy gravelly clay encountered from ground level to 0.30m bgl with a thickness of 0.30m to 1.70m.
- Glacial sand and gravels encountered were encountered from 0.10m to 2.80m bgl. Thickness from 0.20m to 3.90m were recorded.
- Glacial laminated clay was encountered in the upper, north-western part of the site only. This strata is described as slightly sandy clay with lenses of sand. This strata was encountered at 3.30m bgl to a depth of 3.50m bgl.
- Glacial till comprising of a slightly sandy slightly gravelly clay was encountered from 0.25m to 4.00m bgl. Thickness ranged between 0.10m and 18.70m.
- Pennine Middle Coal Measures consisting of mudstone, siltstone and sandstone. This geological unit was encountered from 12.60 to 20.50m. Coal was encountered between 16.40m and 48.00m bgl.
- Groundwater strikes were encountered in exploratory holes BH01, BH02, BH03A, BH04, DS01 – DS06, TP01-TP02 and TP05-TP06. Depths ranged from 1.30m – 14.30m bgl.
- SPT results generally showed the granular made ground, glacial sand and gravel to be medium dense. Glacial Till was shown to be generally stiff to very stiff in nature. Variation of refusal depths indicate the likely presence of cobbles and boulders within Glacial Till.
- Exceedances in heavy metals and PAHs were recorded within the soils chemical testing.
- Several exceedances of EQS and DWS of heavy metals, TPH and PAH were detected within groundwater and leachate testing.
- Piled foundations into very stiff / stiff Glacial Till or socketed into the Pennine Middle Coal Measure are considered the most suitable for the predicted loads.
- Tree influence is anticipated to be an issue due to the effects of shrinking or swelling of clays on site. Suitable engineering strategies such as the use of a void or compressible material below ground beams / suspended floor slabs.
- The Design Sulphate Class for the site is DS-1 and ACEC Class AC-2z.
- CBR values of 3% should be adopted. Ground improvement strategies are recommended in potentially weakened zones.
- No significant risk to controlled water receptors were identified.
- No significant risk to human health receptors were identified.
- No significant sources of ground gas from the made ground or from underlying coal bearing bedrock or potential mine workings was identified.

3.3 BSL Coal Mining Risk Assessment

A summary of the relevant points from the CMRA (ref. PH/C5394/12312, dated August 2023) completed by BSL is presented below:

- The site is located within an area where coal seams are abundant and parts of the site are located within a development high risk zone.
- The site lies within a fault block, strike-slip faults lie to the north and south of the site.
- Two coal seams are recorded to subcrop onsite.
- The dip of the coal seams range from 9° to 24° within the area around the site.
- 11 named coal seams are recorded beneath the site, with a total of 7 seams historically worked according to the Coal Authority Consultants' Mining Report.
- Geological memoir records and the Consultants Mining Report indicate the seams range in thickness from 0.80m to 4.60m.
- The recorded workings are considered to present a low risk to the site due to the depth of workings presented in the Coal Authority report, supported by abandonment plans and outcrop calculations.
- Due to the sub-cropping coal seams being indicated to be of workable thickness from coal memoir records, the risk from unrecorded mine entries is considered to be moderate.
- As there are coal seams indicated to be dipping below the site at a shallow depth and are of workable thickness, the risk from unrecorded mine working is considered to be high.

- The risk from recorded mine entries is considered to be low – no recorded mine entries are located on site, the closest being located approximately 40m east and 85m west of the site.
 - The risk from mine gas is considered to be moderate.
 - The risk from Coal Mining Geology is considered to be low.
 - The risk from coal mining surface hazards is considered to be low.
 - The risk from opencast mining is considered to be low.
 - Recommendations were for a series of rotary openholes to drilled to depth of 30m to 40m across the site to confirm or otherwise the presence of the coal seams or workings.
 - If evidence of potential influence from mine entries or coal workings is identified during construction, BSL should be consulted.
-

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken following the ground investigation undertaken by Geotechnics.

The aim of the fieldwork was to:

- Investigate ground conditions on the site and the potential need for detailed investigation.
- Further investigate the ground conditions on site.
- Install standpipes to allow future monitoring.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.
- Assess the potential for instability caused by historical coal extraction.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation between the dates of 7th and 15th August 2023.

Method	No.	Range Depths (m bgl)	Purpose
Trial pits – JCB 3CX	11	1.50 – 3.50	Establish general ground conditions and gain good coverage.
Window sample boreholes – Tracked WS rig	6	1.20 – 5.45	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination and geotechnical and testing. Installation of ground gas and water monitoring wells. WS103 positioned to further investigate hydrocarbon odour and oily sheen noted in BH03 during the Geotechnics Investigation.
Rotary open boreholes	8	45.00	Investigate the presence and depths of coal seams and potential mine workings.
Hand excavated pits	2	1.10 – 1.20	Establish general ground conditions and gain good coverage.

RO102 and TP110 were moved 5.00m to the east of their original positions due to the intermediate pressure gas main running through the west section of the site.

TP111 was also relocated due to restricted access to the wooded area to the west of the school building. An additional hand pit (HP102) was placed within the road present along the west side of the school building to gain coverage as close to the original positions as possible.

TP103, TP104, TP105, RO107, WS103 & TP109 were moved due to being within the area of the slope between the school car parks and the field in the west.

BSL returned to the site to undertake supplementary intrusive investigation between the dates of 7th to 8th November 2023 which comprised of the following:

Method	No.	Range Depths (m bgl)	Purpose
Trial pits – 8 tonne tracked excavator	7	1.50 – 3.50	TP201 to TP205. To provide additional information as to groundwater levels at the site.
Trial trenching — 8 tonne tracked excavator	2	0.10 – 1.20	In proximity to WS101 to confirm extent of organic made ground in this area of the site.
Trial trenching — 8 tonne tracked excavator	2	0.70 – 1.50	TT01 to TT02. To investigate potential presence of relic railway sidings. TT02 was terminated at 0.70m bgl as a relic, unrecorded, man hole was encountered buried below the surface. The manhole was 0.90m deep and contain 400m of water at the base.
Soakaway Tests	3	1.65 – 2.20	SA101 – SA103. SA102 collapsed upon starting the test and was therefore relocated 5m to the south-east and retested as SA103.

The surveyed locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No C5394/02 & C5394/02A. The exploratory hole logs are presented in Appendix B.

All exploratory holes were logged by an experienced geo-environmental engineer in general accordance with the following guidance:

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.
- BS EN ISO 14689:2018 Geotechnical investigation and testing – Identification and classification of rock.

4.3 Sampling Strategy

Representative samples were taken from exploratory holes at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance. The distribution of samples taken across the site is recorded on the exploratory logs.

Investigatory hole locations were determined by reference to the conditions identified in the preliminary risk assessment. Certain specific areas such as the proposed building footprint were targeted for detailed investigation, but a reasonably even spacing was used for the remainder of the site. No specific sampling statistics or grid were utilised in this instance.

4.4 Laboratory Testing

As part of the further assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

The potential contaminative process on site were associated with railway infrastructure, with hydrocarbon odours encountered and ash with made ground observed, therefore the following suite of determinands were chosen to screen for potential site impacts at a UKAS approved laboratory:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	8
Petroleum Hydrocarbons (TPH CWG) inc BTEX and MTBE.	4
Asbestos Screen.	8
Waste Acceptance Criteria (WAC).	3

The Chemical Laboratory Testing Results are presented in Appendix C.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil'.

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
pH Value.	6
Water Soluble Sulphate Contents.	6
SD1 BRE Full Suite.	3
Natural Water Content.	6
Bulk Density	6
Particle Size Distribution (PSD).	8
Particle Size Distribution (PSD) via Sedimentation.	3
Determination of dry density/moisture content relationship (4.5kg rammer).	6
Laboratory Hand Shear Vane at Compaction Points	5
Determination of California Bearing Ratio (CBR) at received moisture content	6
Moisture Condition Value	6

The Geotechnical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in 6 boreholes and subsequently 3 monitoring visits were undertaken out of 3 proposed as part of the current scope. All gas monitoring was undertaken using either a GA5000 or GFM436 infrared gas meter with integral electronic flow analyser.

Previous gas monitoring has also been undertaken by Geotechnics as part of the previous investigation, including six gas monitoring visits over a period of six weeks. This data has also been included and assessed alongside the supplementary dataset within section 8.7, totalling 9 visits which exceeds the minimum recommendations set out in CIRIA C665.

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O₂), carbon dioxide (CO₂) and methane (CH₄) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
WS101	35mm PVC	0.60 – 1.20	Made Ground	Ground Gas
WS102	35mm PVC	0.50 – 1.50	Made Ground	Ground Gas
WS103	35mm PVC	0.50 – 1.50	Made Ground	Ground Gas
WS104	35mm PVC	1.00 – 2.00	Made Ground	Ground Gas
RO103	50mm HDPE	18.00 – 20.00	Mudstone	Ground Gas
RP104	50mm HDPE	17.50 – 20.00	Mudstone	Ground Gas

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Final ground gas monitoring results are presented in Appendix E of this report.

5.0 GROUND CONDITIONS

5.1 Summary

A brief summary of the ground conditions encountered is presented in the table below:

Stratum	Range Depths - Top (m bgl)	Range Depths - Base (m bgl)	Range Thickness' (m)	Brief Description
Made Ground	0.00	0.15 – 2.00	0.15 – 2.00	Gravelly SAND.
Natural Topsoil	0.00	0.20	0.20	Slightly gravelly slightly sandy CLAY.
Natural Superficial Strata	0.00 – 2.00	1.20 – 20.50	0.20 – 20.00	Sandy, gravelly CLAY.
Solid Geology	11.20 – 20.20	45.00	24.80 – 33.80	MUDSTONE, SILTSTONE, SANDSTONE.
Coal	17.80 – 40.50	18.00 – 40.80	0.20 – 0.30	COAL.

Details are provided in the logs in Appendix B and the individual strata are described in the sections below.

5.2 Made Ground

Made Ground – Topsoil

Made Ground Topsoil was encountered across the majority of the east section of the site within the now overgrown playing field. It generally consisted of grass over dark brown slightly sandy clay with rootlets. This was typically encountered between ground level and 0.20m bgl.

The Made Ground Topsoil within TP102 was recorded as a dark brownish black slightly clayey gravelly sand with anthropogenic inclusions of brick, coal, glass and metal, as well as gravels of mudstone and sandstone.

Made Ground – General

Made ground was encountered in the majority of the exploratory holes across the site and was observed from ground level to a maximum depth of 2.00m bgl, but the base was unproven in HP101, HP102 and WS106.

Hardstanding of tarmacadam was present across the south-east section of the site around the area of the school building and was typically 0.05m thick (WS104, WS106, RO106, TP108 & HP102). A sub-base was typically present below the tarmacadam comprising sandy gravel of limestone.

The made ground onsite generally consisted of dark brown to black gravelly sand with moderate ash content and anthropogenic inclusions of coal, slag, metal, brick, concrete, glass, plastic and timber, as well as sandstone and mudstone. This made ground is concentrated in the east half of the site and was encountered up to 2.00m bgl.

Cohesive made ground with the above inclusions was also encountered in WS101, WS102, WS103 and WS105, but is not observed to be as widespread as the granular made ground, being concentrated more in the north / central section of the site.

Made Ground – WS01

Rare organic matter was encountered within WS101 from 0.60m to 1.20m bgl with a mild organic odour.

Further site investigation in November 2023 delineated the extents of the organic made ground within this area of the site. The material was noted to be between 0.10m in thickness at its perimeter and up to 1.20m at the centre, located around WS101 in the northwest corner of the proposed building footprint. The depths of organic made ground and the extents are demonstrated on drawing ref. C5394/07. The

dimensions of the material in this area are calculated to be approximately 20.5m east to west and 11.5m north to south. Assuming an area of 120m³ and a maximum depth of 1.20m bgl this equates to a maximum estimated volume of 144m³.

5.3 Natural Superficial Strata

Within the north-east section of the site, the superficial strata is typically underlying granular made ground and generally consists of firm to stiff sandy gravelly clay. Generally, within the north-west section of the site (derelict playing field), the natural superficial strata consisted of a layer of soft to firm sandy gravelly clay underlain by either gravelly sand or sandy gravel. This granular stratum was then further underlain by a firm to stiff sandy gravelly clay.

Natural superficial strata were not encountered in the section of the site occupied by the school in the south during the BSL site investigation.

A soft grey gravelly sandy clay with rare organic matter was encountered in WS101 from 1.20m to 1.80m bgl.

SPTs indicate the sands range from medium dense to dense within the natural superficial strata.

Hand shear vanes and SPTs show the clays are predominantly firm to stiff except for localised soft clay encountered in WS101 (1.20-1.80m bgl) and WS105 (1.90-3.00m bgl).

5.4 Solid Geology

Bedrock comprising interbedded siltstone, mudstone and sandstone was encountered below the superficial deposits from depths between 11.20m to 20.20m bgl. Bedrock was proven to a maximum depth of 45.00m bgl across the site and is interpreted to be representative of Pennine Middle Coal Measures Formation.

The depth to bedrock varies across the site, specifically within the building footprint of the proposed school building, the depth to rockhead varies from 11.20m to 20.50m bgl. From assessing the ground model below the proposed development, the general trend shows that the bedrock is shallower in the south-west corner of the building footprint and proceeds to get deeper towards the north-east corner of the footprint.

Coal was also encountered within each of the rotary open boreholes undertaken during the site investigation and was encountered between 17.80m and 40.80m bgl with thicknesses ranging from 0.20m to 0.30m. Detailed depths of the coal encountered are presented in the table below:

Location	Range of depth (m bgl)
RO101	40.50 – 40.70
RO102	17.80 – 18.00
RO103	35.90 – 36.20
RO104	37.50 – 37.80
RO105	21.80 – 22.10 35.80 – 36.10
RO106	25.50 – 25.80 39.50 – 39.80
RO107	22.60 – 22.80 25.70 – 25.90 40.50 – 40.80
RO108	25.50 – 25.70 27.50 – 27.70

The depths to bedrock and depths to coal seams in the vicinity of the proposed building are shown on the Proposed Development Footprint Bedrock Profile drawing ref. C5394/05.

5.5 Groundwater

The depths to groundwater and locations present during site works are shown in the table below:

Location	Depth During Site Works (m bgl)	Depth During Site Works (m AOD)	Comments
HP101	NGW	-	-
HP102	1.10	69.2	Moderate seepage
TP101S	1.10	74.61	Small seepage
TP102	1.70	72.88	Large seepage
TP103	1.90	72.33	Large seepage
TP104	0.80	70.88	Small seepage
TP105	NGW	-	-
TP106	NGW	-	-
TP107	1.30	69.51	Small seepage
TP108	1.50	69.39	Large seepage
TP109	NGW	-	-
TP110	2.00	72.33	Small seepage
TP111	NGW	-	-
WS101	3.00	71.67	Small seepage
WS102	2.10	72.05	Small seepage
WS103	2.00	71.77	Small seepage
WS104	NGW	-	-
WS105	1.80	72.21	Small seepage
WS106	NGW	-	-

NGW – No Groundwater Encountered

Although all of the rotary openhole logs show that there was no groundwater encountered, this is unlikely to be representative due to the method of drilling.

BSL returned to site in November 2023 to undertake further trial pits to assess the groundwater level in open excavations at the site. Five trial pits were excavated within the proposed building footprint and left for between 25 mins and 3.5 hours. Details of the ground conditions and groundwater levels encountered are shown in the table below.

Locations	Ground Conditions	Groundwater Strike (m bgl)	Groundwater Level after excavation left open (m bgl)	Groundwater Level (m AOD)	Comments
TP201	0 – 0.10 TOPSOIL 0.10 – 0.20 MG CLAY 0.20 – 2.10 CLAY 2.10-3.00m GRAVEL	NGW	1.40	73.45	Water ingress from the surface. Major side collapse from 0.20 – 3.00 after excavation remained open for 2.5 hours. After collapse GW level at 1.40m bgl.
TP201A	0 – 0.10 TOPSOIL 0.10 – 1.40 CLAY 1.40 – 1.70 GRAVEL	1.60	1.35	73.50	
TP202	0 – 3.00 CLAY	NGW	2.80	71.34	Water ingress from the surface
TP203	0 – 0.10 TOPSOIL 0.10 – 1.50 MG CLAY	3.00	1.50	73.17	Major side collapse from 0.20 – 3.00 after

Locations	Ground Conditions	Groundwater Strike (m bgl)	Groundwater Level after excavation left open (m bgl)	Groundwater Level (m AOD)	Comments
	1.50 – 2.80 CLAY 2.80 – 3.00 GRAVEL				excavation remained open for 2.5 hours.
TP203A	0 – 0.10 TOPSOIL 0.1 – 1.50 MG SAND 1.50 – 1.90 CLAY	1.50	1.30	73.37	Small seepage from the base of MG
TP204	0 – 0.10 TOPSOIL 0.10 – 0.20 CLAY 0.20 – 3.50 CLAY	NGW	2.60	71.22	Water ingress from the surface & land drain
TP205	0 – 0.10 TOPSOIL 0.10 – 1.00 MG CLAY 1.00 – 2.00 MG CLAY 2.00 – 2.50 CLAY 2.50 – 2.80 GRAVEL	2.70	1.90	71.73	-

As shown in the table above, all locations were surveyed by GPS to National Grid coordinates and mOD elevations. When compared to the proposed footing level for the building of 73.4m AOD, one area of the site is noted to have groundwater levels above or very close to this – localised to TP201, TP201A, TP203 and TP203A in the northwestern corner.

Trial pits TP201 and TP203 needed to be re-excavated as the sides collapsed when left open, as such the groundwater levels may be misrepresentative of the true groundwater level. Regardless of this, TP201A confirmed similar groundwater levels after 25 minutes, and the groundwater level within TP203A was recorded to be very close to the proposed footing level.

Two surfer plots have been produced to demonstrate the groundwater level across the site against ordnance datum (ref. C5394/08) and as a differential between groundwater level (mAOD) and the base of the footing as shown on drawing ref. C5394/09 recorded as metres below footing level (mBFL). As detailed above, the main area where groundwater will be encountered when excavating the building footings is in the northwestern corner.

Groundwater was not encountered in some of the trial pits and was noted to rise in excavations over time suggesting that the groundwater is confined underneath cohesive deposits across the site. Therefore it cannot be discounted that groundwater in areas outside of the northwest of the site may rise above footing level, locally; at least where groundwater levels are recorded to be within 1m of the footing depth.

Within installed standpipes, post site works monitoring has revealed the following depths to groundwater:

Location	Depth During Monitoring Period (range) (m bgl)	
	Min	Max
Overall min/max	0.60	6.08
WS101	0.85	1.34
WS102	0.73	0.90
WS103	0.60	4.10
WS104	1.00	1.28
RO103	0.60	1.37
RO104	0.40	6.08

Following review of the open excavation groundwater level, the above post site works monitoring is considered to not be truly representative of the groundwater body. Given the ground conditions onsite, and the placement of installations to target sources of ground gas it is concluded that the monitoring wells

are most likely acting as a sump for surface water and localised groundwater within the made ground rather than of the superficial aquifer confined at shallow depth beneath the site. As such the above, groundwater data from monitoring wells is not carried through into the below assessments.

5.6 Observations

Contamination

During the works undertaken by BSL, observations for both visual and olfactory evidence of contamination were undertaken.

Ash was observed as a moderate constituent within made ground encountered in HP101, TP106, TP107, TP108 and WS104.

A slight hydrocarbon odour was recorded within the granular made ground within TP106, TP107 and TP108 in the eastern car park area.

WS103 was positioned adjacent to Geotechnics borehole BH03, where a hydrocarbon odour and oily sheen were noted beneath the made ground on the natural sands and gravels at 2.00m bgl, however no evidence of visual or olfactory contamination was noted by BSL.

Stability of Excavations/Boreholes

The sides of the trial pits were generally stable however collapse of the natural strata was observed in TP102, TP103 and TP109. In these locations the exploratory hole was terminated due to collapse. Generally, the cause of the pit collapse can be attributed to ingress of groundwater into the pit, causing the sides to become unstable. Similarly, as discussed above, the sides of TP201 and TP203 and SA102 all collapsed.

TP108 was also terminated due a large groundwater strike.

The stiff nature of the clay within TP106 proved difficult to excavate at depth.

Casing was required to prevent collapse with the granular materials during drilling of the window sample boreholes.

Obstructions

An obstruction was encountered within WS106 as the SPT refused at 1.20m bgl within the made ground. The hole was terminated and was not moved to a different location due to restrictions from underground services in this area of the site.

6.0 TEST RESULTS

6.1 Geotechnical Laboratory Testing

The geotechnical testing results presented below are predominantly taken from the Geotechnics report, and it should also be noted that only the results relevant to the Geotechnical Assessment (those within or in close proximity to the proposed building footprint) have been included in the below summary. Full results are presented in Appendix D.

Plasticity Index Analysis

Plasticity index results ranged between 13% and 24%. Associated water contents ranged between 10% and 26%.

After modification of particle size in accordance with BRE 240 the modified plasticity indices are in the range 9% to 21% indicating the cohesive soils to be of low to medium volume change potential.

Undrained Shear Strength

The results of the tests are shown in the table below:

Location	Depth (m)	Shear Strength (kPa)	Undrained Shear Strength to EC7
BH02	5.00	233	Very High
BH02	8.00	141	High
BH02	14.00	216	Very High
BH02	17.00	61	Moderate
BH03A	8.00	145	High
BH03A	11.00	180	Very High
BH04	3.00	233	Very High
BH04	8.00	92	High

Laboratory Hand Shear Vanes

The results of the tests are shown below:

Location	Depth (m)	Shear Strength (kPa)	Undrained Shear Strength to EC7
BH02	11	150	Very High
BH02	20	21	Low
BH04	5	150	Very High
BH04	11	150	Very High

Unconfined Compressive Strength (UCS) and Point Load Index

A summary of the information pertaining to the Unconfined Compressive Strength (UCS) of the intact rock material (not rock mass) related to mudstone bedrock at the site is shown in the table below. The point load index results have been used to derive the UCS using the relationship of $UCS=18 \times IS50$ for mudstone (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.00-0.32	0.01-0.38	0.90-5.94	Point load	27
-	-	2.4-36.3	UCS test	4

Point load and UCS testing was also undertaken on other rock types encountered onsite by Geotechnics and is summarized in the below tables. A summary of the information related to the siltstone bedrock is shown in the table below. The point load index results have been used to derive the UCS using the relationship of $UCS=20*IS50$ for siltstone (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.07-0.52	0.09-0.61	1.8-12.2	Point load	3
-	-	37.2	UCS test	1

A summary of the information related to the sandstone bedrock is shown in the table below. The point load index results have been used to derive the UCS using the relationship of $UCS=24*IS50$ for sandstone (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.93	1.03	20.6	Point load	1
-	-	35.6-42	UCS test	3

A summary of the information related to the coal bedrock is shown in the table below. The point load index results have been used to derive the UCS using the relationship of $UCS=18*IS50$ for coal (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.03-0.09	0.04-0.09	0.8-1.8	Point load	2

Earthworks

In addition to the general testing above, BSL has undertaken the below testing to inform earthworks requirements at the site.

Dry Density/Moisture Content/MCV

Determination of Dry Density/Moisture Content relationship, Moisture Content and Moisture Condition Value (MCV) testing was completed on representative samples of material types encountered on site. Dry Density/Moisture Content relationship was determined using the 4.5kg Rammer.

Results are summarised as follows:

Location and depth (m)	Soil Type	Assumed Particle Density (Mg/m ³)	Maximum Dry Density (Mg/m ³)	Initial Moisture Content (%)	Optimum Moisture Content (%)	Moisture Condition Value (MCV)
TP101S 0.50m	Slightly silty SAND	2.60	1.67	20.4	7.7	7.5
TP102 1.70m	Slightly clayey silty very sandy GRAVEL	2.65	2.16	12.2	7	4.3
TP103 1.30m	Silty SAND and GRAVEL	2.65	2.08	20.1	9.2	5.9

TP102 0.50m	MG – clayey silty gravelly SAND	2.65	1.79	23.7	17	5.3
TP111 0.50m	MG – clayey silty very gravelly SAND	2.65	1.87	24.1	12	4.0
TP103 0.50m	Slightly gravelly sandy CLAY	2.65	1.89	13.2	15	3.7

*MG = Made Ground

A total of 5 No. laboratory hand shear vane tests were completed during compaction testing, with one test completed at each compaction point during the Dry Density/Moisture Content relationship testing on natural cohesive soils. A summary of the results is presented in the table below:

Location	Depth (m)	Compaction Point Number	Shear Strength (kPa)	Dry Density (Mg/m ³)	Moisture Content (%)
TP103	0.50	1	158	1.821	9.9
		2	136	1.856	11.8
		3	108	1.866	13.9
		4	72	1.860	15.8
		5	40	1.797	17.8

The compaction point number closest to Optimum Moisture Content and Maximum Dry Density for each sample is highlighted in **bold**.

As part of the previous investigation undertaken by Geotechnics, the following testing was also undertaken using the 2.5kg rammer method:

Location and depth (m)	Soil Type	Assumed Particle Density (Mg/m ³)	Maximum Dry Density (Mg/m ³)	Initial Moisture Content (%)	Optimum Moisture Content (%)
BH02 0.50-1.20m	Natural Sand	2.64	1.71	24	18
BH02 1.20-1.65m	Natural Sand	2.66	1.91	17	14
DCP01 0.30-0.70m	MG Gravelly Sand	2.65	1.83	17	14
DCP07 0.90-1.20m	Natural Clay	2.61	1.82	20	14
TP04 1.40-1.60m	Natural Clay	2.61	1.84	16	13
TP06 1.50-1.60m	Natural Clay	2.63	1.88	22	13

Grading/Particle Size Distribution (PSD) Testing

Location	Strata	Provisional Material Classification in accordance with SHW Series 600
TP101S 0.50m	Slightly silty SAND	1A/1B
TP102 1.70m*	Slightly clayey silty very sandy GRAVEL	1A/1B/1C
TP103 1.30m*	Silty SAND and GRAVEL	1A/1B
TP102 0.50m	MG – clayey silty gravelly SAND	1A/1B ^[1]

TP111 0.50m	MG – clayey silty very gravelly SAND	1A/1B ^[1]
TP103 0.50m	Slightly gravelly sandy CLAY	2A/2B

*=Sedimentation undertaken on sample.

[1] Percentage by mass passing 63 micron sieve marginally exceeds definition of class 1A/1B material.

California Bearing Ratio (CBR) Testing

Laboratory CBR testing was undertaken on a range of material types at received moisture content and at optimum moisture content, with results summarised below:

Location	Strata	CBR Value (%) – Test Conducted at Received Moisture Content	CBR Value (%) – Test conducted at Optimum Moisture Content
TP101S 0.50m	Slightly silty SAND	0.2	-
TP102 1.70m	Slightly clayey silty very sandy GRAVEL	0.7	-
TP103 1.30m	Silty SAND and GRAVEL	-	30.6
TP102 0.50m	MG – clayey silty gravelly SAND	1.1	-
TP111 0.50m	MG – clayey silty very gravelly SAND	-	46.6
TP103 0.50m	Slightly gravelly sandy CLAY	-	8.6

6.2 Aggressive Ground Conditions – Geotechnical Chemical Testing

The test results for the assessment of aggressive ground conditions are presented in Appendix D. The results are summarised and assessed within Section 8.0 of this report.

6.3 In Situ Geotechnical Testing

In Situ Hand Shear Vane Tests

Hand shear vane tests were carried out on suitable cohesive soils where possible. Each shear vane result recorded represents the mean value of three tests undertaken at the specified depth.

The results and distribution of the hand shear vane tests are recorded in kPa on the Exploratory Hole Logs which are presented in Appendix B.

In Situ Standard Penetration Tests

Standard Penetration Tests (SPTs) were carried out within the window sample boreholes at regular 1.0m intervals. The results of the individual blows and the N-values are recorded on the Exploratory Hole Logs in Appendix B.

All SPT N values are uncorrected. Density and strength descriptors are reported in accordance with the guidelines stated in BS 5930:2015+A1:2020, incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

Soil Infiltration Test Results

Soil infiltration test tests were undertaken within trial pits, a summary of the results is presented in the table below. These were carried out in general accordance with BRE Digest 365 (BRE 2016) where infiltration rates allow three test runs during a working day (or where there is no infiltration), but where low infiltration rates were encountered the available time may not have been sufficient to fully comply with the BRE test method.

Where less than three tests were possible in a particular location the results provided should be considered as indicative only. Further discussion concerning the suitability of infiltration testing at the site is provided in Section 7.0.

Location	Stratum Type	Depth (m)	Infiltration Rate (m/sec)		
			Test 1	Test 2	Test 3
SA101	Sandy GRAVEL	2.10	4.23×10^{-5}	-	-
SA102	Gravelly CLAY	2.20	-9.74×10^{-5}	-	-
SA103	Sl gravelly sl sandy CLAY	1.65	3.22×10^{-7}	-	-
SA01	-	1.20	1.31×10^{-4}	9.88×10^{-5}	7.50×10^{-5}
SA02	-	1.20	8.93×10^{-5}	4.85×10^{-5}	1.68×10^{-5}
SA03	-	1.20	4.98×10^{-6}	-	-

The full test results are presented in Appendix D.

6.4 Geo-Environmental Testing

Chemical Laboratory Testing

The chemical test results for soils are presented in Appendix C. The results are summarised and assessed within Section 8.0 of this report.

Ground Gas Monitoring

Ground gas monitoring installations have been monitored on 3 occasions to date out of 3 visits scheduled as part of the current scope. The results are presented in Appendix E and are summarised and assessed within Section 8.0 of this report.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Ground Model Summary

The north section of the site consists of an overgrown playing field and a sports court surfaced in hardstanding in the north-easternmost section.

The lower south section of the site is comprised of a secondary school (Spring Lane School) and leisure centre (Radcliffe Leisure Centre) with associated hardstanding car parking areas.

The ground conditions can be summarised as below (top down):

-
- Made ground generally comprising sandy gravelly clay and gravelly sand from ground level to between 0.15m and 2.00m bgl.
 - Natural superficial deposits comprising sandy gravelly clay, clayey gravelly sand and sandy gravel proven to depths between 1.20m and 20.50m bgl.
 - Solid geology comprising mudstone, siltstone, sandstone and coal seams proven to depths of 45.00m bgl.
 - Groundwater levels ranging between 0.80m and 14.40m bgl during site works, with groundwater strikes commonly encountered within the top 3.0m bgl.
 - Groundwater levels are recorded to be between 68.07m AOD in the SE corner of the site (DS06) and 74.61m AOD in the NW corner of the site (TP01S) noted within the red line boundary.
-

An intermediate pressure gas main is present running through the derelict playing field in the north-west section of the site and trends north-south. This will need to be taken into consideration for foundation design.

Large groundwater inflows were encountered within three trial pits (TP102, TP103 & TP108) which caused trial pit sides to become unstable and collapse. Post site work monitoring within borehole installations also showed generally shallow groundwater across the site, with the exception of RO104.

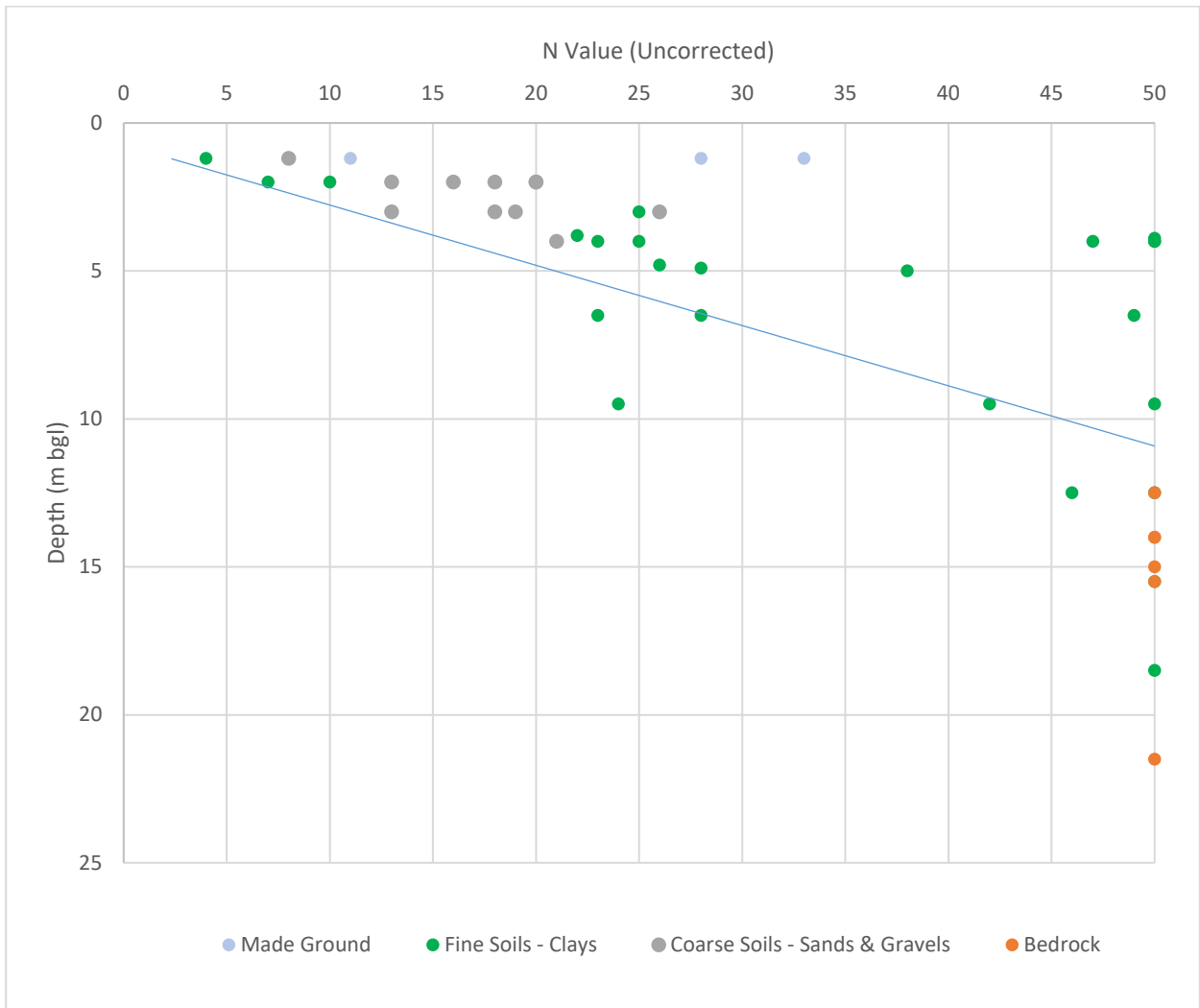
7.2 Design Soil Parameters

The relevant test results from the prior section have been evaluated to derive geotechnical soil parameters for the site. Within this section, only test results from within, or close to, the proposed building footprint have been used to aid the accuracy of foundation design. Due to the nature of the geotechnical assessment, which includes deep foundation solutions, data was taken from both the BSL and Geotechnics exploratory holes to provide a comprehensive profile of the ground which utilises both shallow and deeper data. Laboratory testing presented above in section 6.1 has also been used to inform preliminary foundation design.

Data from the following boreholes have been utilised from both the Geotechnics and BSL geotechnical investigation; BH02, BH03, BH03A, BH04 (Geotechnics). WS101, WS102, WS103, WS104, WS105, TP102, TP103 & TP108 (BSL). These are all within or in close vicinity of the proposed building footprint.

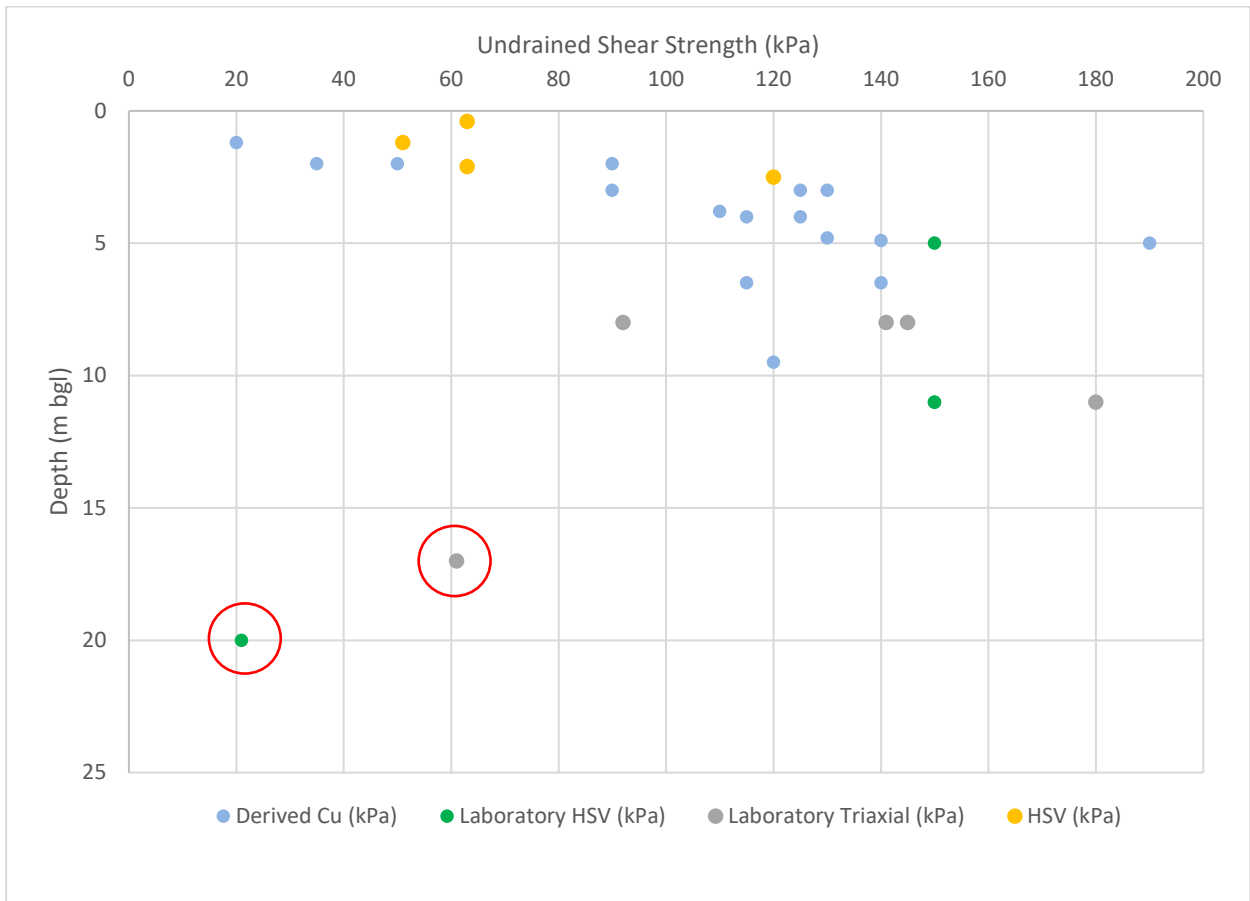
For cohesive (fine) soils, the equivalent approximate undrained shear strengths (C_u) have been calculated from the recorded SPT N values, adopting f_1 values based on the correlation of Stroud (1975) and the 'average' plasticity.

A depth (m bgl) vs SPT N value graph is also provided below to provide a profile of the granular materials underlying the area of the proposed building.



The above graph shows a general increase in strength with depth, although the cohesive deposits are seen to range with depth and therefore a line of best fit has been utilised to show the 'average' increase in depth in relation to the cohesive clay deposits.

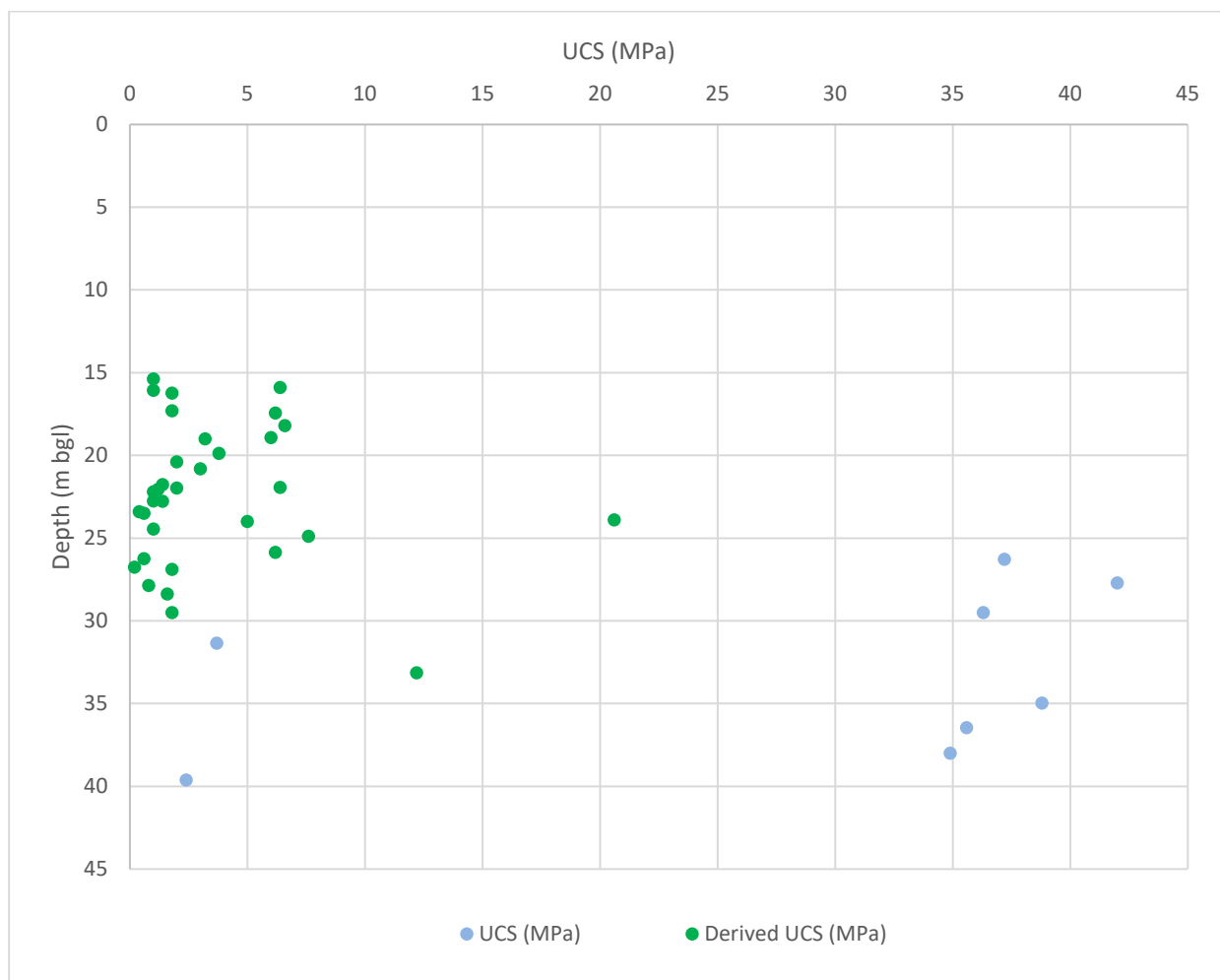
A depth (m bgl) vs derived shear strength (C_u) graph is also provided below to provide a profile of the cohesive soils underlying the site.



The above graph generally shows an increase of strength with depth within the proposed building footprint, with the exception of the two data points highlighted in red on the graph of samples taken from BH02. The soil description from BH02 at 17.00m and 20.00m bgl (result 61kPa and 21kPa, respectively) comprised very stiff sandy gravelly clay, which also has an SPT N value of 50 consistently from 15.50m bgl to rockhead which is encountered at 21.66m bgl, suggesting the clays are indeed very stiff. The gravelly nature of the clay may have resulted in an anomalous shearing of the material and this testing data is therefore considered unlikely to be representative of the soil profile as a whole, and the two results are discounted from the assessment going forward.

In addition, the shear strength derived from the SPT in WS101 at 1.20m is representative of a localised area of soft organic clay, which should be considered when determining characteristics values for the cohesive soils as a whole, given this is a localised area and not representative of the cohesive soils as a whole.

The Unconfined Compressive Strength (UCS) was determined by laboratory testing and was also derived from laboratory point load testing using the relationship of $UCS=18 \cdot IS50$ for mudstone (ISRM), $UCS=20 \cdot IS50$ for siltstone, $UCS=24 \cdot IS50$ for sandstone and $UCS=18 \cdot IS50$ for coal. A graph showing the variation in UCS and derived UCS vs depth is presented below to provide a profile of the variation in UCS of the bedrock with depth.



Based on the exploratory hole logs and geotechnical testing, the table below summarises the generalised ground conditions profile and characteristic geotechnical parameters beneath the proposed building footprint:

Stratum	Depth Top (m)	Depth Base (m)	SPT N Value	C_u (kN/m ²)	ϕ' (°)
Made Ground	0.0	1.7	6	30	N/A
Superficial Deposits – Granular	1.7	4.00	15	NA	31
Superficial Deposits – Cohesive	4.00	11.2 – 20.5	25	125	NA
Solid Geology – Mudstone and Siltstone	11.2 - 20.5	N/A	50	NA	41

7.3 Foundations

The development will comprise a three to four storey steel framed school building, including a sports hall and is considered to be classed as Geotechnical Category 2 in accordance with Eurocode 7.

Preliminary design by calculation has been undertaken to determine the design resistance of the bearing strata in the following section.

Approximate loads have been provided, with column loads at around 1300kN along the internal corridor lines and around 850kN at the perimeter columns.

This assessment is based on the existing ground levels and does not take into consideration any cut/fill exercise, which should be considered at the detailed design stage.

Ground improvement

Based on the proposed loads of the development this will preclude the use of traditional foundations unless improvement is undertaken on the existing soils.

As such, ground improvement by methods such as vibro compaction and/or the use of vibro piling should be considered for structures. This will create a stiffened platform and stiffened columns upon which to help spread the building loads and thus minimise differential settlement. The vibro stone piles would need to penetrate through the made ground and underlying any soft cohesive natural strata, down to a competent horizon. Given the earthworks and enabling works programme which will be required in order to create a suitable development platform, this increases the feasibility of a ground improvement solution across the building footprint and surrounding areas.

Highly organic and soils of shear strengths less than 30kPa are usually considered unsuitable for Vibro piles and an appropriate contractor should be contacted to confirm suitability of the materials on site. The soils encountered within the building footprint are generally considered suitable for this method. Locally soft and organic clays were encountered in WS101 between 0.60m and 1.80m, which are likely to be unsuitable and would require excavation during the enabling works and earthworks programme if vibro ground improvement is adopted. If ground conditions vary compared to those encountered during the site works, a suitably qualified engineer should be consulted.

On completion of the vibro treatment works, in-situ testing should be carried out to confirm the treatment meets the bearing capacity and deformation criteria for construction. Further guidance is provided in BRE 391 "Specifying vibro stone columns".

Following ground improvement, reinforced pads and ground bearing slab foundations could be used bearing onto the improved ground, usually at depths of circa 600mm depth. Typically, allowable bearing capacities of the order of 150kN/m² can be achieved, keeping total and differential settlements within tolerable limits, although this should be discussed with specialist contractors. Alternatively, a raft /semi-raft foundation could be used to distribute the structural loads across a stiffened layer, with installed columns acting as "rigid inclusions" to support the slab.

It is recommended that discussions are held with a competent ground improvement contractor to discuss options in detail including confirming suitability for the envisaged loads.

Working Platform

Prior to the commencement of penetrative works (vibro piling), a working platform will be required for tracked plant. This should be designed and installed in accordance with BR470 (BRE 2004) based on the plant requirements, data and rig loadings.

Piling Risk Assessment

A risk assessment may be conditioned by the Local Authority for the installation of vibro-piles, as there is a possibility that this could lead to creation of new pathways for migration of contamination.

7.4 Building Near Trees

The clay soils on site are of low to medium volume change potential. Medium volume change should be assumed for preliminary design purposes. Where foundation excavations (or piles if adopted) encounter cohesive strata in the vicinity of existing, proposed or recently removed trees, foundations should be adjusted in full accordance with BRE 298. All foundations should be deepened below roots of greater than 5mm diameter during excavations for footings.

A survey of all trees and hedges on the site and within influencing distance of the site boundary has been undertaken to identify tree species and heights by a qualified arboriculturist in accordance with BS 5837:2012. The closest tree within proximity to the location of the proposed building footprint is a Common Oak, using NHBC guidance, the influencing distance of this would be 17.98m. As the building footprint is approximately 15.0m away from this tree, this means that the north-west corner of the proposed building footprint would be within influencing distance of this tree (T-62 on the Arboricultural Survey ref. FS1013-ATC-XX-XX-T-O-0001). At a distance of 15.0m away, the required depth to mitigate against heave would be 1.00m bgl for foundations. As the proposed cut in this area of the site exceeds 1.50m, there is not considered to be a risk from tree influence. Should any materials within the zone of influence of trees be replaced they should be granular to avoid reintroducing soils that may be prone to heave and thus increasing the risk.

7.5 Floor Slabs

A suspended floor slab should be adopted at the site supported by piles. Where cohesive (shrinkable) strata remain below the structure, the required void size for beneath floor slabs on this site is 250mm based on the low to medium volume change potential clays.

Alternatively, ground bearing floor slabs supported by vibro improved ground on a grid fashion i.e. “rigid inclusions” could be adopted, provided the below criteria are also considered:

-
- Any other compressible or unsuitable materials (topsoil containing vegetation and organic matter, including tree roots, are excavated and either improved or removed and replaced with suitable materials
 - Any fill beneath the slab is suitable, well-compacted granular material placed in an appropriate thickness in accordance with a suitable specification (e.g. SHW Series 600) designed and supervised by an appropriately qualified engineer, with the end performance validated.
 - The slab is adequately reinforced.
 - Regular construction joints and ties are provided to allow for differential settlement.
-

The final floor slab design should be of sufficient thickness and sufficiently reinforced to accept the envisaged applied loads, without unacceptable total or differential movement.

Vertical elements within the structure, such as columns and walls will need to be isolated from the ground bearing slab in order to allow for the slab to expand against them without resulting in cracking.

Prior to the placement of the founding materials and the construction of a ground bearing floor slab, the sub-formation and formation will need to be inspected and checked by a geotechnical engineer to ensure the ground conditions are as expected. If soft spots or hard spots are identified at the formation level, they should be reported to the Geotechnical Engineer immediately and remedial actions agreed.

Incorporation of geogrid reinforcement at formation level, before granular material is placed and compacted, will likely minimise required excavation depths and help provide a suitable foundation for the ground bearing slab.

Ground floor slabs should also be designed to incorporate any ground gas protections measures, where required, although these are not anticipated to be required based on the data available.

7.6 Site Preparation and Construction

Topsoil and subsoil should be removed from beneath all proposed buildings and hardstanding areas, it should be noted that the topsoil is unlikely to be re-usable due to both saturation and the volume required.

If organic soils are encountered below the proposed buildings then these will need to be removed – notably the localised soft organic clays encountered in WS101 between 0.60m and 1.80m bgl.

There are a number of services crossing the site including an intermediate pressure gas main. To allow remediation and construction, all services will need to be disconnected and any suspected dead services are confirmed as dead by testing.

Instability of the made ground and granular superficial strata should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'.

Collapsing of the trial pit sides was observed in the natural granular strata and temporary shoring maybe required. Otherwise, the foundation excavations will be significantly wider than anticipated and costs will be incurred for additional volumes of concrete.

Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme.

It should be noted that undertaking ground improvement locally or using deepened foundations (i.e. focussing only on the footprint of structures) means that the surrounding areas (roads, gardens and landscaping) are likely to settle relative to the structures if disturbed. This risk can be mitigated by undertaking more widespread ground improvement through techniques such as dynamic compaction, surcharging or excavation and re-compaction, which could be incorporated into the wider earthworks programme.

To protect against the effects of heave, new drainage in cohesive soils should be designed to take account of potential ground movement, including where pipes and services which pass through substructure walls or foundations. The volume change potential on this site is low to medium and the potential ground movements that need to be considered for design are 100mm.

Recorded post site works groundwater levels ranged between 0.60m and 8.50m bgl and therefore will be encountered within likely excavation depths. Based on the exploratory hole logs and monitoring, which have identified a high groundwater table and rapid ingress of groundwater into some trial pits, it is possible that conventional methods such as sump pumping may not be sufficient to deal with anticipated flows and alternative methods of dewatering may be required such as dewatering wells localised to areas where groundwater level is close to or above the proposed footing depth of 73.4m AOD. A specialist dewatering contractor should be consulted for advice in this instance. Further guidance is provided in CIRIA C750 "Groundwater Control: Design and Practice". It should be noted that groundwater levels will vary seasonally and the timing of construction may influence requirements.

Any water pumped from excavations may need to be passed via settlement tanks and treated before being discharged to the sewer; discharge consents/permits will also be required.

7.7 Mine Workings

The site is located within an area where coal seams are abundant and is noted to be within a Coal Authority Development High Risk Area as shown on the Coal Authority Interactive Map. The site also appears to be located within a fault block. The BGS mapping (1:50,000 Sheet 85 Manchester, Solid Edition) shows faults to be present to the north-east and south-west of the site, these faults are both indicated to be strike slip faults trending north-west to south-east and are shown to displace the coal seams outcropping onsite.

The Coal Mining Risk Assessment (PH/C5394/12312) undertaken by Brownfield Solutions Ltd has identified that a total of eleven coal seams are recorded to be present below the site, their depths ranging from outcropping directly below the superficial deposits to 246m below the site. The regional direction of dip

of the bedrock is towards the south-east, ranging from 9° and 24°, with the closest dip being 9° which is shown onsite on the geological mapping. The records from the geological memoir and Consultants Coal Mining Report indicate the seams range in thickness from 0.80m to 4.60m. The shallowest seams are indicated to be the Stonedelf and Ashclough Mines which are both indicated to subcrop onsite beneath the superficial deposits, striking north-east to south-west and 1.70m and 2.46m in thickness respectively. The next shallowest coal seam is indicated to be the Top Five Quarters (Bin) Mine at a depth of 24m below rockhead. Full details of the seams recorded beneath the site, as assessed in the Coal Mining Risk Assessment, are presented below:

Seam	Approximate Distance from Site (m)	Thickness from Geological Memoir (m)	Thickness calculated from Within's Pit BGS Log (m)	Anticipated Depth from outcrop calculations (m)
St D M – Stonedelf Mine	Onsite NW	1.70	-	Subcropping – 28.5
As M – Ashclough Mine	Onsite NW	2.46	-	Subcropping – 39.6
T 5 QRS – Top Five Quarters (Bin)	152m NW	1.00	-	24-72
LYD – Lower Yard	863m NW	0.76	-	136-185
W M – White	95m N(Faulted)	1.00	1.50	164-207
BK M – Black	227m N (Faulted)	0.90	1.20	182-225
G M – Gingham	317m NW (Faulted)	1.20	0.80	203-246
5QRS – Five Quarters	444m NW (Faulted)	1.50	1.20	190-224

The following seams are interpreted to dip beneath the site as detailed in the Consultants Coal Mining Report.

Seam	Approximate Distance from Site (m)	Thickness from Geological Memoir (m)	Extraction Thickness from CA Consultants Report (m)	Thickness calculated from Within's Pit BGS Log (m)	Anticipated Depth from outcrop calculations (m)	Depth Provided by Coal Authority Report (m)
T3YDS – Top Three Yards (Top Yard, Shuttle and Crumbouke Mines, Brassey & Roger (in east of coal field)) – Possibly also Nine Feet Mine	584m NW	4.60*	1.90	-	92.5-141	65
2YDS – Two Yards (Rams & Six Feet)	711m NW	1.80	1.70	-	112-161	96
Doe – Doe (Dow)	419m NW (Faulted)	3.40	1.00	3.50	188-221	141-149

*This seam is encountered as two bands with up to 1.80m of fireclay between, this figure is based off the total thickness of both seams and fireclay.

NB: The range of depths stated above refers to the west boundary depth and east boundary depth respectively.

The Coal Mining Risk Assessment identified the following risks which were considered to be significant enough to require further investigation or remedial action:

- High risk from unrecorded coal workings.
- Moderate risk from unrecorded mine entries.

- Moderate risk from mine gas.

The recorded mine workings highlighted in the Consultants Coal Mining Report were not considered to be a risk to the development due to the recorded depths in both the Mining Report and the Abandonment Plans acquired for the site. But as both the seams recorded to be subcropping onsite are shown to be of workable thickness, there was considered to be a high risk from unrecorded workings. The moderate risk to unrecorded mine entries also relate to the two seams subcropping onsite and due to the relatively shallow thickness of superficial deposits.

Following the Coal Mining Risk Assessment, Geotechnics completed an initial ground investigation comprising drilling of 4 No. rotary boreholes in the vicinity of the proposed building, and did not identify any evidence of shallow coal workings or unrecorded mine entries up to 45m below the site, no loss of flush or voids were encountered during the drilling. In addition, the initial ground investigation demonstrated the depth to bedrock beneath the site ranged between approximately 13m and 20.5m bgl. It should be noted that at these depths the feasibility of primitive mining methods, such as bell pits, are less feasible due to the risk of mine entry collapse. In addition, the high groundwater table further reduces the likelihood of unrecorded mine workings and entries due to the challenging conditions created by the thickness of superficial deposits and difficulties with dewatering using primitive methods.

Following the initial investigation by Geotechnics, to increase confidence in the existing assessment, BSL carried out a detailed mining investigation comprising the drilling of 8 No. rotary open holes within the footprint of the proposed building to further investigate the potential for shallow unrecorded mine workings.

The below table shows the depths and thicknesses of the coal encountered onsite during the investigation undertaken by BSL:

Location	Range of depth (m bgl)	Thickness
RO101	40.50 – 40.70	0.20
RO102	17.80 – 18.00	0.20
RO103	35.90 – 36.20	0.30
RO104	37.50 – 37.80	0.30
RO105	21.80 – 22.10 35.80 – 36.10	0.30
RO106	25.50 – 25.80 39.50 – 39.80	0.30
RO107	22.60 – 22.80 25.70 – 25.90 40.50 – 40.80	0.20-0.30
RO108	25.50 – 25.70 27.50 – 27.70	0.20

The coal seams encountered during the BSL Investigation ranged in thickness between 0.20m and 0.30m in thickness, whereas the thickness of coal encountered within the Geotechnics investigations ranged from 0.15m to 1.58m. It should be noted that the Geotechnics investigation comprised rotary coring which is likely to provide a greater accuracy in seam depths due to the nature of sample recovery in openhole drilling. Nevertheless, in both investigations, no evidence of workings was encountered such as loss of flush, broken ground, voids or soft drilling.

One coal seam within BH02 and one coal seam encountered within BH03A do not mean the 10T criterion. Guidance within CIRIA C758 'Abandoned Mine Workings Manual' indicates that a void will not migrate to the surface where there is more than ten times the seam thickness of rock cover (10t criterion, Piggott

and Eynon 1978; Wardell and Eynon 1968). Up to this depth, the void will begin to choke with rock from the roof, which is represented by broken ground. As detailed below:

Location	Coal Seam Depth (m)	Rock Cover
BH02	26.80 - 28.00 (1.20)	6.30
BH03A	19.50 – 20.40 (0.90)	6.40

Although these do not meet the 10T criterion, as there was no evidence of coal workings below the building footprint during the BSL investigation and the majority of the coal seams encountered in this section of the site are not of workable thickness, the likelihood of any workings being present is considered to be low. In addition, due to the high density of coverage gained by the eleven rotary boreholes undertaken by BSL and Geotechnics which are located within and in close vicinity of the proposed building footprint, this significantly increases confidence in the assessment that the risk of unrecorded workings in this area of the site is very low. Despite the lack of coverage in other parts of the site, as stated above the consistently high groundwater table and significant thickness of superficial deposits provides further confidence that the risk of mining across the site as a whole is likely to be low.

In conclusion the overall risk from shallow unrecorded mine workings is considered to be low and no further action is required below the proposed structure.

7.8 Treatment of Mine workings

As no evidence of mine workings were encountered onsite during both the investigations by BSL and Geotechnics, engineering treatment of mine workings such as drilling and grouting is not considered to be required for proposed structures.

However, given the lack of coverage in other parts of the site outside of the building footprint which are still located in the Coal Authority Development High Risk Area, consideration should be given to the installation of to a geogrid across roads and car parking areas, as a form of mass subsidence prevention. The POS and sports pitches would not need these measures beneath them, as they are considered to be lower risks areas as per the guidance within CIRIA C758.

The findings and recommendations made within this assessment should be confirmed with the Local Authority, and Coal Authority, prior to any irrevocable action at the site.

7.9 Concrete Classification

The soluble sulphate and pH test results have been assessed in accordance with BRE Special Digest 1 “Concrete in aggressive ground” 2005. The Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in the table below.

For the purposes of this assessment, the made ground and natural strata is considered to be relatively permeable, therefore the groundwater has been classed as mobile.

Stratum	No. Samples	Characteristic SO ₄ (mg/l)	Characteristic pH	DS Class	ACEC Class
Made Ground	8	339	6.1	DS1	AC-2z
Natural Superficial Strata	9	82	6.8	DS1	AC-1

Based on the above, the results of laboratory pH and sulphate content, alongside the BRE full suite tests, indicate that sulphate class DS-1 and ACEC Class AC-1 conditions prevail in the natural superficial strata whereas the made ground comes under ACEC class AC-2s, in accordance with BRE Special Digest 1 “Concrete in aggressive ground” 2005.

The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

7.10 Highways

Based on Table 5.1 from DMRB IAN 73/06 Rev 1 equilibrium CBR values of 2% are likely to be achieved in made ground soils, 2% for natural clays soils and 5% for natural granular soils for pavement design purposes, unless proven otherwise by in-situ testing at formation level by a specialist geotechnical engineer.

The previous Geotechnics report, which did include in-situ and laboratory CBR testing, reports a CBR value of 10% where the subgrade is comprised of granular materials and where the subgrade material is cohesive, a CBR value of 3% should be adopted. But it also states it would be prudent to undertake further testing to confirm this.

Where the CBR is found to be less than 2%, the sub-grade is unlikely to be suitable for both the trafficking of site plant and as a permanent highway foundation without improvement of the soils.

Based on the fines content of the soils, they are considered to be frost susceptible, therefore highway construction should be a minimum thickness of 450mm to mitigate against the risk.

Care should be taken to ensure the stratum at formation level is protected against inclement weather, as this is likely to lead to surface deterioration and a decrease in soils strengths.

7.11 Site Drainage

The use of sustainable drainage systems, such as traditional soakaways within the natural ground, is not likely to be feasible due to the presence of low permeability cohesive strata underlying the site and the presence of high groundwater levels across the site.

7.12 Earthworks

Given the variability of existing site levels and development layout requirements including finished levels, earthworks will be required in order to achieve the desired development platform levels.

Design of the earthworks, particularly in the western part of the site, should consider the stability of any cut or fill slopes. From the preliminary cut and fill information provided by the client, the maximum cut in the north-west section of the site is 2.5m bgl, with the magnitude of the cut becoming smaller towards the east. Cut materials will generally be used as fill within the south-east corner of the building footprint (up to a maximum of circa 2.5m of fill). Any fill should be placed in accordance with an appropriate specification, discussed further below. Designs should allow for incorporation of suitable drainage to prevent the build-up of pore water pressure which could lead to slope instability.

The investigation and earthworks testing completed to date reveals spoil resulting from excavations within the made ground and superficial deposits should generally be suitable for re-use as general fill subject to further testing and specification, or may be disposed off site. Any grossly contaminated soils if encountered may require extensive treatment before they become geotechnically suitable and re-use would also be subject to compliance with the Remedial Strategy and BSL should be consulted in the event grossly contaminated soils are encountered. If site-won material is to be re-used on site, it is recommended this is carried out under the CL:AIRE Development Industry Code of Practice (DoWCoP CL:AIRE March 2011).

An initial summary of the materials classification is presented below.

Compaction testing carried out on samples of the natural granular soil indicate Optimum Moisture Contents (OMC) of between 7% and 9.2%, with corresponding Maximum Dry Density (MDD) values between 1.67 Mg/m³ and 2.16 Mg/m³.

Compaction testing carried out on samples of the natural cohesive soil indicate Optimum Moisture Contents (OMC) of 15%, with corresponding Maximum Dry Density (MDD) values of 1.89 Mg/m³.

Compaction testing carried out on samples of the granular made ground soils indicate Optimum Moisture Contents (OMC) of between 12% and 17%, with corresponding Maximum Dry Density (MDD) values between 1.79 Mg/m³ and 1.87 Mg/m³.

Recorded water contents range from 11.2% to 24.1% and all material types were 'wet' of OMC, but may be suitable for re-use following 'drying back' of the soils, such as the addition of binders to control the moisture content (i.e. stabilisation).

The Moisture Condition Values (MCV) range from 3.7 to 7.5 across the samples tested as part of the earthworks.

Results Interpretation

Based on the testing results the site won materials generally fall within the requirements for re-use onsite as general fill; granular soils in general fall within the classification of material class 1A/1B and cohesive soils within material class 2A/2B, in accordance with SHW Series 600 table 6/2.

It should be noted that the grading of the material is based on the as received sample and therefore any gradings of granular materials may be altered through onsite re-grading / processing.

Within Section 6.1, the results for the California Bearing Ratio are shown for the different soil types encountered onsite; testing was completed both at as received water content and at optimum water content. From assessing the data within the table in Section 6.1, the natural granular material tested had an average CBR at received water content (ASWC) of 0.45% , which is generally considered to be poor. Although when tested at optimum water content, a CBR of 30.6% was achieved. Similarly for the granular made ground, the ASWC CBR was recorded at 1.1%, whereas at optimum moisture content a CBR of 46.6% was achieved. The cohesive material tested had a CBR of 8.6% at optimum water content which is considered to represent good performance for this material type.

From the above, although the CBRs at the as received water contents are generally considered to be poor, the CBRs at optimum water content are considered to be good and provides confidence that good materials performance can be achieved through appropriate compaction methods and treatment in accordance with an appropriate specification.

Where it is proposed to re-use site won materials as an engineered fill, it will be necessary to develop an appropriate Earthworks Specification. The basis for the Specification should be BS 6031:2009 and the latest version of the SHW, Series 600 Earthworks. This will be produced under a separate cover.

8.0 GEO-ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

The samples were tested for an assessment of the chemical contamination that may pose a risk to human health. The results were examined with reference to a selection of guidance documents as detailed in Appendix A. In this case the LQM/CIEH S4ULs and DEFRA C4SLs for a residential end use without homegrown produce have been adopted as Tier 1 generic screening values due to the development being a school building, adopting a relatively conservative approach.

The apparent exceedance of the relevant screening value is taken as indicating further detailed assessment or remedial action is required.

A summary assessment sheet is presented in Appendix C alongside the chemical test results. Results are discussed in detail in the sections below.

8.2 Soils Test Results and Risk Assessment – Human Health

The following elevated metals were detected during the investigation undertaken by BSL:

Exploratory Hole	Depth (m)	Stratum	Metal	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
TP108	0.10 – 1.00	Made Ground	Arsenic	43	40
HP101	0.30 – 1.10	Made Ground	Arsenic	43	40

The following elevated metals were detected as part of the previous Geotechnics investigation:

Exploratory Hole	Depth (m)	Stratum	Metal	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
DS01	0.50	Made Ground	Arsenic	130	40
			Lead	380	310

Asbestos

No asbestos fibres have been detected in any of the 8 samples screened by BSL. Additionally, no asbestos fibres were detected as part of the 16 samples screened by Geotechnics.

Poly Aromatic Hydrocarbons (PAHs)

The locations, depth and concentrations of elevated species of PAHs are summarised in the table below:

Exploratory Hole	Depth (m)	Stratum	Species	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
TP106	0.40 – 1.25	Made Ground	Benzo(b)fluoranthene	6.90	4.00
			Benzo(a)pyrene	5.70	5.30
			Dibenz(a,h)anthracene	0.65	0.32
HP101	0.30 – 1.10	Made Ground	Dibenz(a,h)anthracene	0.33	0.32

The following PAH elevations were detected as part of the previous investigation by Geotechnics:

Exploratory Hole	Depth (m)	Stratum	Species	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
DS05	0.5	Made Ground	Naphthalene	21.00	5.60
			Benzo(a)anthracene	23.00	14.00
			Benzo(b)fluoranthene	23.00	4.00
			Benzo(a)pyrene	19.00	5.30
			Dibenz(a,h)anthracene	2.10	0.32
HDP04	0.2	Made Ground	Dibenz(a,h)anthracene	0.34	0.32

Total Petroleum Hydrocarbons (TPH CWG)

No petroleum hydrocarbons have been identified above the adopted screening criteria.

BTEX and MTBE

No BTEX or MTBE compounds have been identified above the adopted screening criteria.

Volatile Organic Compounds (VOCs)

No VOCs have been identified above the adopted screening criteria.

Semi - Volatile Organic Compounds (SVOCs)

No SVOCs have been identified above the adopted screening criteria.

8.3 Summary – Human Health Risk Assessment

Based on the testing and assessment undertaken it would appear that there is pervasive contamination within the made ground in the form of metals and PAHs attributed to ash within the made ground strata and is especially prevalent in the eastern half of the site, likely related to the historic railway development in this section of the site.

The above pose a risk to human health and will require further consideration.

8.4 Waters and Leachate Test Results – Controlled Waters

Groundwater and leachate testing was not undertaken as part of the current scope, but groundwater and leachate testing was included in the previous site investigation, which identified a number of exceedances of the Environmental Quality Standards (EQS) and Drinking Water Standards (DWS) for various metals as well as minor exceedances in short chain aliphatic hydrocarbons and PAHs.

However, Geotechnics considered the elevated contaminants in groundwater and leachate analysis were representative of natural background concentrations in groundwater due to the lack of correlation between elevated soil contamination including leachates, and contaminants present in groundwater. Furthermore, it was anticipated that the levels of manganese are likely increased due to the oxidation of the naturally occurring iron within the groundwater when being sampled.

8.5 Controlled Waters Risk Assessment

Whilst there are elevated concentrations of contaminants, based on the investigation works undertaken to date and subject to agreement with the Environment Agency, the site is not considered to pose a significant risk to controlled water for the following reasons:

- No significant anthropogenic sources of these contaminants were identified during the ground investigation and are likely to be representative of naturally occurring background concentrations.

- There does not appear to be any clear linkage between contaminant concentrations within soils and leachates when compared to exceedances within groundwater.
- No visual or olfactory evidence of gross contamination has been encountered during the site investigations to date.
- There is no indication under present conditions of pollution of controlled waters and conditions following development of the site will not be any worse, indeed they may improve with increased hard cover and water retaining imported soils.
- It would be technically challenging and probably disproportionately costly to remove the contaminants from the water to the pre-input stage.
- The above is especially pertinent given the relatively minor exceedances of PAHs and petroleum hydrocarbons.
- A canal is present to the north of the site but a pathway is unlikely to exist due to the canal likely being clay lined. The nearest natural watercourse is circa 130m away based on the desk study, which provides considerable distance for attenuation and contaminant degradation.
- The site is underlain by low permeability clays, representing a Secondary Undifferentiated Aquifer, which itself is not a sensitive receptor and will inhibit lateral and vertical contaminant migration.
- Whilst the deeper aquifer is classified as a Secondary A Aquifer, due to the presence of coal mining at depth in the surrounding area, groundwater quality within the aquifer is likely already relatively poor when compared to the results of shallow groundwater taken from the boreholes on site.
- The site does not lie within 500m of an SPZ.
- There are no potable (sensitive) water abstractions within 500m.

8.6 Permanent Ground Gas and Vapours Results

A total of 3 ground gas monitoring visits have been carried out between the dates of 30th August and 27th September 2023. Results are summarised in the table below:

	CH ₄ (%)		CO ₂ (%)		O ₂ (%)		CO (ppm)		H ₂ S (ppm)		TVOC (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	0.0	41.6	0.0	11.7	0.1	21.5	0.0	22.0	0.0	1.0	0.0	1.0	-0.6	21.7
Steady	0.0	26.1	0.0	9.6	4.7	20.8							0.0	37.8

Notes: CH₄ = Methane; CO₂ = Carbon dioxide; O₂ = Oxygen; CO = Carbon Monoxide; H₂S = Hydrogen Sulphide; TVOC (PID) = Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm = Parts Per Million.

The highest methane concentrations were recorded within WS101 (41.6% v/v) on the second monitoring visit, whilst the highest carbon dioxide concentrations were recorded in WS104 (11.7% v/v) on the second visit. The maximum flow of 37.8 l/hr was recorded in RO103 on the third visit. Methane was only detected within WS101 throughout the monitoring period, with no methane concentrations being recorded in any of the other 5 installations throughout all 3 visits.

The atmospheric pressure ranged between 1001mb and 1010mb over the monitoring period, of which visits were conducted over a range of falling and rising pressure trends.

Groundwater levels were recorded above the response zones in RO103 and RO104 on 3 out of 3 visits.

During the monitoring period, due to the high groundwater levels in the boreholes, after the peak reading were taken, the groundwater was purged from the boreholes and left for a short period of time before taking the steady gas flows. This was due to the potential for a piston effect to impact the results of the steady flow, by purging the groundwater from the holes before monitoring, this gives a more representative reading of the steady flow rates in the boreholes.

The steady flow rate recorded in RO103 on the third visit was 37.8 l/hr, however this occurred during recharge of the groundwater level which is likely to have resulting in pushing air within the borehole column upwards creating an artificially high flow reading. This also occurred within the same borehole RO103 on the first visit, when a steady state flow reading of 5.7 l/hr was recorded following purging.

Summary of Geotechnics Monitoring Dataset

A total of 6 ground gas monitoring visits have been carried out between the dates of 16th June and 20th July 2022. Results are summarised in the table below:

	CH ₄ (%)		CO ₂ (%)		O ₂ (%)		CO (ppm)		H ₂ S (ppm)		TVOC (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	0.0	0.1	0.0	4.0	6.1	20.3	0.0	3.0	0.0	0.0	0.0	0.0	-0.3	17.5
Steady	0.0	0.0	0.0	4.0	6.1	20.3							-9.7	3.6

Notes: CH₄ = Methane; CO₂= Carbon dioxide; O₂= Oxygen; CO= Carbon Monoxide; H₂S= Hydrogen Sulphide; TVOC (PID)= Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm= Parts Per Million.

The atmospheric pressure ranged between 990mb and 1025mb over the monitoring period, of which visits were conducted over a range of falling, rising and steady pressure trends.

The concentrations of carbon dioxide and methane were consistently very low to negligible, with a maximum carbon dioxide concentration of 4% v/v recorded in BH03A on the final visit, and the maximum methane concentration of 0.1% v/v recorded in BH03A on the first visit. Ground gas flow rates were consistently low, generally ranging from 0.0 l/hr to 0.7 l/hr. A steady state flow rate of 3.6 l/hr was recorded in BH02 on the final visit, however this is likely attributed to a significant rise in groundwater level from 1.95m bgl to 8.50m bgl between the fifth and sixth visits, causing artificially high and unrepresentative flow rates. Groundwater levels were consistently recorded above the response zone in BH02, further suggesting that the flow rates from this borehole should not be relied upon heavily for assessment.

Over the course of the monitoring period completed by both Brownfield Solutions and Geotechnics, a total of 9 visits have been completed comprising a total of 48 individual steady-state monitoring datapoints. With the exception of the two likely erroneous flow readings taken from RO103 due to the piston effect, flow rates have been consistently low, ranging from 0.0 l/hr to 0.7 l/hr. Therefore, it is recommended that a 'typical' maximum flow rate of 0.7 l/hr is adopted for the purposes of this assessment.

8.7 Ground Gas Risk Assessment

Basis of Assessment

In order to assess the ground gas situation and the requirement for ground gas precautionary measures at the site, guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings' and BS8485:2015+A1:2019 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.

Rationale and Suitability of Dataset

As per the Phase 1 Desk Study, in accordance with CIRIA C665 and as set out in Appendix A of this report, the ground gas generation potential is considered to be **low** (sources including possible shallow mine workings, made ground and mildly organic clay). The sensitivity of the development is **moderate** on account of the proposed school development.

In line with current guidance, it is recommended gas monitoring should comprise 6 visits over a 3-month period. The required monitoring frequency has been exceeded, given a total of 9 visits have been

completed over two separate periods of monitoring; 6 visits over 6 weeks by Geotechnics in June and July 2022, and 3 visits over 4 weeks by BSL in August and September 2023. A total of four visits were carried out during periods of low and/or falling atmospheric pressure, including a relatively rapid fall in atmospheric pressure from 1014 mbar to 1000 mbar preceding the monitoring visit carried out by Geotechnics on 24/06/2022, therefore reasonable 'worst case' conditions are considered to have been captured during the monitoring.

Due to groundwater being above the response zones in two of the boreholes (RO103 & RO104), a GSV should not be calculated from the flows obtained as they are not representative of natural flows. In addition, these boreholes were installed within bedrock and designed to target the potential ground gas source associated with possible shallow mine workings. Therefore, the potential ground gas risk associated with coal mining will be assessed separately in accordance with current guidance and best practice.

Assessment of Data – Shallow Boreholes

As the proposed end-use is for a commercial/school development, guidance dictates that the gas monitoring results should be assessed in accordance with the Wilson and Card methodology.

The Wilson and Card methodology uses the concept of a Gas Screening Value (GSV) which is derived using the following equation: $(\text{max gas concentration} / 100) \times \text{maximum steady flow}$.

The GSV's presented below are from the BSL window sample boreholes and Geotechnics dataset which targeted the made ground and superficial deposits. A typical steady flow of 0.4l/hr has been used to derive the GSVs. The GSV's for the site are presented below.

Ground Gas	Adopted Typical Flow Rate (l/hr)	Max Concentration (% v/v)	GSV (l/h)	Classification based on GSV	Typical Threshold Concentration Exceeded
Methane	0.4	41.6	0.166	CS2	Yes
Carbon Dioxide	0.4	11.7	0.0456	CS1	Yes

The GSVs place the site the site into Characteristic Situation 1 (CS1) for carbon dioxide, however due to concentrations of carbon dioxide greater than 5% v/v being recorded at the site then guidance states **consideration** should be given to increasing the site classification.

From the GSVs above, the site has preliminary been classified as CS2 in regard to the methane concentrations but is unlikely to pose a risk to the site. Methane was only detected within one borehole during the monitoring period (WS101), the maximum flow within this hole during the monitoring was recorded as 0.1l/hr, showing that no significant flows were detected within this hole. Furthermore, the response zone in this hole was targeting a localised stratum comprising cohesive made ground with a mild organic odour and rare organic matter content. From installing the borehole within this strata, the disturbance of the ground and the act of introducing oxygen to the strata has likely contributed to oxygenation of the organic matter within the made ground, resulting in the high methane concentrations. This environment is not likely to be able to be recreated naturally and therefore the methane concentration is likely to be an artificial result of the borehole installation. In addition, this material was not encountered in other exploratory hole locations and is therefore highly localised and not representative of the ground conditions as a whole. In addition, geotechnically unsuitable soils such as soft organic clays will likely be removed from the building footprint and surrounding areas as part of any enabling works and earthworks programme, thus removing the source of methane.

To further support that this is an isolated occurrence of methane, the gas monitoring results from the previous Geotechnics investigation did not show any elevations of methane, carbon dioxide or high flows.

Due to the above, it is recommended that in respect to methane the site be classified as CS1.

Based on the GSVs for carbon dioxide alone, the site falls into the CS1 classification. However, on numerous occasions and in a number of locations, carbon dioxide exceeded the 5% threshold concentration where consideration should be given to upgrading the classification. Whilst the high flows have largely been discounted, the potential effects of construction affecting the gas regime and creating pathways cannot also be fully ignored. Therefore, in order to build confidence that the site is CS1 we have undertaken the below assessment.

Ternary Plot Assessment

The most likely source of carbon dioxide encountered to date is likely to be microbial respiration of small quantities of organic matter in the general made ground.

In order to further increase confidence in this assessment and adopting a lines of evidence approach, reference has been made to the 2018 paper by Wilson et al (Ambience and EPG Ltd) "Using ternary plots for interpretation of ground gas monitoring results" and the latest NHBC NF94 guidance.

The paper states that carbon dioxide is widespread in the sub surface environment and is generated by microbial and geochemical processes. If there is any organic, carbonate or pyrite content in the soils or rocks then carbon dioxide could potentially be present at concentrations up to 21% v/v. Soils in the UK where carbon dioxide is present commonly include glacial Till and made ground.

When monitoring wells are installed in these materials, the small volumes of organic material are exposed to oxygen. This can result in biological respiration or oxidation of the material resulting in the production of carbon dioxide.

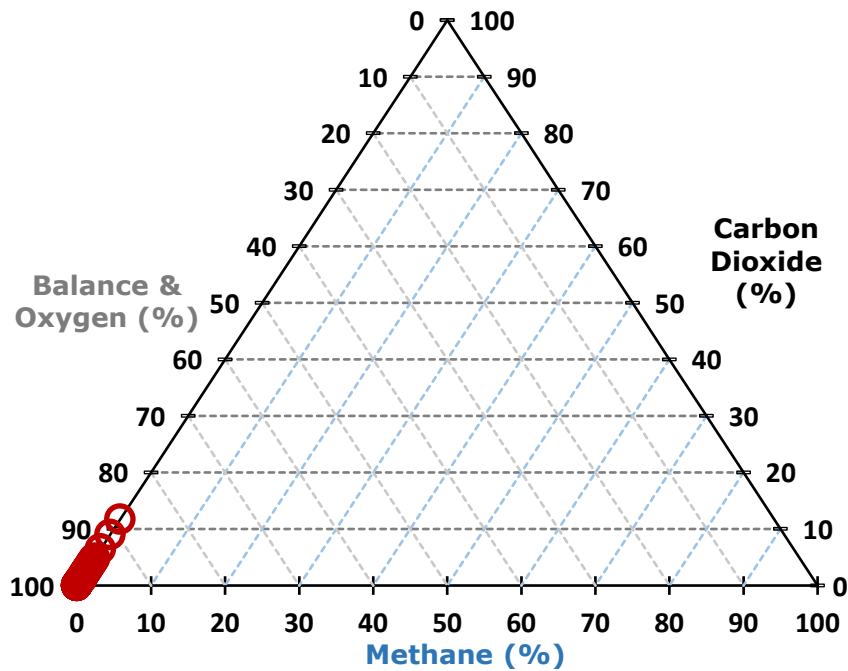
Low volumes of organic material in made ground can also degrade aerobically to produce carbon dioxide or may locally be degrading anaerobically with the process being so slow that the methane completely oxidises to carbon dioxide before reaching the well headspace. In all these cases the carbon dioxide is generated so slowly that it will not be emitted from the ground surface in quantities or at a rate that is sufficient to pose a risk to overlying development.

All of the commonly used screening approaches used in the UK for ground gas have a requirement to **consider** increasing the characterisation of a site identified as Characteristic Situation CS1 or Green based on the Gas Screening Value, if carbon dioxide concentrations exceeding 5% have been recorded.

This increase in characterisation is **not** a mandatory requirement in any of the guidance documents. The distribution of elevated concentrations and the source of the gas should be considered before deciding whether the increase is appropriate. The paper goes on to state that in most cases there will not be any need to increase the classification if the carbon dioxide is caused by biological respiration of small quantities of organic material. Increasing the characteristic situation is only likely to be a requirement if the gas source is one of the high-risk sources (landfills, open mine workings, flow of acidic mine water through rocks).

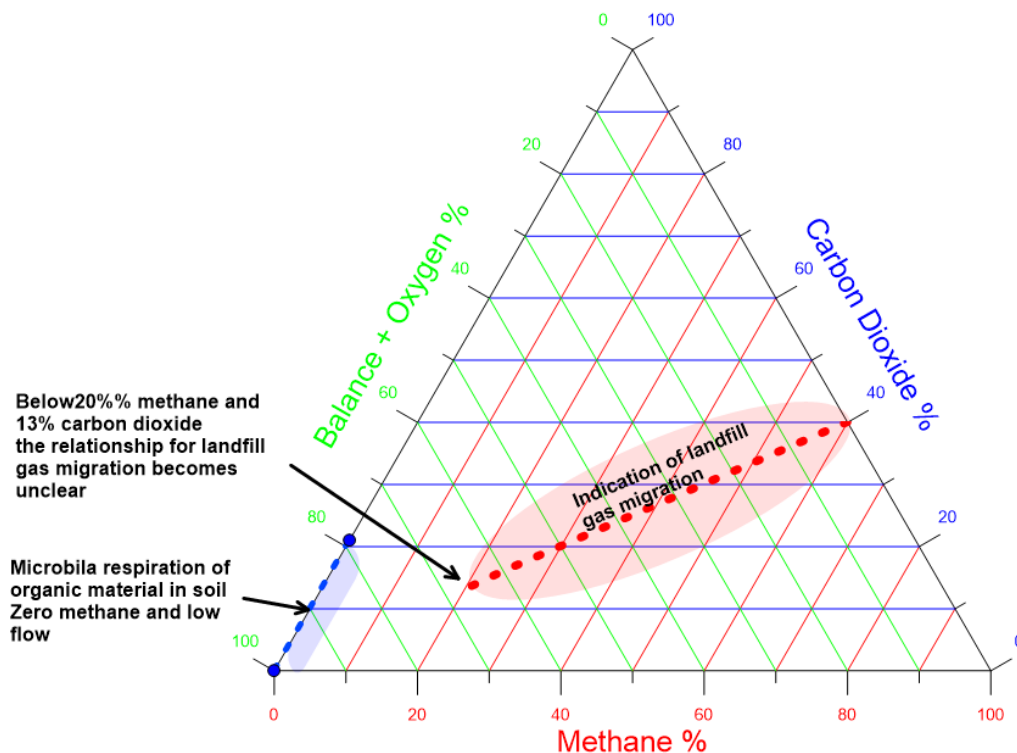
Based on the methodology described in the paper, a ternary plot has been produced using the monitoring and is presented below. Note that the results from WS101 have been omitted given these are not representative of the general made ground, rather a localised area of soft organic clay.

Figure 1: Ternary plot showing gas monitoring data



The distribution of the gas concentrations over the monitoring period fall within the area associated with microbial respiration of organic matter in soils in accordance with Wilson et. al. An extract is presented below for reference:

Figure 2: Ternary Plot Extract from Wilson et. al 2018



Where gas monitoring results plot in the zone for microbial respiration, there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%. This, as the

paper recommends, is supported by other data and lines of evidence such as the site conceptual model and continuous monitoring data.

Coal Mining Gas Risk Assessment - Deep Boreholes

As stated above, given the need to purge groundwater due to persistent flooding of the response zones of RO103 and RO104, the high steady-state ground gas flow rates are not considered representative of the ground gas regime beneath the site.

During the monitoring of RO103 and RO104, no methane has been detected and concentrations of carbon dioxide have ranged between 0.0% v/v and 4.0% v/v. Steady state gas readings have been consistently lower, ranging between 0.0% v/v and 1.2% v/v, suggesting that the presence of a ground gas monitoring well in itself is likely to be creating an artificial reservoir for accumulations of small quantities of ground gases.

In reality, the site is underlain by a significant thickness of low-permeability cohesive soils representing glacial Till, which is unlikely to provide any significant reservoir for potential accumulation of ground gases which could impact a redeveloped site. The installation of piles is unlikely to act as a significant pathway and the use of vibro improvement will likely improve the shallow soils as opposed to extending downward to the coal measures, thereby not becoming significant vectors for ground gas transport from the coal measures below.

Consideration should also be given to the extensive investigation into the possibility of mine workings which has been undertaken to date. A total of 12 rotary boreholes have been drilled on site, all either within or in immediate proximity to the proposed building footprint, none of which have encountered any evidence of mine workings such as loss of flush, soft drilling etc, therefore there is no evidence to suggest that shallow mine workings exist beneath the site. In any case, the high groundwater table at the site means that any deeper workings which may be present, and have not been investigated for geotechnical purposes due to their substantial depth, are highly likely to be flooded which reduces the potential for piston-style pumping as a mechanism for ground gas migration to negligible levels beneath the site. The closest recorded mine entry is located circa 45m away from the site but significantly further away from the proposed building, therefore the potential for recorded mine entries to act as potential migration pathways for ground gases is considered negligible.

Based on the monitoring dataset and conceptual site model, the overall risk from mine gases impacting the site is considered to be low and no mitigation with respect to mine gases is considered necessary.

Ground Gas Risk Assessment Summary

In summary, based on a lines of evidence approach, **we consider that the site should be placed within Characteristic Situation 1 (CS1) and ground gas protection measures are not required** within structures at the development, subject to agreement with the Local Authority, based on the following rationale:

-
- The available data set exceeds the minimum requirements suggested by the guidance for assessment.
 - It is considered that the ground gas concentrations and flows have been monitored to enable a predication of “worst case” conditions; rapid and short pressure decreases are within the dataset.
 - Although the methane concentrations place the site into CS2 based on the gas screening values, the levels are likely caused by the disturbance and oxygenation of the low organic content within the made ground.
 - The organic made ground responsible for the methane concentrations is highly localised, has not been encountered elsewhere on site, and is therefore not representative of the ground conditions as a whole.
 - Soft organic clays are geotechnically unsuitable and are likely to be removed anyway as part of the enabling works and earthworks programme likely to be required to create a development platform.
 - The typical threshold concentration for carbon dioxide of 5% has been exceeded on a number of occasions within the spot monitoring data.
-

- Despite the carbon dioxide concentrations, the dataset as a whole is characterised by very low to negligible flow rates and low methane concentrations.
- However, based on the conceptual site model, likely generation sources and detailed assessment via ternary plots, the carbon dioxide concentrations are likely due to microbial respiration, where there is no requirement to increase the characteristic situation simply because the carbon dioxide concentration exceeds 5%.
- The gas flows from the rotary boreholes have been discounted due to the groundwater being above the response zone and creating a piston effect.
- Based on the evidence suggesting an absence of coal mining beneath the site, high ground water table, low permeability superficial deposits, and gas monitoring data, the overall risk from mine gases has been assessed as low.

Radon Risk Assessment

The Geotechnics Desk Study dated May 2022 indicated the property is located in an area where <1% of properties are at or above the action level. However, since the production of this report, the UK Health Security Agency and British Geological Survey (BGS) have published updated Radon mapping; publicly available data from UK Radon now suggests that the property is located in a 1km grid-square where the maximum radon potential is 3-5%.

Therefore, BSL have obtained a detailed BGS Radon Report, which is a significantly higher-resolution dataset, and shows the area of the site over which new buildings are to be constructed lies within an area where <1% of properties are above the Action Level. Therefore, the overall risk from Radon is low and no further action is required.

The BGS Report is presented in Appendix G.

8.8 Qualitative Risk Assessment

The CSM has been revised based on the findings of the site investigation and laboratory testing results and these are presented overleaf.

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made Ground associated with former railway development. Metals, PAH's, asbestos, Petroleum Hydrocarbons	Direct contact, inhalation of dusts	End-users	Low likelihood	Medium	Moderate/low	From the testing of made ground undertaken by BSL and Geotechnics, exceedances of heavy metals and PAHs have been detected within the made ground. In this instance, residential without homegrown produce has been selected for the initial screening criteria due to the nature of the development. The contamination has been encountered mostly in the east section of the site and is likely attributed to the made ground associated with the historical railway development. The proposed development shows that this area of the site will mostly be covered in MUGA pitches, these are typically astroturf/artificial cover and therefore will act a barrier for any contamination within the made ground and as such a pathway is not likely in these areas. Although if there are any areas of general soft landscaping, a pathway could exist between the contamination and end-users. Therefore, the risk is considered to be moderate/low.
On site Made Ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Likely	Medium	Moderate	Contaminants within the soil/groundwater could potentially attack the clean potable water supply pipe, contaminants should be assessed in accordance with the relevant guidance to determine the correct pipe material and level of precautions required.
Made Ground Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/explosion	End-users / property / structures	Unlikely	Medium	Low	Made ground is present onsite but is unlikely to be a significant source based on the encountered depths, lack of significant concentrations of putrescible or organic material, etc. The ground gas monitoring data is characterised in general by low flow rates, low methane although concentrations of carbon dioxide exceeding 5% have been encountered on a number of occasions. Very high methane concentrations have been recorded in WS101, however this is associated with a soft organic clay and is highly localised having not been recorded elsewhere on site. The disturbance of the ground and the act of introducing oxygen to the strata has likely contributed to oxygenation of the organic matter within the made ground, resulting in the locally high methane concentrations. This environment is not likely to be able to be recreated naturally and therefore the methane concentration is likely to be an artificial result of the borehole installation. In addition, this material will be geotechnically unsuitable for retention on site and will likely be removed during the enabling works and earthworks programme. Detailed assessment into the elevated concentrations of carbon dioxide indicates the source is likely biogenic respiration in the form of microbial activity, which is

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
						unlikely to result in high flows or accumulations of ground gases to harmful concentrations. Furthermore, as the majority of the site is underlain by impermeable cohesive deposits, it is not suitable as a reservoir for storing ground gases and accumulation of gases in significant concentrations is unlikely to occur. Based on the detailed risk assessment carried out, the overall risk from ground gases is considered to be low.
Onsite Bedrock Geology – Coal Measures.	Migration into confined spaces, inhalation and asphyxiation/explosion	End-users / property / structures	Unlikely	Medium	Low	Two monitoring wells were installed within the bedrock strata (RO103 & RO104). Some high flow readings were recorded within the deep rotary open boreholes but as the groundwater was recorded above the response zone in both of these, these flows can be attributed to a piston effect of the groundwater rising, further increased by the purging of the groundwater which took place during each visit. Due to this, the flows from RO103 and RO104 are not considered representative of the bedrock geology, and this means a GSV cannot be calculated. The concentrations of methane and carbon dioxide recorded in these wells were both low. In addition to the monitoring data, no evidence of coal workings was encountered and the high groundwater table means any deeper workings are highly likely to be flooded. There are also no mine entries on or close to the site. Based on the monitoring dataset and conceptual site model, the overall risk from mine gases impacting the site is considered to be low and no mitigation with respect to mine gases is considered necessary.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAH's, Metals	Overland flow, / migration through saturated zone	Unnamed Inland River 130m E (Surface waters)	Unlikely	Medium	Low	It is considered contaminants associated with the made ground and other past industrial uses are unlikely to impact the River. This is due to the low permeability of the clays underlying the area, which will inhibit lateral migration, and the potential for contaminants to attenuate and degrade over this distance. Therefore, a low risk is posed to the river from the made ground.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary Undifferentiated/ Secondary A Aquifer (Ground-water)	Unlikely	Medium	Low	Although elevations of both PAHs and heavy metals have been detected within the made ground in the east section of the site, it is unlikely to impact controlled waters. Typically, the made ground is underlain by cohesive deposits and therefore this will reduce migration potential of contaminants, furthermore the site is not within a source protection zone and there are no groundwater abstractions within 200m of the site. Groundwater testing has been undertaken as part of the Geotechnics investigation, which revealed elevations in Copper, Iron, Lead, Manganese, Nickel, and Zinc, although Geotechnics' assessment suggests these are typical of natural background concentrations. No gross contamination has been observed on site. Therefore, the risk is considered to be low.
	Migration through saturated zone	Secondary A Aquifer (Ground-water)	Unlikely	Medium	Low	Bedrock across the site is overlain by impermeable natural clay strata which will likely break the pathway from any contamination migration downwards from the made ground. In addition, the new development will likely result in betterment of drainage and will therefore reduce leaching into the saturated zone. In any case, the existing groundwater quality within the Coal Measures is likely to be of low quality due to historical workings in the surrounding area, and the absence of any gross contamination means it is likely to be disproportionately costly to remove contaminants from the groundwater given the site's setting and potential receptors.

8.9 Outline Remedial Measures

Where soft landscaping areas are present (not including MUGA pitches) a cover of “clean” subsoil and topsoil should be provided to break the pathway to site end users. This should be 450mm thick in soft landscaping areas in accordance with BRE 465. This will allow plants to be grown and prevent undesirable soils being brought to the surface.

Site-won topsoil, whilst appearing to be chemically suitable, is unlikely to be reused onsite due to the water saturation of the material, stockpiling requirements and volume required therefore importation of suitable topsoil/subsoil is likely to be required. The testing to date suggests that site won made ground is unsuitable for re-use as subsoil, therefore suitable subsoil will also need to be imported to form the cover system.

Prior to import clean cover soils, they should be tested to confirm chemical suitability. After installation of the clean cover, soil depths should be verified by a suitably qualified independent geo-environmental engineer, such as BSL.

The inclusion of a cover system containing a degree of cohesive material, together with the hard cover supplied by the proposed development, will have the effect of reducing rainfall infiltration and consequently contributing to a general betterment of groundwater and surface water quality.

Utilities

The level of protection for the clean potable water supply pipes should be determined using the local water company risk assessment criteria in accordance with UKWIR.

As the site is brownfield, there is the assumption that barrier pipe would be utilised, although requirements should be confirmed by risk assessment and with the water supply company.

Ground Gas Protection Systems

Based on the ground gas monitoring results, no mitigation measures are required and no radon protection is required for new buildings at this location, subject to the anticipated removal of the organic made ground material encountered locally in the vicinity of WS101 in the proposed building footprint, during the earthworks programme.

General

It is recommended that the approval of the Regulators (Local Authority / Environment Agency) is obtained in regard to the above prior to any irrevocable action is taken at the site.

Once the above bodies have approved the above outline remedial proposals, a Remedial Strategy will need to be produced to meet planning requirements and submitted to the regulatory authorities for approval. This will also give guidance to enable a suitably qualified contractor to carry out the works.

In addition, the writing and approval of a Materials Management Plan (MMP) or suitable exemptions/permits will be required to allow re-use of suitable material at the site.

A watching brief is recommended during groundworks for any unidentified sources of contamination. If any gross contaminated material is encountered works should cease in that area and BSL consulted.

Once remediation is complete, verification reports will need to be produced by a suitably qualified independent geo-environmental engineer, such as BSL, in order to achieve regulatory sign off.

8.10 Health and Safety Issues

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground (heavy metals, PAHs, petroleum hydrocarbons)	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Likely	Mild	Moderate/low
Asbestos	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Unlikely	Medium	Low
Ground gas	Inhalation in confined spaces/trenches	Construction Workers	Unlikely	Medium	Low

The risk from made ground will be mitigated by standard PPE including gloves. Welfare facilities should be made available to wash before hand to mouth activities.

It is noted that concentrations of carbon dioxide (an asphyxiant) in the soil exceed HSE Workplace Exposure Limits for personnel in the working environment of 1.5% for short term (15 minutes) exposure and/or 0.5% for long term exposure. Furthermore, soil concentrations of oxygen are below the HSE recommendations of 18%.

Soil gas concentrations are not necessarily reflected by those in the breathing zone, all contractors and maintenance workers should be made aware of the possible presence of carbon dioxide and should take all necessary health and safety precautions when working in trenches or confined spaces. It should be noted that the vast majority of construction works will take place in external and/or well ventilated areas, in which cases the risk from ground gases would be negligible.

General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land". In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

8.11 Asbestos

The investigation of asbestos issues within structures was beyond the scope of this report. However, guidance from UK Government indicates that asbestos should be assumed to be present in buildings unless proven otherwise.

Any asbestos within structures will require removal prior to re-development. This will need to be done by a suitably qualified experienced and licensed contractor, who ensures that adequate PPE is provided to operatives, and that all the relevant legislation is adhered to.

Excavations in soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CARSOIL) and CAR 2012. All such works will need to be agreed with the regulatory bodies (HSE and/or LA).

Additional guidance is provided within the BSL methodology Guidance Note in Appendix A.

9.0 WASTE SOIL CLASSIFICATION & ASSESSMENT

9.1 Summary

BSL have undertaken a preliminary assessment of potential excavation waste to arise from the site during redevelopment to:

- Classify the excavation waste to arise as either hazardous or non-hazardous.
- Identify the most sustainable options for the wastes to arise in accordance with the waste hierarchy.
- Provide a written description of the waste required as part of the Duty of Care.
- Provide details of “hazardous properties” to complete hazardous waste consignment note (where applicable).
- Be able to provide a basic classification report to a landfill operator (where waste is destined for landfill disposal).

9.2 Waste Classification Procedure

As described in the ‘Waste Duty of Care Code of Practice (2016)’ any substance or object that the holder discards, intends to discard or is required to discard is a waste. It is the responsibility of the waste producer to classify this waste. The classification process is described in the ‘Guidance on the classification and assessment of waste’ WM3 and aims to determine whether the waste is Hazardous or Non-Hazardous to human health and the environment.

Hazardous wastes are signified by entries where the code is followed by an asterisk, where some wastes are deemed hazardous without further assessment, which are termed “Absolute Entries” e.g. most waste oils. Alternatively, waste entries are termed “Mirror” entries that require further assessment of hazardous properties, in order to determine whether they are hazardous waste or not (e.g. soil and stones). The EWC codes relevant to excavation wastes are:

- 17 05 03* - soil and stones containing dangerous substances.
- 17 05 04 – soil and stones other than those mentioned in 17 05 03.

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste, Decision 2003/33/EC and Landfill Regulations 2005) led to the establishment of a methodology for classifying wastes.

Wastes first need to be classified based on their total concentrations and classified as either hazardous or non-hazardous waste. WAC testing is only required if the end disposal route is a landfill and WAC analysis must not be used for waste classification.

Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. A waste must comply with the WAC limits for the relevant landfill, otherwise the soil will need to be pre-treated. There are three different WAC criteria, these are:

- Inert waste.
- Stable Non-Reactive Hazardous Waste (SNRHW).
- Hazardous waste.

There are no standard set of WAC limits for non-hazardous landfill sites and each non-hazardous landfill will have its own set of criteria under which it is licenced to accept non-hazardous waste. These will need to be determined through the selected waste receiver prior to disposal.

A non-hazardous waste should not be compared with WAC limits for hazardous or SNRHW waste sites and the WAC test should only be used to determine if the waste is suitable for disposal at an inert waste landfill site. Likewise, wastes classified as hazardous based on their total concentrations should not be compared with WAC limits for inert waste landfill sites, as these will not be accepted.

Details of how material should be classified for waste disposal are presented in the BSL Methodology and Guidance in Appendix A and are summarised in the table below:

Classification based on Total Concentrations ¹	PRIOR TO LEAVING SITE			
	Non-Hazardous Waste		Hazardous Waste	
	IF SOILS CANNOT BE RE-USED ELSEWHERE AND MUST GO TO LANDFILL			
WAC testing	Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values ⁴	> WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill ²	HAZARDOUS landfill	PRE-TREATMENT ³

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).

2 Individual sites may have certain limit values pre-determined in their licence.

3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.

4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Inert Waste

The possibility of automatic inert classification of the naturally occurring “clean” soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing. This is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source); and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other classes of landfill.

9.3 Waste Classification and Waste Acceptance Criteria (WAC)

We have reviewed the testing results and assessed them through a waste classification database which allows users to code and classify waste as defined in the EWC (European Waste Catalogue) based on EC Regulation 1272/2008 on the Classification, Labelling and Packaging of Substances and Mixtures (CLP) and latest Environment Agency guidance (WM3 “Guidance on the classification and assessment of waste - Technical Guidance”).

The samples tested were screened against assessment criteria within WM3 using the HazWasteOnline tool to assess whether they contained any contaminants in the hazardous range.

The Waste Classification Report and WAC testing results is presented in Appendix F. The results of the waste assessment based on total concentrations are presented in the table below, alongside the WAC analysis test results.

Location	Depth (m)	Stratum	Waste Classification	WAC Analysis	Landfill	Comments
BSL Testing						
WS101	0.20-0.60	MADE GROUND	Non-hazardous	Below Inert WAC limit values	INERT landfill	-
WS103	1.50	MADE GROUND	Non-hazardous	-		-
WS106	0.15-1.20	MADE GROUND	Hazardous	Below Hazardous WAC limit values	HAZARDOUS Landfill	pH - corrosive
TP101	0.00-0.20	MADE GROUND	Non-hazardous	-		-
TP103	0.00-0.20	MADE GROUND	Non-hazardous	-		-
TP106	0.40-1.25	MADE GROUND	Non-hazardous	-		-
TP108	0.10-1.00	MADE GROUND	Non-hazardous	Exceeds Inert WAC limit values	NON-HAZARDOUS landfill	Loss on Ignition
HP101	0.30-1.10	MADE GROUND	Non-hazardous	-		-
Geotechnics Testing						
BH01	0.50	Gravelly SAND	Non-hazardous	-		-
BH02	0.50	MADE GROUND	Non-hazardous	-		-
BH03	0.50	MADE GROUND	Non-hazardous	-		-
BH03	2.00	Gravelly SAND	Non-hazardous	-		-
BH03A	2.00	Gravelly SAND	Non-hazardous	-		-
BH04	1.00	MADE GROUND	Non-hazardous	-		-
HD01	1.00	MADE GROUND	Non-hazardous	-		-
HD02	0.50	MADE GROUND	Non-hazardous	-		-
HD03	1.00	MADE GROUND	Non-hazardous	-		-
HDP04	0.50	MADE GROUND	Non-hazardous	-		-
DCP05	0.50	MADE GROUND	Non-hazardous	-		-
DCP07	0.20	MADE GROUND	Non-hazardous	-		-
DCP08	0.20	MADE GROUND	Non-hazardous	-		-
DS01	0.50	MADE GROUND	Non-hazardous	-		-
DS04	0.50	MADE GROUND	Non-hazardous	-		-
DS05	0.50	MADE GROUND	Non-hazardous	-		-

Based on the waste classification database assessment, the majority of the made ground soils have been classified as **non-hazardous**, with the exception of WS106 which was classified as hazardous due to pH. This is possibly due to the concrete observed within the made ground comprising brownish grey sandy gravel, from which the sample was taken. During sample preparation a grinder is used which would grind any sand or gravel sized fragments within the sample, including concrete, to a fine powder. This fine powder has a much larger surface area, exposing increased amounts of calcium hydroxide, potentially skewing the pH of the soil mass. As a result this may be representative of the made ground strata as a whole, however re-testing and re-classification would be required on the actual arisings prior to disposal off site.

WAC testing suggests that the cohesive made ground (sampled in WS101) should be suitable for disposal at an inert landfill site, whereas the granular made ground (sampled in TP108) should be suitable for disposal at a Non-Hazardous landfill site, likely due to the relatively high ash content within the granular made ground in the eastern area of the site.

Alternatively, given the earthworks required on site, re-use of suitable soils is likely to be more cost-effective than disposal to landfill, and options are discussed in full in section 9.5.

Note that further testing of the soils (WAC testing) may be required on the actual arisings in order to satisfactorily categorise the soil for its suitability for disposal to landfill.

9.4 Options Assessment

Following the classification of waste materials, the options available for the waste can be considered in the context of the waste hierarchy as below:

- Onsite re-use (with or without prior treatment) under suitable exceptions/permits.
- Offsite processing for recycling or recovery e.g. screening.
- Offsite disposal (with or without prior treatment) i.e. landfill.

Where feasible, efforts should be made to retain soils for onsite re-use to minimise costs and maximise the sustainability of projects.

Based on the above, the possible options for the generation of waste soils at the site are described in the table below:

Waste Generation Source	Comments
Crush	Crushed concrete is/will be site derived from structures which had not been used for potentially contaminative activities. These should be subject to an asbestos survey and removal of asbestos as required, prior to demolition and crushing of structures. Assuming the above criteria are met, with materials containing no asbestos or ACM, crushed concrete is considered to be inert without testing. Where samples of crushed concrete have been subject to totals testing this is likely to be hazardous due to pH, and where subject to WAC testing, the sulphate and TDS limits are breached, this is to be expected due to the presence of concrete.
Topsoil	Topsoil is considered unsuitable for re-use at the site as would require long-term storage. Long term storage of topsoil can alter the soils chemistry as well as decrease available nutrients, pH and organic matter levels. Long term storage can result in compaction of the soils, increase in bulk density and changes in pore size distribution and micro-structure which can make the soils more difficult to drain. Additionally, given the absence of available storage space onsite, and the scale of earthworks required to accommodate proposed site levels, it is advisable that the site won topsoil be removed from site.
Made Ground from site levelling/foundations excavations/services excavations	Samples of made ground from across the site have been classified as non-hazardous and hazardous for off-site disposal purposes, although should be suitable for re-use on site if required under suitable exemptions/permits. But it should be noted that elevations of PAHs and heavy metals have been detected in the made ground and therefore may not be suitable for reuse.
Natural ground from site levelling/foundations excavations/services excavations	The Till may be considered suitable for re-use onsite as fill where the criteria of the WFD exception for re-use of naturally occurring soils can be met. Naturally occurring clean materials could also be exported to another site under the direct transfer scenario of the DoWCoP.

General

If any gross hydrocarbon contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Where it is necessary to dispose material off site it is recommended that materials are segregated and sufficient time is allowed to further classify the actual soil arisings that constitute the waste, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is illegal to dilute and mix soils without a suitable permit.

9.5 Re-use of Soils

By definition in law, any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a “waste”) is then placed on another part of the development site (or used on another development site) without an appropriate materials management plan, permit or exemption being in place, by law this material is defined as “illegally deposited waste”.

Landfill tax rules allow HM Revenue & Customs (HMRC) to recover landfill tax on illegally deposited waste on construction sites. This could lead to excessive costs without the correct documentation in place. In addition, a person who makes, knowingly causes or knowingly facilitates a disposal to be made at an unauthorised site is also liable to pay Landfill Tax.

In order to comply with UK legislation and avoid excessive costs, if the re-use of soils is proposed on site, this should be done in accordance with the relevant exemptions or permits in place.

Soils Re-use Under DoWCoP

One of the main industry mechanisms for allowing the re-use of soils in construction is the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE DoWCoP) also known as a Materials Management Plan (MMP). Further guidance is provided in the BSL Methodology and Guidance in Appendix A.

To implement the DoWCoP (for Route A), there is a requirement to notify the Environment Agency and Local Authority of the intention to use the code of practice in principal, after which there is a 21-day notice period for their response.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

-
- The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
 - The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
 - There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
 - Quantity (the quantity of materials used should be known).
-

Information on existing site levels, proposed levels, volumes generated (e.g. foundation / drainage excavation arisings) would need to be known in order to complete the MMP.

If the DoWCoP is the chosen route, the MMP should be in place and declared by a Qualified Persons (QP) before works commence, otherwise excavated soils could constitute an illegal deposit of waste and enforcement action could be taken by the EA and HMRC.

The declared MMP should be amended as new import sources are added.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-compliant with the CoP can be referred to the EA for further investigation.

Regardless of implementing re-use under the code of practice or not, all sites should have some form of materials tracking in place in compliance with current legislation. Any re-use scheme should also be designed to minimise disposal costs.

Re-use of soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CAR-SOIL™) and CAR 2012.

In terms of the re-use of brick/concrete crush materials, the DoWCoP does cover aggregates, but only on the site of origin, and the EA WRAP aggregate Quality Protocol might best apply to ensure quality standards, which are discussed further below.

Soils Re-use under Exemptions and Permits

Other potentially suitable options to allow the re-use and/or import of soils and aggregates on site are provided in the table below:

Re-use Mechanism	Description
U1 Exemption	Can be applied to re-use/import of soils and stones, but only up to 1000 tonnes or for brick and concrete up to 5000 tonnes. This is usually an efficient way to re-use small volumes of waste materials. However, only one U1 can be filled in per site in any 3-year period. Quick and free via online registration.
WRAP Quality Protocols	Describes how processed demolition arisings can be removed from regulatory waste regime. Requires a demonstration of appropriateness by: • Factory Production Control Manual. • Facility Permit (or Exemption). • Grading Analysis.
Waste Framework Directive (WFD) exclusion	In regard to "clean" naturally occurring soils only that are to be re-used on their site of origin, these are covered by a Waste Framework Directive (WFD) exclusion which is an EA regulatory position statement. So long as the project can prove the four criteria listed above for the DoWCoP, then permits or the DoWCoP are not required. However, many projects still use the CoP to ensure compliance.
T5 Screening and blending of waste	The T5 exemption allows you to temporarily treat waste on a small scale to produce aggregate or soil at a particular location, such as a construction or demolition site. The limit is 5,000 tonnes. This applies to: • Screening soil on a demolition site to remove wood and rubble. • Blending soil and compost that has been produced under an exemption on a construction site to produce better soil for landscaping on that site (e.g. peaty deposits). • Crushing waste (except bricks, tiles and concrete) before screening or blending • Grading waste concrete after it has been crushed to produce a certain type of aggregate.
T7 Exemption	The T7 allows treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size. This needs to be registered with the Local Authority.
Other Permitting Routes	Other options include use under an Environmental Permit (Standard or Bespoke Rules), however these may be a time consuming and costly route, where use of the other above options (if applicable) are likely to be more feasible in construction.

10.0 CONCLUSIONS

10.1 Geo-Environmental

Geo-Environmental – Human Health

Testing of the made ground at the site revealed relatively widespread exceedances of heavy metals and PAHs particularly in the eastern section of the site.

The above are considered to pose a risk to human health and remedial measures are required in the form of a cover system in soft landscaping areas to mitigate the risk.

Based on the gas monitoring and detailed assessment the site is classified as Characteristic Situation 1 and ground gas protection measures are not required.

Geo-Environmental – Controlled Waters

The overall risk to controlled waters is considered to be low and no further action is required.

Waste

Waste classification for the made ground at the site has revealed the majority of the soils to be non-hazardous, except for one of the samples which has been classified as hazardous due to the pH of the sample, possibly skewed due to the presence of concrete within the sample.

WAC testing suggests that the cohesive made ground (sampled in WS101) should be suitable for disposal at an inert landfill site, whereas the granular made ground (sampled in TP108) should be suitable for disposal at a Non-Hazardous landfill site, likely due to the relatively high ash content within the granular made ground in the eastern area of the site. However, efforts should be made to retain all soils on site where feasible to minimise costs and maximise sustainability.

Whilst the testing to date suggests site-won topsoil may be chemically suitable, topsoil is considered unsuitable for re-use given the saturation of the material and duration required for stockpiling and the limited storage space present onsite.

10.2 Geotechnical

Foundations

Ground improvement by methods such as vibro ground improvement and/or vibro piling are considered suitable for structures. Reinforced pads and ground bearing slab foundations could be used bearing onto the improved ground, at depths of circa 600mm bgl. Allowable bearing capacities of the order of 150kN/m² can typically be achieved per pad.

Alternatively, a piled solution may be adopted, with the piles extending through the made ground and superficial deposits, utilising a combination of skin friction and end-bearing resistance. The profiles below have been split into different options dependant on the depth to rockhead which varies across the building footprint.

Profile	Assumed Depth to Bedrock (m bgl)	Pile Diameter (mm)	Pile Length (m)	Allowable Load (kN)
RO102, BH03A, RO105, RO106, BH04	12	300	14.00	430
		500	14.00 ^[1]	840
		750	14.00 ^[1]	1450
RO103, RO104, RO107	17	300	18.50	490
		500	18.50 ^[1]	940
		750	18.50 ^[1]	1600
RO101, RO108, BH02	20.5	300	22.00	560

Profile	Assumed Depth to Bedrock (m bgl)	Pile Diameter (mm)	Pile Length (m)	Allowable Load (kN)
		500	22.00 ^[1]	1050
		750	22.00 ^[1]	1800

Floor slabs

Suspended floor slabs supported by piles or ground bearing floor slabs may be adopted provided the criteria in section 7.5 are satisfied

Concrete classification

DS1 AC-2s conditions prevail in the made ground. DS1 AC-1 conditions prevail in the natural superficial strata.

Highways

Based on the ground conditions encountered, the following CBR values are likely to be achievable.

- Made Ground CBR – 2%.
- Superficial Strata CBR – cohesive/fine soils–2%
- Superficial Strata CBR – granular/coarse soils– 5%

The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.

Drainage (SuDS)

Drainage to soakaways is considered potentially unsuitable for this site.

Earthworks

Given the variability of existing site levels and development layout requirements including finished levels, earthworks will be required in order to achieve the desired development platform levels. Based on the earthworks testing completed to date, site won granular and cohesive soils are likely to be suitable for re-use in accordance with an appropriate earthworks specification, which will be issued under a separate cover.

Mining

The risk from shallow unrecorded mine workings affecting the new building construction is considered to be low and no further action is required.

However, geogrid installation would be prudent within external areas of proposed hardstanding highways and car parking located in the Coal Authority Development High Risk Area where borehole coverage is limited.

10.3 Further Work

The following further work is considered necessary to progress the site to construction phase:

- Demolition Asbestos survey.
- Detailed foundation design by a structural engineer, including foundation zonation plan and depth schedule.
- Production of Earthworks Specification.
- Production of Materials Management Plan (MMP) under the CL:AIRE DoWCoP, if required.

-
- Implementation of the Earthworks, Remedial Strategy and verification of the works.
-

11.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	Definition
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Desk Study). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental health Officer.
EQS	Environmental Quality Standard.
GAC	Generic Assessment Criteria.

GLOSSARY	
Term / Abbreviation	Definition
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).

GLOSSARY	
Term / Abbreviation	Definition
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	Definition
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m ²)
KN/m ² /mm	Kilo Newton per metered squared per millimeter
kN/m ²	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m ²)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M ² /MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m ³	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

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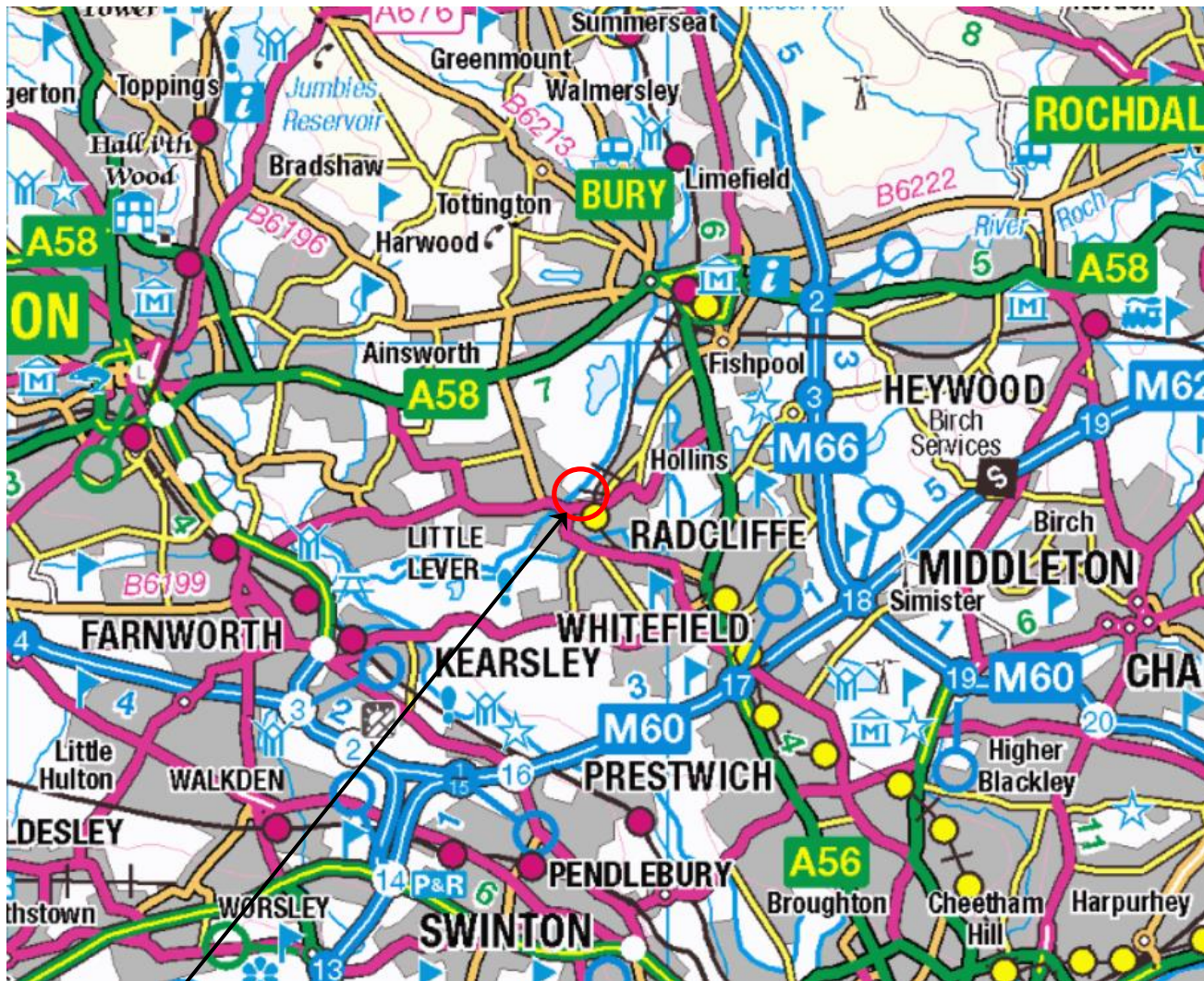
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DRAWINGS



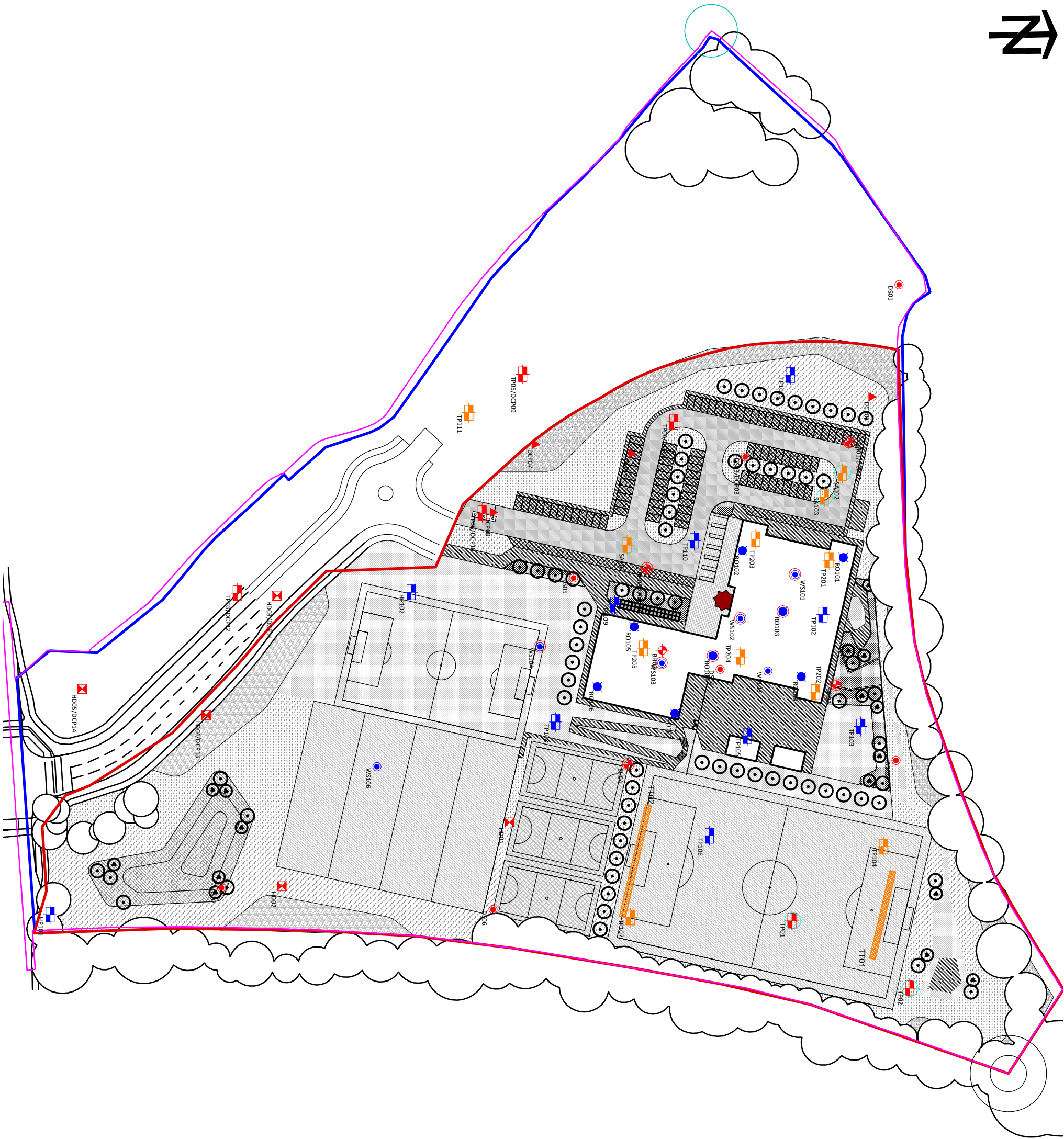
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NEAREST POSTCODE: M26 2SZ

SITE ENTRANCE WHAT3WORDS:
///CHAIR.VERGE.SINGLE



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CLIENT MORGAN SINDALL				
PROJECT TITLE STAR ACADEMY, RADCLIFFE, MANCHESTER				
DRAWING TITLE SITE LOCATION PLAN				
DRAWING No. C5394/01	REVISION -	SCALE NTS	DATE 16/06/23	
DRAWN BY SD		CHECKED BY PH		



KEY	
	APPROXIMATE SITE BOUNDARY
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	ROTARY OPEN BOREHOLE
	BOREHOLE INSTALLATION
	ADDITIONAL TRIAL PIT
	ADDITIONAL TRIAL TRENCH
	ADDITIONAL SLIP TRENCH
	SOAKAWAY INFILTRATION TEST

GEOTECHNICS (2022)	
	HAND EXCAVATED TRIAL PIT
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	CABLE PERCUSSIVE/ROTARY CORE BOREHOLE
	PLATE LOAD TEST, LWD, TRL-DCP
	SOAKAWAY INFILTRATION TEST
	BOREHOLE INSTALLATION

NOTES

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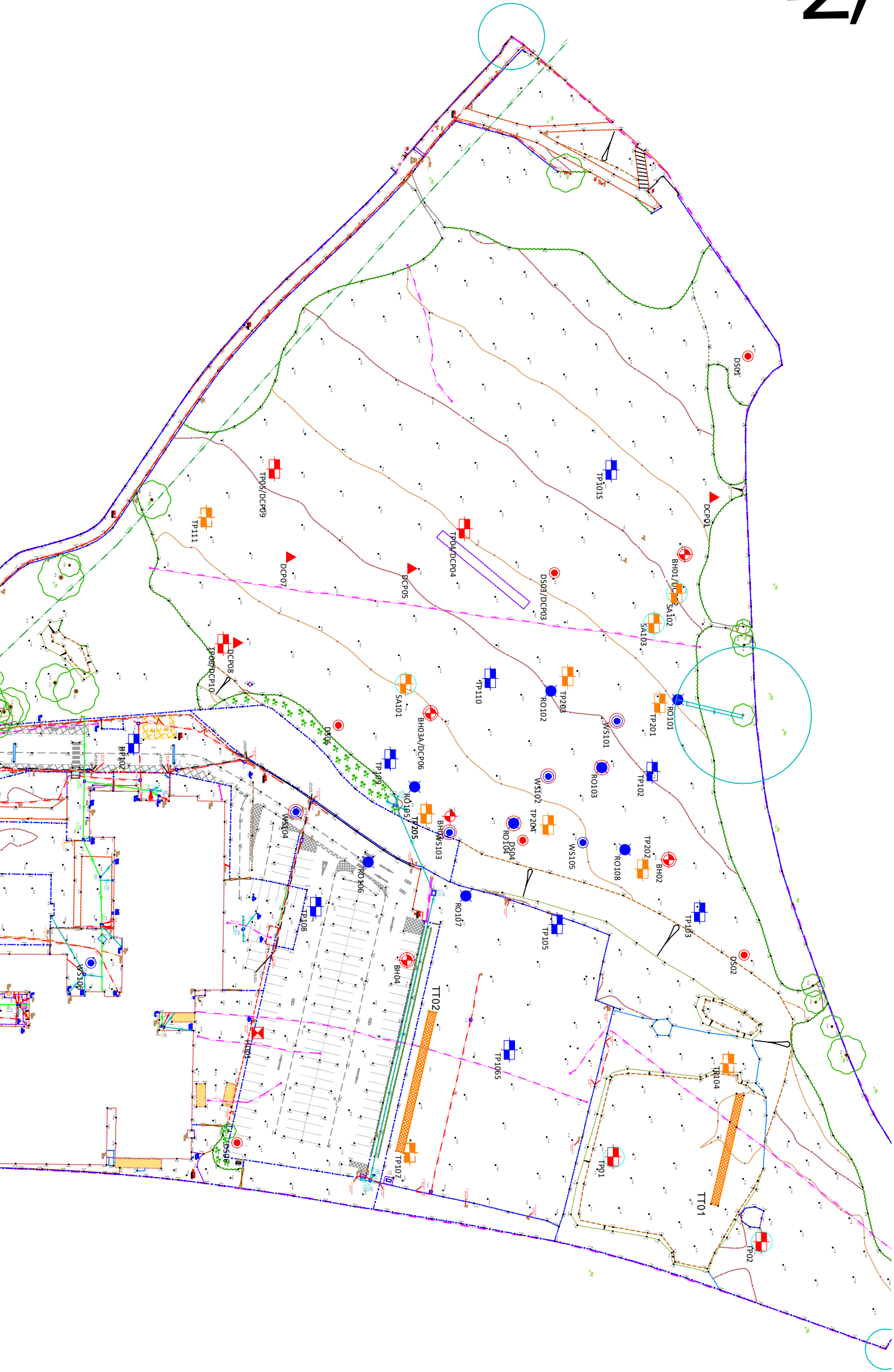


MORGAN SINDALL

STAR ACADEMY, RADCLIFFE

EXPLORATORY HOLE LOCATION PLAN

DRAWING NO.	REVISION	SCALE	DATE
CS394/02	B	NTS	17/11/23
DRAWN BY	PH	CHECKED BY	NS



REV	DATE	DESCRIPTION	BY	C

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			C



PROJECT TITLE

STAR ACADEMY, RADCLIFFE

DRAWING TITLE

EXPLORATORY HOLE LOCATION
PLAN

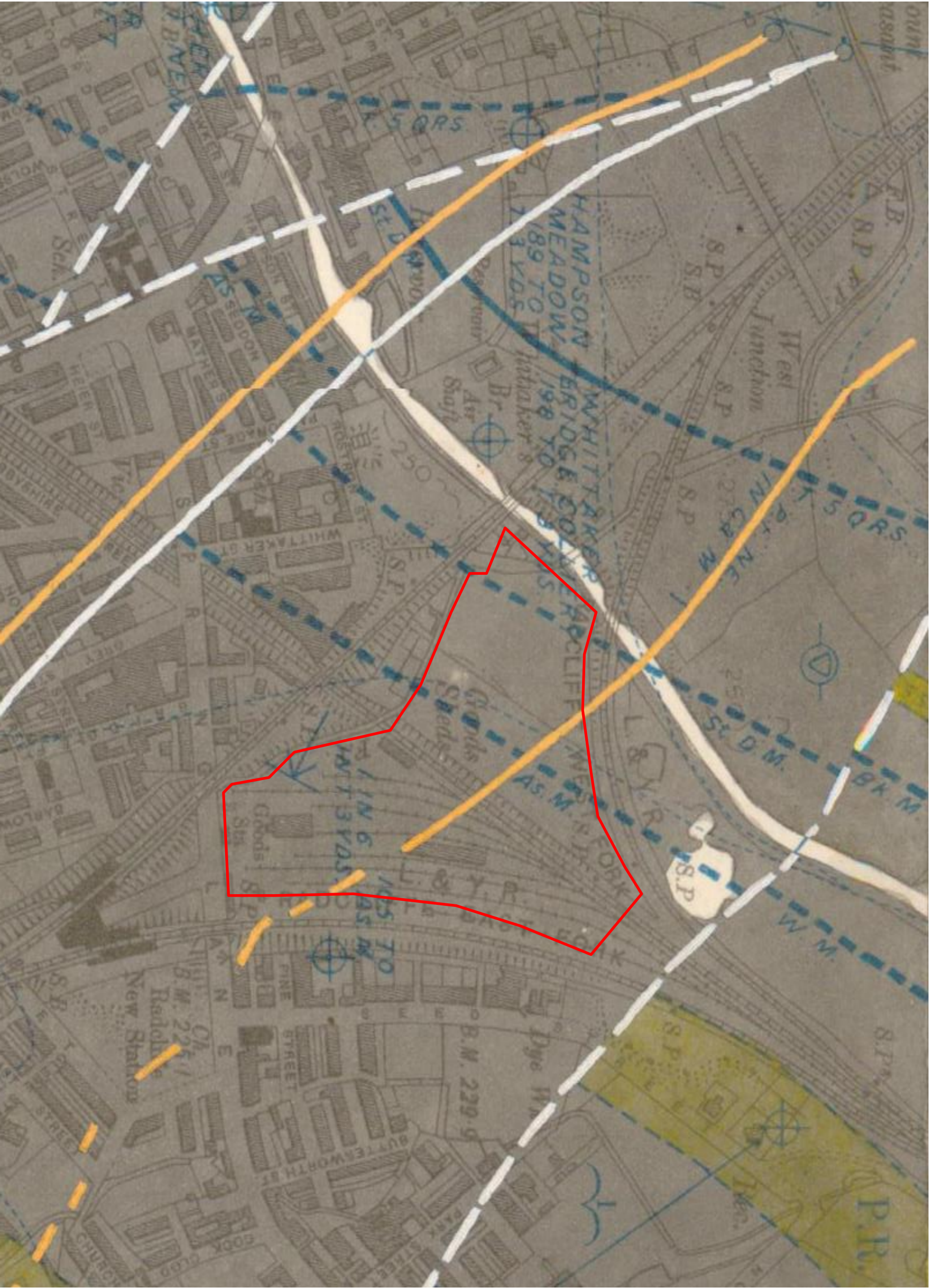
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C5394/02A	B	NTS	17/11/20
DRAWN BY	PH	CHECKED BY	NS



KEY

- APPROXIMATE SITE BOUNDARY
- MINE SHAFT
- DEVELOPMENT HIGH RISK AREA
- PROBABLE SHALLOW COAL MINE WORKINGS
- ABANDONED MINES CATALOGUE
- SURFACE COAL RESOURCE AREA
- COAL OUTCROPS

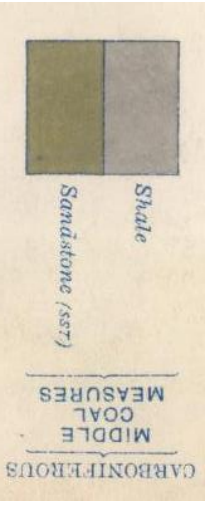
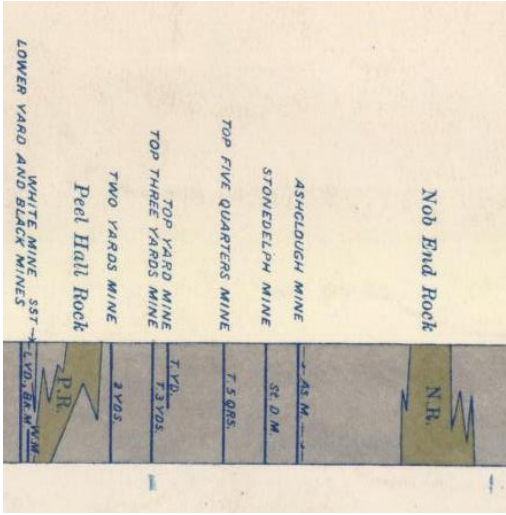
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CLIENT				
MORGAN SINDALL				
PROJECT TITLE				
STAR ACADEMY, RADCLIFFE				
DRAWING TITLE				
COAL AUTHORITY INTERACTIVE MAP				
EXTRACT				
DRAWING NO.	REVISION	SCALE	DATE	
C5394/03	-	NTS	31/07/23	
DRAWN BY		CHECKED BY		
PH		JM		



BGS COUNTY SERIES 1:10,000 LANCASTER SHEET 95 NE SOLID

KEY

— APPROXIMATE SITE BOUNDARY



REV	DATE	DESCRIPTION	BY	CKD



CLIENT
MORGAN SINDALL

PROJECT TITLE
STAR ACADEMY, RADCLIFFE

DRAWING TITLE
Geological Map Extract

DRAWING NO.	REVISION	SCALE	DATE
C5394/04	-	NTS	31/07/23

DRAWN BY	CHECKED BY
PH	JM

KEY		
—	APPROXIMATE SITE BOUNDARY	
	TRIAL PIT	
	WINDOW SAMPLE BOREHOLE	
	ROTARY OPEN BOREHOLE	
	BOREHOLE INSTALLATION	
	ADDITIONAL TRIAL PIT	
GEOTECHNICS (2022)		
	HAND EXCAVATED TRIAL PIT	
	TRIAL PIT	
	WINDOW SAMPLE BOREHOLE	
	CABLE PERCUSSIVE/ROTARY CORE BOREHOLE	
	PLATE LOAD TEST LWD, TRL-DCP	
	SOAKAWAY INFILTRATION TEST	
	BOREHOLE INSTALLATION	

NOTES

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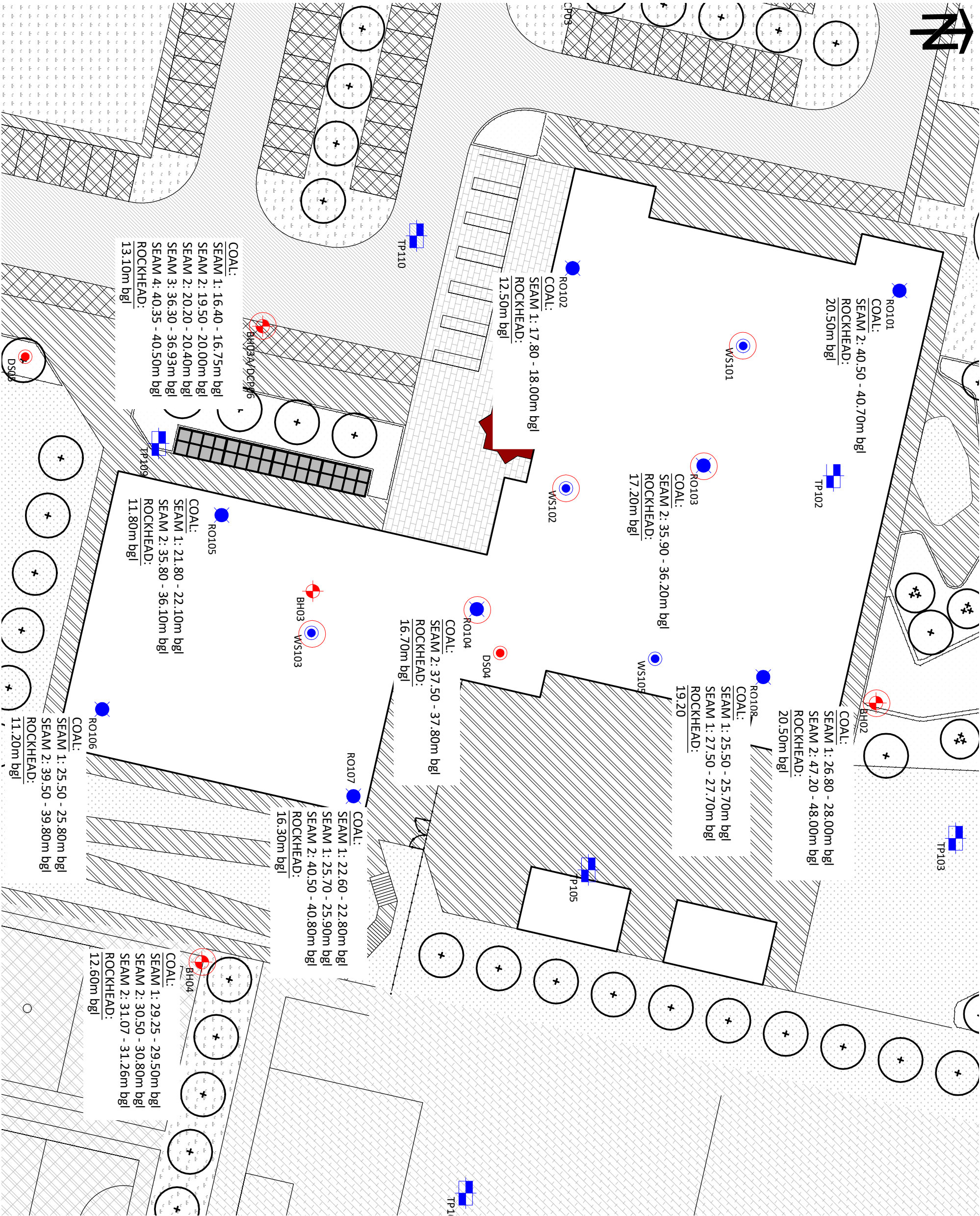


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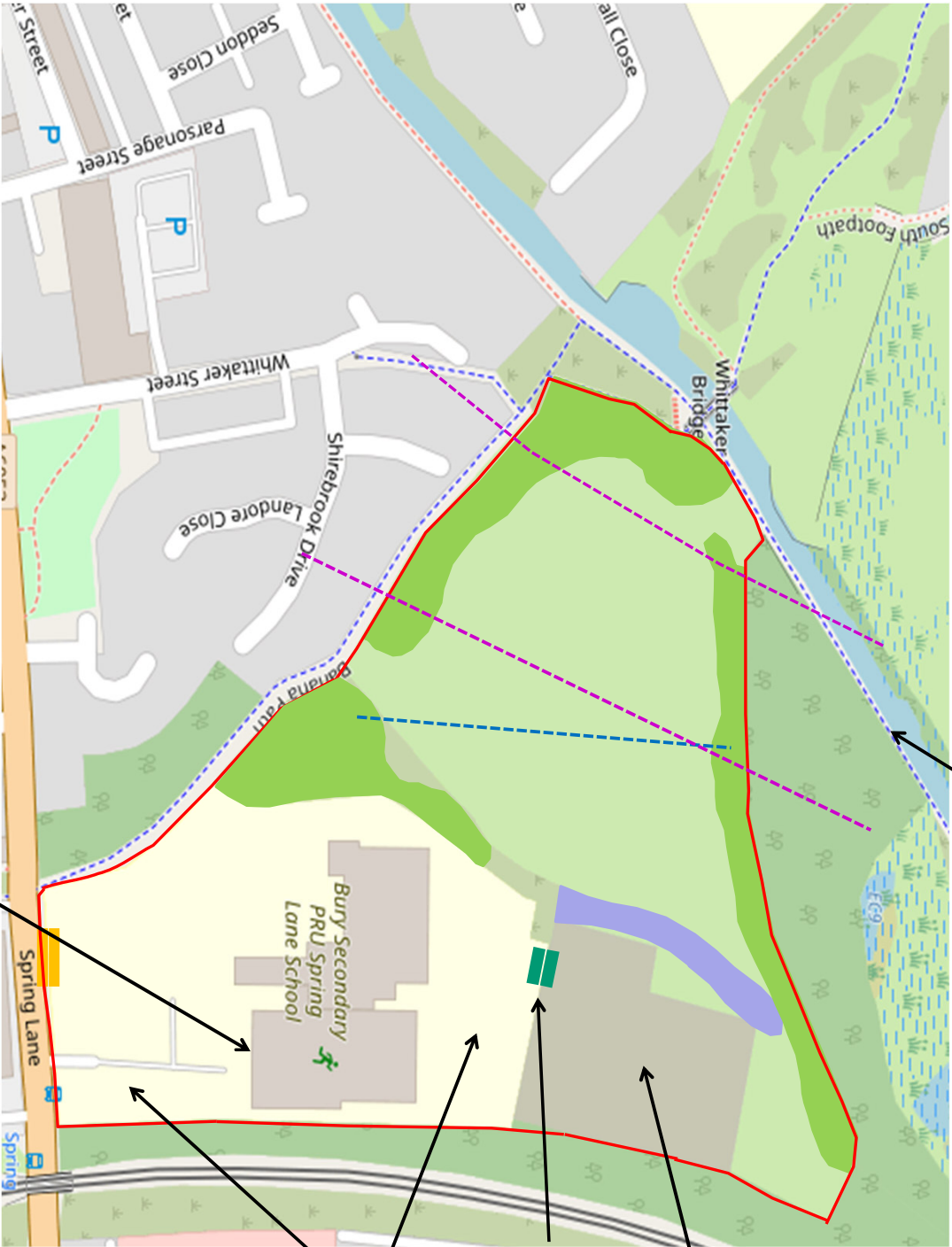
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FOOTPRINT BEDROCK PROFILE

DRAWING NO.	REVISION	SCALE	DATE
C394/05		NTS	12/10/23
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MANCHESTER
BOLTON & BURY
CANAL



BOILER HOUSE AND
DISUSED CHIMNEY

GRAVEL
GATE
CAR PARK

KEY

- APPROXIMATE SITE BOUNDARY
- SLOPE AREA
- WOODLAND
- IP GAS MAIN
- COAL SUBCROP
- SITE ENTRANCE
- DERELICT PLAYING FIELD
- GATE

NOTES
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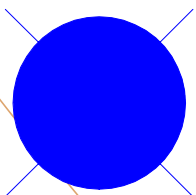
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STAR ACADEMY, RADCLIFFE

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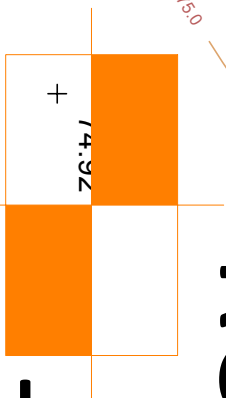
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C5394/06	-	NTS	12/10/23
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+ 75.21



RO101



TP201

+ 75.07

AREA = 120m²

APPROXIMATE

VOLUME =

144m³

0.80m bgl

1.00m bgl

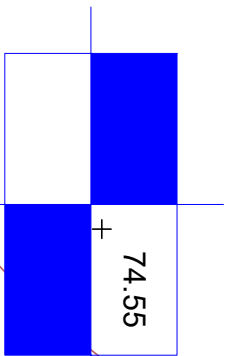
MG DEPTH
= 1.20m bgl

1.00m bgl

0.10m bgl

0.10m bgl

WS101

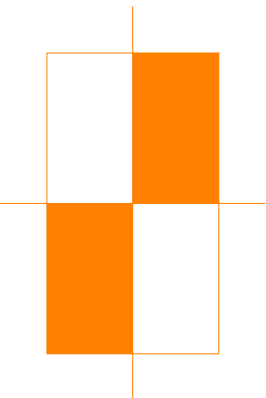


TP102

+ 74.36

RO103

+ 74.71



TP203

+ 74.28

+ 74.

KEY	
	APPROXIMATE SITE BOUNDARY
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	ROTARY OPEN BOREHOLE
	BOREHOLE INSTALLATION
	ADDITIONAL TRIAL PIT
	ADDITIONAL TRIAL TRENCH
	ADDITIONAL SLIT TRENCH
	APPROXIMATE AREA OF ORGANIC MATTER
	DEPTH OF ORGANIC MATTER
GEOTECHNICS (2022)	
	HAND EXCAVATED TRIAL PIT
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	CABLE PERCUSSIVE/ROTARY CORE BOREHOLE
	PLATE LOAD TEST.LWD.TRL-DCP
	SOAKAWAY INFILTRATION TEST
	BOREHOLE INSTALLATION

NOTES

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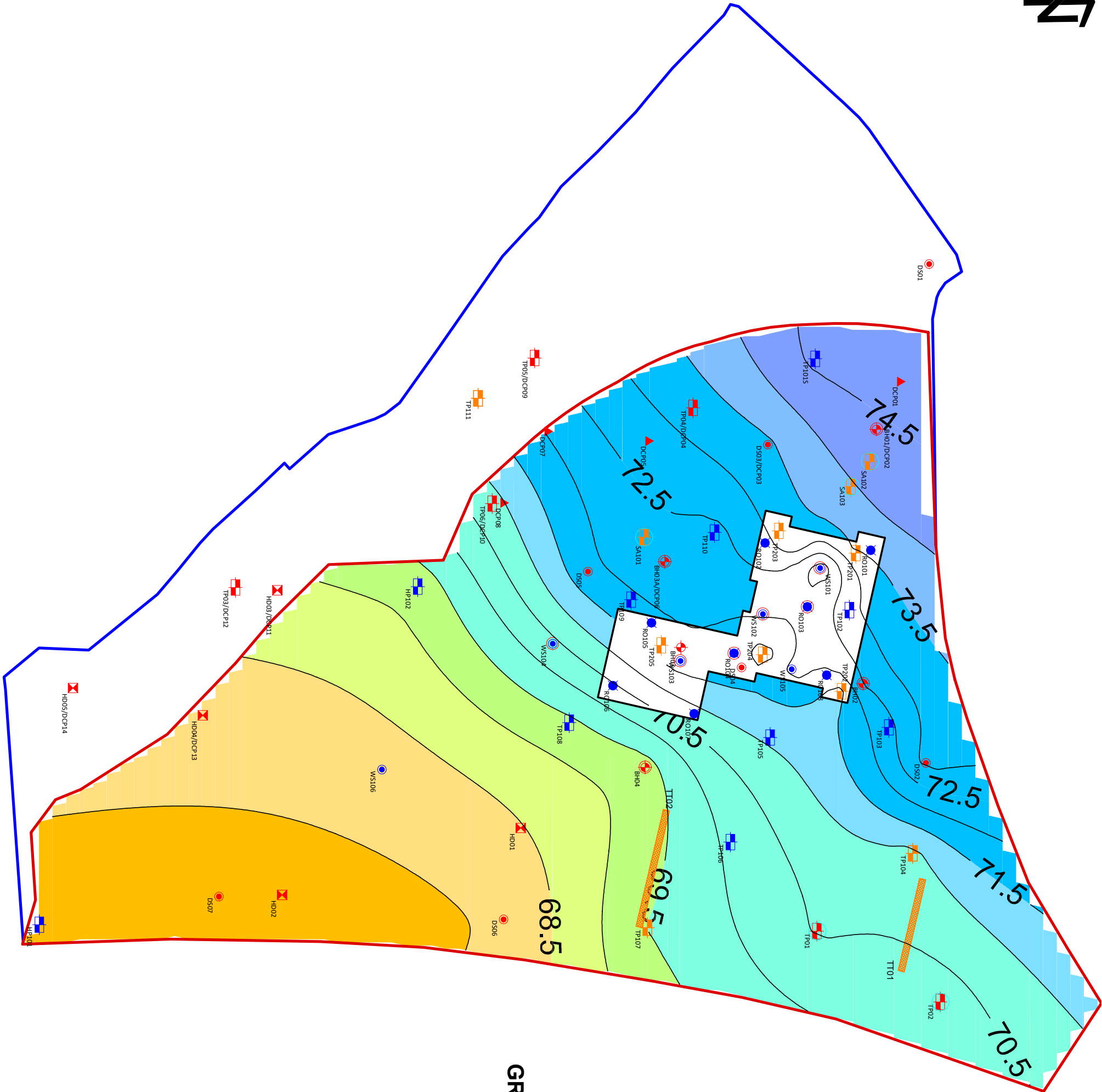


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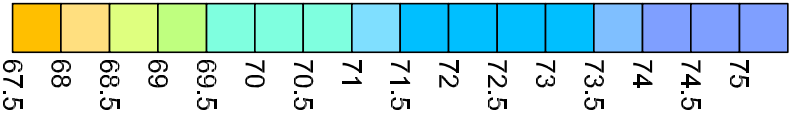
STAR ACADEMY, RADCLIFFE

WS101 ORGANIC MATTER PLAN

DRAWING NO.	REVISION	SCALE	DATE
C5394/07	-	NTS	23/11/23
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GROUNDWATER LEVEL
mAOD



KEY	
	APPROXIMATE SITE BOUNDARY
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	ROTARY OPEN BOREHOLE
	BOREHOLE INSTALLATION
	ADDITIONAL TRIAL PIT
	ADDITIONAL TRIAL TRENCH
	ADDITIONAL SLIP TRENCH
	SOAKAWAY INFILTRATION TEST

GEOTECHNICS (2022)	
	HAND EXCAVATED TRIAL PIT
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	CABLE PERCUSSIVE/ROTARY CORE BOREHOLE
	PLATE LOAD TEST, LWD, TRL-DCP
	SOAKAWAY INFILTRATION TEST
	BOREHOLE INSTALLATION

- NOTES
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 - DRAWING NOT FOR CONSTRUCTION PURPOSES.
 - GROUNDWATER LEVELS ARE ACCURATE ONLY AT THE EXPLORATORY HOLE LOCATIONS SHOWN. CONTOUR PLOT SUBSEQUENTLY GENERATED TO SHOW INDICATIVE GROUNDWATER LEVELS ACROSS THE SITE WHICH ARE ASSUMED EMPIRICALLY BY THE CONTOUR MODELLING SOFTWARE AND NOT REPRESENTATIVE OF THE ACTUAL GROUNDWATER LEVEL AT A GIVEN LOCATION.
 - EXPLORATORY HOLES WHERE NO GROUNDWATER WAS ENCOUNTERED HAVE BEEN OMITTED FROM THE MODEL.

REV	DATE	DESCRIPTION	BY	CKD

BROWNFIELD SOLUTIONS LTD

CLIENT

MORGAN SINDALL

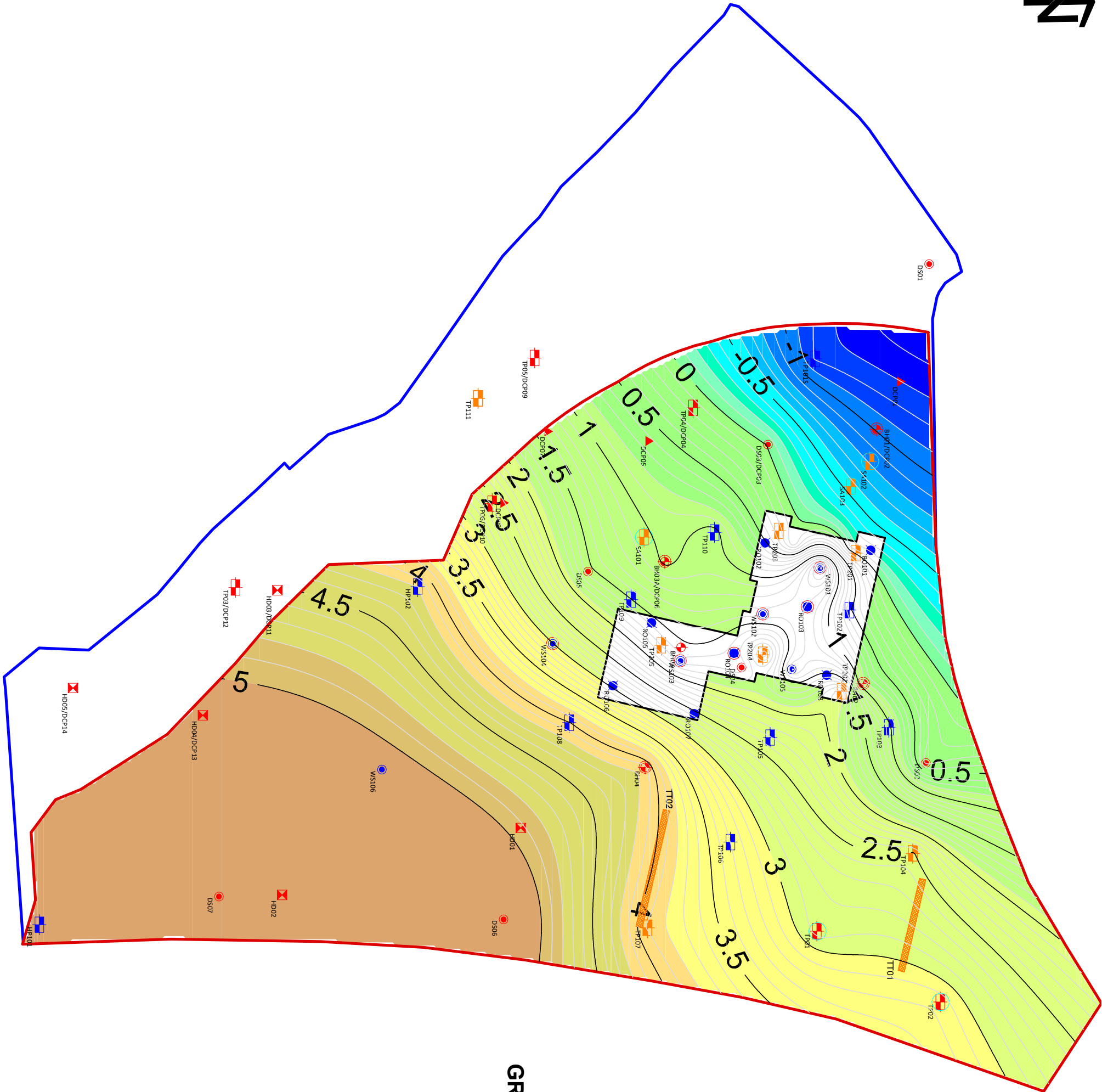
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DRAWING TITLE

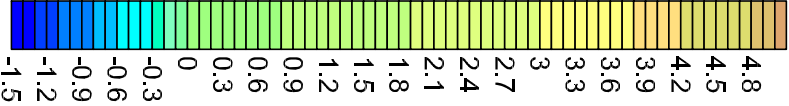
GROUNDWATER CONTOUR PLAN (mAOD)

DRAWING NO.	REVISION	SCALE	DATE
C5394/08	-	NTS	23/11/23
DRAWN BY	NS	CHECKED BY	TM



GROUNDWATER LEVEL

mbfl



KEY	
	APPROXIMATE SITE BOUNDARY
	TRIAL PIT
	WINDOW SAMPLE BOREHOLE
	ROTARY OPEN BOREHOLE
	BOREHOLE INSTALLATION
	ADDITIONAL TRIAL PIT
	ADDITIONAL TRIAL TRENCH
	ADDITIONAL SLIP TRENCH
	SOAKAWAY INFILTRATION TEST

NOTES

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3. DRAWING NOT FOR CONSTRUCTION PURPOSES.
4. GROUNDWATER LEVELS ARE ACCURATE ONLY AT THE EXPLORATORY HOLE LOCATIONS SHOWN. CONTOUR PLOT SUBSEQUENTLY GENERATED TO SHOW INDICATIVE GROUNDWATER LEVELS ACROSS THE SITE WHICH ARE ASSUMED EMPIRICALLY BY THE CONTOUR MODELLING SOFTWARE AND NOT REPRESENTATIVE OF THE ACTUAL GROUNDWATER LEVEL AT A GIVEN LOCATION.
5. EXPLORATORY HOLES WHERE NO GROUNDWATER WAS ENCOUNTERED HAVE BEEN OMITTED FROM THE MODEL.

REV	DATE	DESCRIPTION	BY	CKD



MORGAN SINDALL

STAR ACADEMY, RADCLIFFE

GROUNDWATER CONTOUR PLAN (mbfl)

DRAWING NO.	REVISION	SCALE	DATE
CS394/09	-	NTS	23/11/23
DRAWN BY	NS	CHECKED BY	TM

APPENDIX A

BSL Methodology and Guidance

BSL Phase I & II Geo-Environmental Assessment Reports - Methodology and Guidance

Background

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial **Conceptual Site Model (CSM)**. From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. In the case of the geotechnical hazard identification, this is referred to as the **Ground Model**.

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

-  The 1995 Environment Act.
-  The Contaminated Land Statutory Guidance, DEFRA – April 2012.
-  The Contaminated Land (England) Regulations 2006.
-  The Contaminated Land (England) Amendment Regulations 2012.
-  Water Resources Act.
-  Water Framework Directive.
-  Environmental Damage Regulations.
-  Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused.
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.

Pathway - a potential route by which contaminants can move from the source to the receptor, and the impact of that migration on the source e.g. attenuation.

Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused.



Where any one of the “pollution linkages” between the above is absent there is deemed to be no risk.

The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the S-P-R approach is ‘suitable for use’ criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Groundwater Protection <https://www.gov.uk/government/collections/groundwater-protection>
- UK Technical Advisory Group (UKTAG) - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- The Pollution Prevention and Control (England and Wales) Regulations (2000).
- The Landfill Regulations (England and Wales) Regulations (2002).
- The Landfill (England and Wales) (Amendment) Regulations (2004).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017).
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) – latest version.

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:



LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:

<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.

Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.

Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.

Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment.

Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.

Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	Negligible	Negligible Risk / No Linkage			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term.

Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'negligible risk' and 'no linkage' in the summary table, which give rise to an overall **negligible** risk category and no further action is required.

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General

The purpose of using generic Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake remedial action based on the data to hand is cost effective.

Human Health

Current UK guidance on risks to human health is provided by DEFRA and the Environment Agency (EA). Under the land use planning system where the aim is to demonstrate 'suitability for use' the key will usually be to confidently determine that the level of contamination of the land is low relative to some appropriate measure of risk at a particular critical connection.

Publications forming part of the guidance include the CLEA Model and toxicological reports collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values or Generic Assessment Criteria (GACs) for soils contamination based on standard land uses and soil assumptions. The critical concentrations referred to above can be the relevant GAC.

CLEA guidance has gone through a number of revisions over time. Tier 1 generic S4UL values (or GACs) have been published using the CLEA 1.06 Model by CIEH/LQM. These are the third set of generic assessment criteria generated by CIEH and replace the previous two sets of GACs. The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

C4SL values for six determinands including lead were published by DEFRA/CL:AIRE in December 2014. Additional determinands were added in 2021. They represent a low risk as opposed to minimal risk, however they are still strongly precautionary. These screening values were published by DEFRA for Part 2A use, although DEFRA have also confirmed acceptability for use under planning. However, S4ULs remain the first reference point for BSL due to the broader range of end uses scenarios and the availability of a wide array of determinands with various soil organic contents.

As part of Tier 1 assessments, the following data sources are used in the order of preference given below, unless further justification is provided to adopt less conservative criteria:

-  CIEH S4UL values (derived by CIEH/LQM).
-  DEFRA/CL:AIRE C4SL's <https://www.claire.co.uk/projects-and-initiatives/category-4-screening-levels>
-  CL:AIRE GAC values.
-  Guidance from other European countries.
-  Guidance from the outside Europe.

Dependent on requirements, test results may be divided into representative data sets for assessment against the above referenced screening criteria, based on the conceptual model and taking into account such characteristics as variation in soil properties, historical, existing or proposed land uses. The soils in these areas are considered likely to form the ground cover in critical receptor areas (e.g. gardens, soft landscaping etc)

where pathways may exist. The critical part of the soil column is typically taken as the upper metre in terms of contact with end users of a development site for the purposes of initial assessment.

The screening criteria adopted by BSL are presented overleaf.

Further Assessment

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and assessment to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway. In some cases, dependant on the Conceptual Site Model (CSM), no action may be required.

PAHs and B(a)P as a Surrogate Marker for Adoption of C4SLs

As stated above, S4ULs remain the first reference point as screening levels unless further justification is provided. In order to determine if the C4SL can be adopted, benzo(a)pyrene (B(a)P), the following guidance within SP1010 Appendix E for B(a)P and Public Health England (PHE) may be adopted with our assessments where appropriate.

Guidance states that benzo(a)pyrene is considered to be one of the most potent PAHs, and it would be appropriate to assume the cancer risk in a mixture is proportional to the concentration of a surrogate marker PAH (benzo(a)pyrene) in the mixture. The ratio of PAHs within the mixture can be assessed to ensure that the profile is similar to that seen for the test material (coal tar mixtures) in the toxicological study by Culp et al. The International Programme on Chemical Safety (IPCS) considered that the PAH profile of the soil sample may deviate from the average profile by about an order of magnitude (up or down).

A more recent study by Bull et al (2013) which analysed PAH concentrations in soil samples from 274 sites, showed that the levels of PAH relative to B(a)P showed little variability and were similar to that recorded for the coal tar mix used in the Culp et al study. Given this, it was concluded that benzo(a)pyrene is a suitable surrogate marker to represent mixtures of PAH in soil.

In order to risk assess the PAH mixture for site specific soil samples using human health guideline values, notably the C4SLs, as detailed in SP10101 the ratio of the seven genotoxic PAHs as shown below, relative to B(a)P, should be calculated to ensure it is similar to the test material used in the Culp study (PHE 2010). To be considered sufficiently similar, the ratio relative to B(a)P should fit within the upper and lower limits (representing an order of magnitude above and below the mean ratio to B(a)P of test material used in the Culp et al study). In such cases B(a)P is considered an adequate surrogate marker and the Low Level of Toxicological concern (LLTC) for B(a)P (i.e., the C4SL) may be used in the risk assessment.

Statistical Analysis on Soils

Guidance on the use of statistics is taken from the CL:AIRE publication “Comparing Soil Contamination Data with a Critical Concentration” 2020, the basis of which in statistics is termed Central Limit Theorem (CLT), which says “*The distribution of sample means converges to a normal distribution as the sample size increases*”.

If the critical concentrations have been exceeded, as part of a further assessment, statistical analysis may be undertaken on a dataset to demonstrate that the mean concentration on the site (or a particular area) is actually below the critical concentration. The true mean concentration of a contaminant is never known because all the site soil has not been tested. An estimation of the true mean can be obtained from the samples tested during the investigation. The greater the number of samples tested, the closer the mean of these values is to the true mean.

As discussed above, test results are typically divided into representative data sets for assessment and may be referred to as ‘averaging areas’ to which statistics can be applied, although several statements need to be satisfied before applying the guidance:

-  Averaging areas have been defined based on the CSM.
-  Sample locations – random/grid sampling adopted as opposed to targeted investigation.
-  Samples are evenly spread and not clustered.

- Analysis do not suggest a hotspot/outlier or cluster established by histogram or other means.
- Samples are of same/similar depth and taken from one population (e.g. just topsoil).
- Analyses do not show a spatial trend or other spatial pattern across that zone.
- The number of samples has been shown to be sufficient for statistical analysis.

Once the above have been satisfied, when undertaking statistical analysis, the question “*are mean soil concentrations within the averaging area equal to, or greater than, the GAC?*” is being asked. Typically, outliers or “hotspots” are treated as separate zones or averaging areas. The sampling strategy and assessment should also take into account uncertainty (for example, spatial heterogeneity) in contaminant concentrations. There is the assumption that sampling was random or stratified and systematic (e.g. on a grid) and not targeted at specific sources; data from such targeted areas should be omitted from the statistical analysis. Data should be from one population (i.e. the same materials).

The statistical test that is carried out is used to demonstrate that there is a certain probability that the true mean falls below the critical concentration (typically the GAC in a screening exercise). The main tool used to draw conclusions based on the 2020 guidance is a comparison of a 2-way confidence interval with the critical concentration. A confidence interval consists of two sets of numbers; an interval i.e. a range of values plus a pre-determined level of confidence e.g. 80%. A common interpretation of a confidence interval of say 80% is that “*there is an 80% chance that the true mean concentration level of the contaminant in a sampling zone lies between X concentration and Y concentration*”.

The current guidance for planning says that the site has to be “safe” which suggests we should use a large confidence interval such as 95% or higher to make a decision. This means that there is a 95% chance of the true mean concentration lying in this interval, there is also a 5% chance it lies outside this interval. One could then conclude that the requirements of planning have been met if the 95% confidence interval lies below the critical concentration.

The guidance recommends that at least two confidence levels are used such as 90% and 99% or 80% and 95%. By using two differing confidence intervals, we can use the smaller confidence interval (e.g. 80% confidence interval) to say “*we think the mean is most likely to be inside this range*” and the larger confidence interval (e.g. 95% confidence interval) to say “*we think the mean is most unlikely to be outside this range*”.

If the confidence interval extends to above the critical concentration, then further action may be required.

Controlled Waters

The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards (Water Quality Targets – WQTs) for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 and The Private Water Supplies (England) Regulations 2016. SI 2016 / 618). In Scotland, the Public Water Supplies (Scotland) Regulations 2014 apply. The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impact of contamination on controlled waters are Environmental Quality Standards (EQS). These cover a large number of compounds. EQS are available for inland surface waters (freshwater) and other surface waters (transitional and marine).

Several EQS are based on bioavailable metal proportions (i.e. copper, lead, manganese, nickel and zinc). A software tool (M-BAT) is available from the Water Framework Directive - UK TAG website for calculating the bioavailable fraction. Where this tool has been used, the bioavailability has been taken into account by calculating site-specific $PNEC_{dissolved}$ (Predicted No Effect Concentration) values. These enable the dissolved concentration data to be compared with the PNEC as if it were an EQS.

UK Drinking Water Standards (DWS) apply to waters abstracted for human consumption. Where no UK or EU drinking water standard exists, reference is made to the World Health Organisation criteria (2011).

The DWS apply to groundwater or to surface water used for abstraction and the EQS apply to surface water where the aquatic ecosystem is the receptor. Where the most appropriate water quality target cannot be determined with certainty, the lowest one is adopted in line with the precautionary principle.

In some instances, the laboratory detection limits (LODs) may be greater than the water quality target it is being screened against, but it should be noted that these comparisons are an initial screening assessment. It may be the case that lower LODs could be obtained using a more specialised technique, but it would be disproportionately expensive to adopt the more costly specialist technique for initial screening exercises.

The preference of BSL is to have testing carried out on actual samples of ground/surface water rather than theoretical values obtained from leachate testing, which is considered to often be highly conservative. Data from water samples obtained or from leachate analysis is then compared against the screening criteria adopted by BSL, which are presented overleaf.

When screening values are exceeded then further consideration is required. This could include further additional detailed investigation and detailed quantitative risk assessment (DQRA) to further define the risk or to design appropriate remedial measures to either remove the source or break the pathway.

Ground Gas Risk Assessment

BS8485:2015+A1:2019, BS 8576:2013, CL:AIRE RB17, and NHBC 'Hazardous Ground Gas - An essential guide for housebuilders' 2023, are the current guidance which gives up-to-date advice on all aspects of permanent ground gas risk. BS8576 alongside CIRIA C682 also provides guidance on assessment of hydrocarbon vapour intrusion.

The CL:AIRE publication 'Good Practice for Coal Mine Gas Emissions' 2021 provides guidance on the assessment of risks from mine gas sources.

The above all outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination. The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework

BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land*.

Generation Potential of Sources

BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	- Natural carbonate soil and strata, e.g. chalk and limestone. - Natural soil strata with a low degradable organic content, e.g. alluvium, peat. - In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. - Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). - Mine workings shallow or shaft (where there is clear evidence that they are flooded). - Inert landfill sites (and pre -1945 landfills).
Low	- Natural soil strata with a high degradable organic content (DOC). - Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). - Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). - Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	- Sewage sludge. - Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). - Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).
High	- Landfill mid 1960s to early 1990s. - Mine workings – unflooded – less than 50 years since last worked.
Very High	- Municipal landfill sites. - Landfill early 1990s onward.

Frequency and Duration of Monitoring

BS8576 notes to determine where and how to monitor ground gases requires consideration of credible pathways of possible exposure of the receptors, taking into account what is known about the geology and hydrogeology, building construction and services layout, foreseeable events such as flooding, changes in groundwater level, climate change, extreme weather conditions, the closure of mines, and possible changes to the gas regime caused by future development.

The monitoring period for a specific site should cover the “worst case” scenario. A “worst case” scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with ground gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 “Ground Gas Monitoring and ‘Worst-Case’ Conditions” provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Notes

- 1 Generation potential of sources based on descriptions within BS 8576:2013.
- 2 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

Gas Risk Assessment

Within BS8485:2015+A1:2019 a semi-quantitative method is set out for the assessment of risk.

This method (Modified Wilson and Card) uses the concept of Gas Screening Values (GSVs) and typical threshold concentrations of carbon dioxide and methane to identify levels of risk. Sites are then classified into a 'Characteristic Situation' or 'CS' from CS1 where no mitigation is required and CS2 increasing up to CS6 where protection measures are required.

The NHBC guide 'Hazardous Ground Gas - An essential guide for housebuilders' 2023 provides further assessment tools for ground gas monitoring data, including the use of ternary plots to determine ground gas sources.

A separate approach to assessment without monitoring data is discussed under the RB17 header further below.

CIRIA C682 and BS 8576:2013 provide guidance on assessment of VOC intrusion risk.

Ground Gas Mitigation

Where a risk is determined to be present by assessment, BS8485:2015+A1:2019 provides guidance for the design of protection systems based on a points scoring system depending on the characteristic situation, structure type, structural barrier types, ventilation and a gas resistant membrane. Source removal can also be considered.

The design requires the structures to be categorised into one of four building types: Type A, Type B, Type C or Type D, related to the construction and end use of the building, together with the control of future structural changes and maintenance.

CIRIA C748 provides advice on the use of membranes as VOC vapour barriers.

CIRIA C735 sets out the approach for verification of installed mitigation measures. Note that if a membrane is installed it must be verified in accordance with CIRIA C735 or it will score zero points and assumed to not afford any protection.

RB17 Approach

CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Radon

Advice on radon protection in England is provided by the UK Health Security Agency, <https://www.ukradon.org/information/ukmaps> and by the BRE (BR 211 (Scivyer 2023)).

Areas of the country can be categorised according to the percentage of existing homes where radon is present above the Action Level:

-  0-1% lower probability.
-  1-3% and 3-10% intermediate probability.
-  >10% higher probability.

Basic radon protection measures are required in new buildings and extensions in areas of England and Wales where 3-10% of properties exceed the Action Level and full radon protection measures where >10% exceed the Action Level.

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Geotechnical Guidance

A preliminary risk assessment of geotechnical hazards is carried out at the desk study stage and confirmed (or amended) at the ground investigation stage.

The CD 622 'Managing Geotechnical Risk' guidance document defines the technical approval and certification procedures to be used to ensure that the risk associated with the geotechnical activities are appropriately managed.

The desk-based stage may also include the requirements for a Coal Mining Risk Assessment (CMRA) which specifically assesses the risks from mining induced instability and related issues in high risk development areas: <https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments>.

In order to establish the requirements of a project, the Geotechnical Category which is based on a consideration of project complexity, proposed geotechnical activities, presence of geo-hazards and severity of geotechnical risks, shall also be considered. These range from Category 1 (small/simple structures) to Category 3 (very large, unusual or complex activities/structures, such as tunnels). It is envisaged most projects typically fall into Category 2, including conventional types of geotechnical structures, earthworks and activities.

In the case of the geotechnical hazard identification at the intrusive investigation stage, this is referred to as the **ground model**.

The geotechnical sections of the report contain the factual information on the geology and relevant site data, including both in situ and laboratory testing, with a geotechnical evaluation of the information stating the assumptions made in the interpretation of the data.

Derived values of geotechnical parameters are obtained from test results by theory (book values), correlation or empiricism in general accordance with BS EN 1997-2:2007 (EC7).

Where derived geotechnical parameters are to be used in designs in accordance with EC7, the selection of characteristic values for geotechnical parameters using the derived values is carried out by well-established experience.

The characteristic value is a cautious estimate of the value affecting the occurrence of the limit state. For any particular material type there may be more than one characteristic value for each parameter because there may be more than one limit state.

The second stage is the selection of design values. The design values are either derived from the characteristic value by applying the relevant partial factors or assessed directly. Similarly, there can be several design values for the same material type.

In the event that geotechnical designs are included in this report, selection of the characteristic and design values is included. Otherwise, it is the duty of the geotechnical designer to determine these within a separate design report (a GDR).

Where it has not been possible to reasonably use an EC7 compliant technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

In addition to the above:

-  Assessments for highways designs are based on CD 622 Managing Geotechnical Risk.
-  The assessment of sustainable drainage is based on BRE365 and CIRIA C753 'The SuDS Manual'.
-  Earthworks Assessments are based on SHW Series 600 and BS6031.
-  Risks from mining (both at the desk based and intrusive stages) are assessed adopting guidance from CIRIA C758.

Re-Use of Waste Soils Guidance

Definition of Waste

The Environment Agency considers waste to be “...any material that is discarded, or intended to be discarded...” this includes any soil from drainage trenches, foundation arisings, site strips etc. It is no longer required in its original location, therefore it is considered to be waste. Without an appropriate materials management plan, permit or exemption in place, by law this material is defined as “illegally deposited waste”.

Landfill tax rules allow HM Revenue & Customs (HMRC) to recover landfill tax on illegally deposited waste on construction sites. This could lead to excessive costs without the correct documentation in place. In addition, a

person who makes, knowingly causes or knowingly facilitates a disposal to be made at an unauthorised site is also liable to pay Landfill Tax.

CL:AIRE: Code of Practice

Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. This can be implemented under the CL:AIRE “Development Industry Code of Practice for the Definition of Waste” (CL:AIRE DoWCoP), also commonly referred to as a “Materials Management Plan”.

<https://www.claire.co.uk/projects-and-initiatives/dow-cop>

Developers and contractors are advised to complete all works under the DoWCoP where applicable.

To implement the DoWCoP (for Route A), there is a requirement to notify the Environment Agency and Local Authority of the intention to use the code of practice in principle, after which there is a 21-day notice period for their response.

In order to re-use soils under the DoWCoP, there are four key criteria that need to be met:

-  The aims and objectives of the project meet the requirements of the Waste Framework Directive (does not harm human health or the environment).
-  The soils can be demonstrated to be suitable for use (backed up by chemical/geotechnical testing and assessment).
-  There is certainty of use (planning consents are in place alongside materials tracking, which should be in place as part of good site practice in any case).
-  Quantity (the quantity of materials used should be known).

Potential scenarios where soils may be able to be re-used:

-  Material capable of being used in another place on the same site without treatment.
-  Material capable of being used in another place on the same site following ex-situ treatment on site.
-  Material capable of being used in another development site without treatment (Direct Transfer).
-  Material capable of being used in another development site following ex-situ treatment on another site e.g. Hub site.

In order to satisfy these requirements, the following are required:

- i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
- ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
- iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
- iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
- v) Volume calculations.
- vi) Planning permission for the development.
- vii) Contractual details to be clear, regarding who steps in if a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (e.g. bioremediation, stabilisation etc) may require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.

Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties are not generally regarded as waste treatment operations and do not require a permit.

Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

Any declared MMP should be amended as new import sources are added.

Regardless of implementing re-use under the code of practice or not, all sites should have some form of materials tracking in place in compliance with current legislation. Any re-use scheme should also be designed to minimise disposal costs. Note that for re-use of landfilled materials or mining wastes, the DoWCoP may not apply and a Waste Recovery Permit (or others) may be required. Liaison with the Environment Agency would be needed on a case by case basis to determine the best option.

Once the project is complete, a verification report detailing soils re-use/import will need to be produced and submitted to CL:AIRE, which may be subject to a random audit process. Sites found to be non-complaint with the CoP can be referred to the EA for further investigation.

Soils Re-use under Exemptions and Permits

Other potential options to allow the re-use and/or import of soils and aggregates on site are provided in the table below. Applies to England/Wales only – Scotland differs.

Re-use Mechanism	Description
U1 Exemption	Can be applied to re-use/import of soils and stones, but only up to 1000 tonnes or for brick and concrete up to 5000 tonnes. This is usually an efficient way to re-use small volumes of waste materials. However, only one U1 can be filled in per site in any 3-year period. Quick and free via online registration.
WRAP Quality Protocols	Describes how processed demolition arisings can be removed from regulatory waste regime. Requires a demonstration of appropriateness by: • Factory Production Control Manual. • Facility Permit (or Exemption). • Grading Analysis.
Waste Framework Directive (WFD) exclusion	In regard to “clean” naturally occurring soils only that are to be re-used on their site of origin, these are covered by a Waste Framework Directive (WFD) exclusion which is an EA regulatory position statement. So long as the project can prove the four criteria listed above for the DoWCoP, then permits or the DoWCoP are not required. However, many projects still use the CoP to ensure compliance.
T5 Screening and blending of waste	The T5 exemption allows you to temporarily treat waste on a small scale to produce aggregate or soil at a particular location, such as a construction or demolition site. The limit is 5,000 tonnes. This applies to: • Screening soil on a demolition site to remove wood and rubble. • Blending soil and compost that has been produced under an exemption on a construction site to produce better soil for landscaping on that site (e.g. peaty deposits). • Crushing waste (except bricks, tiles and concrete) before screening or blending • Grading waste concrete after it has been crushed to produce a certain type of aggregate.
T7 Exemption	The T7 allows treatment of waste bricks, tiles and concrete by crushing, grinding or reducing in size. This needs to be registered with the Local Authority.
Other Permitting Routes	Other options include use under an Environmental Permit (Standard or Bespoke Rules), however these may be a time consuming and costly route, where use of the other above options (if applicable) are likely to be more feasible in construction.

There are also potential non-enforcement positions for re-use e.g. a site has a large volume waste illegally deposited on it (not by landowner). The new owner is keen to re-use waste where possible to reprofile the site (planning condition granted). The DoWCoP could not be used as materials already excavated and deposited as a waste (illegally). The EA may agree that although the DoWCoP not applicable, they would take a non-enforcement position if the works were completed in accordance with the DoWCoP – this would need to be agreed in advance.

Waste Classification and Disposal Guidance for Soils

Introduction

As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. Waste producers have a duty of care to classify the waste they are producing:

-  Before it is collected, disposed of or recovered.
-  To identify the controls that apply to the movement of the waste.
-  To complete waste documents and records.
-  To identify suitably authorised waste management options.
-  To prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal

The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points:

-  Not all waste can be landfilled.
-  Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
-  Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
-  Most wastes must be treated before you can send them to landfill.
-  There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification

Wastes are listed in the European Waste Catalogue and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not i.e. the hazard assessment. The most common EWC waste codes related to soil are:

17 05	Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (e.g. asbestos, oil,) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on specific "hazardous properties" which include hazards such as carcinogenicity, flammability and toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations** and classified as either hazardous or non-hazardous waste. WAC analysis must not be used for waste classification.

Waste Definitions

Inert	- Will not undergo any significant physical, chemical or biological transformations. - Will not dissolve. - Will not burn. - Will not physically or chemically react. - Will not biodegrade. - Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. - Has insignificant total leachability and pollutant content. - Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above). Is not hazardous (see below).
Hazardous	Soil has hazardous properties as defined in WM3 (Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance).
Stable Non-reactive hazardous waste#	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents either: in the waste alone (for example, by biodegradation), under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints) or by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that is stable and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. If the waste has any disposal route other than a landfill site (e.g. recycling facility, incineration etc) then WAC is not relevant. Furthermore, the WAC limits **cannot** be used to make an assessment of whether a waste is hazardous. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.

Classification based on Total Concentrations ¹	Non-Hazardous Waste		Hazardous Waste	
WAC testing	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	> WAC limit values

Landfill requirements	INERT landfill	NON-HAZARDOUS landfill ²	HAZARDOUS landfill	PRE-TREATMENT ³
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- 1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
- 2 Individual sites may have certain limit values pre-determined in their licence.
- 3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
- 4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Greenfield Sites and Inert Waste

The possibility of automatic inert classification naturally occurring “clean” soils should be explored in accordance with the requirements of paragraph 10 (wastes acceptable without testing at landfills for inert waste) of the Landfill (England and Wales) (Amendment) Regulations (2005). This is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source); and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other classes of landfill (e.g. the waste producer can characterise the waste based on visual assessment and written description with supporting evidence such as a desk study, subject to agreement by the landfill operator).

Hydrocarbons in Soils

WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However, hydrocarbons in soils are a mixture rather than a pure product and are therefore not absolute entries.

Known Oils

The simplest scenario is where the identity of the contaminating oil is known or can be identified. If the oil is known the manufacturer’s or supplier’s REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation of the chromatograph to determine if it is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils

Where hydrocarbons are contaminating soils, it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

For contaminated land specific consideration must be given to the following before proceeding:

- The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in WM3 example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
- The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of marker compounds is optional; however, it is recommended that where possible the marker compounds should be used. WM3 states:

If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:

- The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
- This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D of WM3, and
- The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

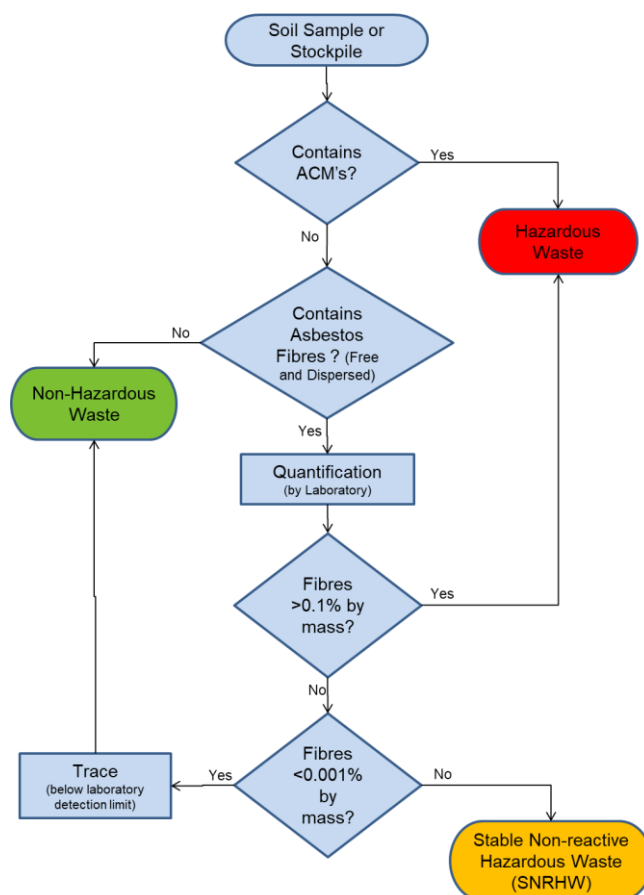
1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the subsequent Council Decisions.
2. Environment Agency Environmental Permitting Regulations: "Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land" 2009.
3. Environment Agency "Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria" Nov 2010.
4. Environment Agency "Guidance on the classification and assessment of waste (Technical Guidance WM3)".
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
7. 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament.
8. Environmental Permitting Guidance The Landfill Directive For the Environmental Permitting (England and Wales) Regulations 2010 Updated March 2010 Version 3.1.
9. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

Waste Containing Asbestos

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's).

Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.



Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it as summarised below:

Waste	Conc. by Weight (%)	EWG 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.

Waste	Conc. by Weight (%)	EWIC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site¹. These levels are often termed “trace” by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)¹. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	Insulation materials and asbestos-containing construction materials
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and “*other suitable materials*” may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction

Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However, where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However, it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four-hour period. The control limit is not a 'safe' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 "the release of dispersed asbestos fibres from soil" 1988 concludes that:

-  Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m³.
-  An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (e.g. by wetting).
-  The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use

The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation.

Asbestos containing materials can remain in situ under a suitable cover system which may be hard surfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Publications from the JIWG provide guides for decision making in relation to construction.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk. There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However, the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required. Re-use of soils containing asbestos should be as per CARSOILS.

The re-use of soils containing asbestos at concentrations above hazardous waste levels may be met with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
Not detected	✓	✓			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractor's method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes.	None.
Trace (<0.001%)		✓ ²			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: - Ensuring soils do not dry out to become dusty. - Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			✓		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling. - Clean haulage routes.	Possibly. Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover with hard dig/demarcation layer or hardstanding cover required.
0.1+%				✓	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: - Site personnel have the risk communicated at induction stage. - Ensuring personnel have suitable training. - Task monitoring to inform PPE requirements. - Site wide and or perimeter monitoring. - Ensuring soils do not dry out to become dusty and that misting is available during groundworks. - Separate stockpiling.	Unlikely ³ Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the risk for generating dusts will be significantly	Clean cover and a hard dig / demarcation layer. A plan should be in place for future excavations as part of the Health and Safety File.

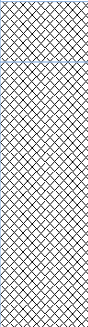
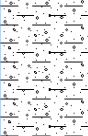
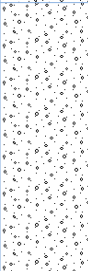
Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recycle	Inert	SNR	Haz		Suitable for re-use on site	Precautions
					- Clean haulage routes. - Decontamination unit	increased with repeated handling and compaction.	

1. The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.
2. The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.

APPENDIX B

Exploratory Hole Logs

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP101S	
PROJECT NO: C5394						CO-ORDS: 378609E, 407703N		Sheet 1 of 1	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 75.71m OD		Hole Type TP	
CLIENT: MORGAN SINDALL						DATES: 09/08/23		Scale 1:25	
								Logged	Checked
								PH	NS
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.00-0.20	ES		0.20	75.51		MADE GROUND TOPSOIL: Grass over dark brown slightly sandy clay with rootlets. Sand is fine to coarse.		
	0.50	B D		0.70	75.01		Orangish brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of quartz, sandstone, flint, mudstone and coal.		
				1.10	74.61		Firm orangish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of coal, sandstone, mudstone and quartz.	1.0	
	1.20	B D		1.50	74.21		Brown sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone, flint and quartz.		
							End of Trial Pit at 1.50m		
								2.0	
								3.0	
								4.0	
								5.0	
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Moderate groundwater seepage encountered at 1.10m bgl. 3. Hand shear vanes unable to be taken in clay due to friable nature. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP102	
PROJECT NO: C5394						CO-ORDS: 378688E, 407714N		Sheet 1 of 1	
								Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.58m OD		Scale 1:25	
								Logged PH	
CLIENT: MORGAN SINDALL						DATES: 09/08/23			
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.10	ES		0.20	74.38		MADE GROUND TOPSOIL: Grass over dark brownish black slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of brick, coal, mudstone, sandstone, glass and metal.		1.0
	0.40	ES					MADE GROUND: Dark brownish black slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of brick, coal, mudstone, sandstone, glass and metal.		
	0.50	B							
	1.20	HSV	51kPa	1.10	73.48		Firm grey mottled orange slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.		
	1.40	B D		1.60	72.98				
	1.70	B D					Grey sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of flint, sandstone, mudstone and quartz.		2.0
	2.40	D		2.50	72.08				
End of Trial Pit at 2.50m									3.0
									4.0
									5.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Large groundwater seepage encountered at 1.70m bgl 3. Terminated at 2.50m bgl due to side collapse on both sides of pit at 1.60m bgl due to large groundwater strike. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	



No.

TP103

Sheet 1 of 1

CO-ORDS: 378725E, 407726N

Hole Type

LEVEL: 74.23m OD

Scale

1:25

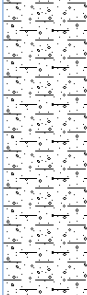
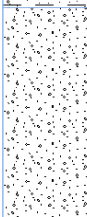
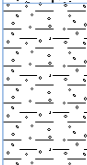
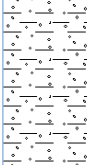
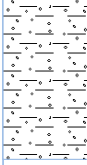
DATES: 09/08/23

Logged

Checked

PH

NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
▼	0.00-0.20	ES	63kPa	0.20	74.03		TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone and mudstone.	1.0	
	0.40	D		63kPa					Firm grey mottled orange slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
	0.50	HSV B							
	1.30	B D	1.20	73.03		Orangish brown gravelly SAND. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone and quartz.	2.0		
	2.00	B D	1.90	72.33		Stiff grey gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone. <i>Becoming slightly sandy from 1.90m bgl.</i>			
	2.50	HSV	120kPa						
3.00	D						3.0		
				3.50	70.73		End of Trial Pit at 3.50m	4.0	
								5.0	

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. Large groundwater seepage encountered at 1.90m bgl.
3. Terminated due to side collapse on north side of pit at 3.50m bgl.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.

TP104

Sheet 1 of 1

CO-ORDS: 378765E, 407734N

LEVEL: 71.68m OD

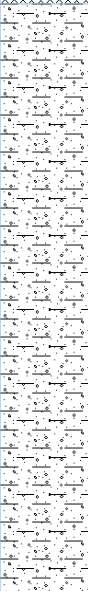
DATES: 10/08/23

Logged

Checked

MB

NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.50-1.00	B ES		0.15	71.53		MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base).	
							Firm brown gravelly sandy CLAY with medium cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Cobbles are sub-angular to sub-rounded of mudstone up to 200mm in diameter.	
				2.10	69.58		End of Trial Pit at 2.10m	
								1.0
								2.0
								3.0
								4.0
								5.0

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. Small groundwater seepage encountered at 0.80m bgl
3. Terminated at 2.10m bgl due to large mudstone cobbles.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.

TP105

Sheet 1 of 1

PROJECT NO: C5394

CO-ORDS: 378728E, 407689N

Hole Type

Hole Type

PROJECT NAME: STAR ACADEMY, RADCLIFFE

LEVEL: 71.47m OD

Scale

1:25

CLIENT: MORGAN SINDALL

DATES: 10/08/23

Logged

Checked

MB

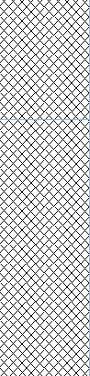
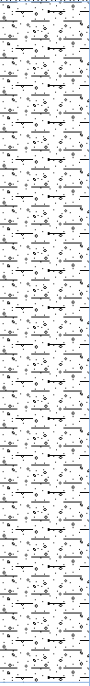
NS

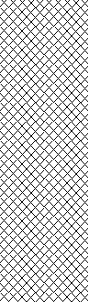
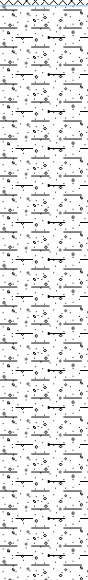
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.50-1.00	B ES		0.20	71.28		MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base). <i>Geotextile membrane at 0.10m bgl.</i>	1.0
							Stiff brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of coal, mudstone and sandstone. Cobbles are sub-angular to sub-rounded of mudstone up to 200mm in diameter.	2.0
				3.10	68.38		End of Trial Pit at 3.10m	3.0
								4.0
								5.0

Remarks

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. No groundwater encountered.
3. Completed at 3.10m bgl.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
PROJECT NO: C5394						CO-ORDS: 378761E, 407676N		TP106
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 71.24m OD		Sheet 1 of 1
CLIENT: MORGAN SINDALL						DATES: 09/08/23		Hole Type
								TP
								Scale
								1:25
						Logged	Checked	
						PH	NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.20	D					MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base).	
	0.40-1.25	ES		0.40	70.84		MADE GROUND: Black gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of coal, slag, metal, brick, glass, mudstone and sandstone. <i>Slight hydrocarbon odour from 0.40m to 1.25m bgl.</i>	1.0
	0.70	B						
				1.25	69.99		Stiff grey mottled orange and red slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse sub-rounded of sandstone and mudstone.	
	1.60	D						
	1.70	HSV	110kPa					2.0
	1.80	B						
	2.50	D HSV	120kPa					3.0
				3.50	67.74		End of Trial Pit at 3.50m	4.0
								5.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Terminated at 3.50m bgl due to very stiff clay. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
PROJECT NO: C5394						CO-ORDS: 378788E, 407650N		TP107
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 70.81m OD		Sheet 1 of 1
CLIENT: MORGAN SINDALL						DATES: 10/08/23		Hole Type
								TP
								Scale
								1:25
						Logged	Checked	
						MB	NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.20			0.20	70.61		MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base). <i>Geotextile membrane at 0.10m bgl.</i>	
	0.50-0.60	B ES					MADE GROUND: Black gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of coal, slag, brick, mudstone and sandstone.	1.0
	1.30			1.30	69.51		Firm dark grey mottled blue slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone. <i>Slight hydrocarbon odour from 1.30m to 3.20m bgl.</i>	2.0
	1.50-1.60	B ES						3.0
	3.20			3.20	67.61		End of Trial Pit at 3.20m	4.0
								5.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Small groundwater seepage encountered at 1.30m bgl. 3. Completed at 3.20m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane



No.

TP108

Sheet 1 of 1

CO-ORDS: 378724E, 407626N

LEVEL: 70.89m OD

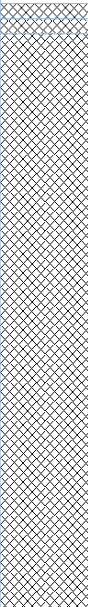
DATES: 09/08/23

Logged

Checked

PH

NS

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
▼	0.10-1.00	ES	63kPa	0.05	70.84		MADE GROUND: Black tarmacadam.	1.0	
	1.00 1.00-2.00	B ES		0.10	70.79		MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base).		
							MADE GROUND: Black gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of coal, slag, metal, brick, glass, mudstone and sandstone. <i>Slight hydrocarbon odour from 0.10m to 2.00m bgl.</i>		
	2.10	B ES HSV		2.00	68.89		Firm grey mottled orange slightly sandy gravelly CLAY.		2.0
				2.20	68.69		Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone. End of Trial Pit at 2.20m		
								3.0	
								4.0	
								5.0	

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. Groundwater encountered at 1.50m bgl.
3. Terminated at 2.20m bgl due to large groundwater strike.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



No.

TP109

Sheet 1 of 1

PROJECT NO: C5394

CO-ORDS: 378685E, 407645N

Hole Type

Hole Type

PROJECT NAME: STAR ACADEMY, RADCLIFFE

LEVEL: 73.60m OD

Scale

1:25

CLIENT: MORGAN SINDALL

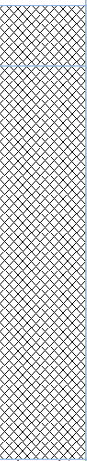
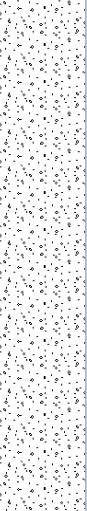
DATES: 10/08/23

Logged

Checked

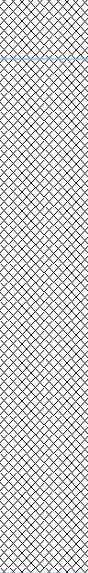
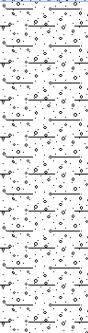
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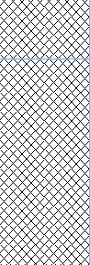
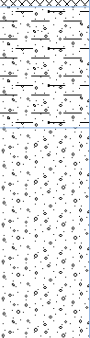
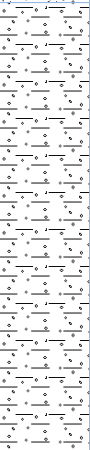
NS

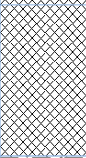
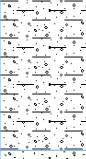
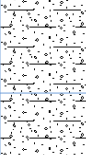
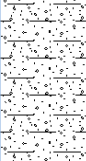
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.30-1.00	B ES		0.20	73.40		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. MADE GROUND: Dark brown slightly gravelly clayey sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, coal, mudstone, sandstone, plastic and timber.	1.0
	1.60-2.00	B ES		1.50	72.10		Orangish brown slightly gravelly SAND with low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Cobbles are subrounded of mudstone up to 200mm in diameter.	2.0
					3.20	70.40		End of Trial Pit at 3.20m
								4.0
								5.0

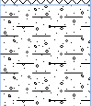
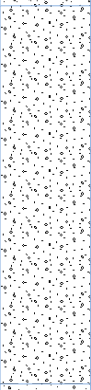
1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. No groundwater encountered.
3. Terminated at 3.20m bgl due to instability of the trial pit walls.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
PROJECT NO: C5394						CO-ORDS: 378664E, 407671N		TP110
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.33m OD		Sheet 1 of 1
CLIENT: MORGAN SINDALL						DATES: 10/08/23		Hole Type
								TP
								Scale
								1:25
						Logged	Checked	
						MB	NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.50-1.00	B ES		0.20	74.13		MADE GROUND TOPSOIL : Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. MADE GROUND: Dark brown slightly gravelly clayey sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, coal, mudstone, sandstone, plastic and timber. <i>Mild organic odour from 0.20m to 1.90m bgl.</i>	1.0
	2.00-2.50	B ES		1.90	72.43		Brown slightly clayey sandy GRAVEL with low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Cobbles are sub-angular to sub-rounded of mudstone. up to 250mm in diameter.	2.0
				3.00	71.33		End of Trial Pit at 3.00m	3.0
								4.0
								5.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Small groundwater seepage encountered at 2.00m bgl. 3. Completed at 3.00m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
								TP111
								Sheet 1 of 1
PROJECT NO: C5394						CO-ORDS: 378622E, 407597N		Hole Type
								TP
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.11m OD		Scale
								1:25
CLIENT: MORGAN SINDALL						DATES: 09/08/23		Logged
								Checked
								PH
								NS
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
	0.10	ES		0.20	73.92		MADE GROUND TOPSOIL: Grass over dark brown slightly sandy clay with rootlets. Sand is fine to coarse.	
	0.40	ES					MADE GROUND: Dark brownish black slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of brick, coal, mudstone, sandstone, glass and metal.	
	0.50	B						
				0.90	73.22		Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	1.0
	1.20	D		1.30	72.82		Grey sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of flint, sandstone, mudstone and quartz.	
	1.40	B D						
				2.00	72.11		Firm bluish brown gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	2.0
	2.20	HSV	69kPa					
	2.50	D						
								
	2.90	HSV	74kPa					3.0
				3.50	70.61		End of Trial Pit at 3.50m	
								4.0
								5.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Completed at 3.50m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.
									WS101
									Sheet 1 of 1
PROJECT NO: C5394							CO-ORDS: 378675E, 407705N		Hole Type
									WS
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 74.67m OD		Scale
									1:30
CLIENT: MORGAN SINDALL							DATES: 08/08/23		Logged
									Checked
									NA
									NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00-0.20	ES					MADE GROUND TOPSOIL: Grass over dark brown slightly sandy clay with rootlets. Sand is fine to coarse.	1.0
		0.20-0.60	ES		0.20	74.47		MADE GROUND: Brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse of sandstone and mudstone.	
					0.60	74.07			
		0.80-1.00	ES					MADE GROUND: Black slightly gravelly slightly sandy clay with rare organic matter content. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of brick, sandstone and mudstone. <i>Mild organic odour from 0.60m to 1.20m bgl.</i>	2.0
		1.20	SPT	N=4 (0,0/1,1,1,1)	1.20	73.47		Soft grey mottled orange slightly gravelly slightly sandy CLAY with rare organic matter content. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone and mudstone.	
		1.30-1.40	D						
		1.90-2.00	D		1.80	72.87		Medium dense grey slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and sandstone.	3.0
		2.00	SPT	N=16 (3,3/3,3,5,5)					
		2.40-2.60	D		2.20	72.47		Medium dense brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded of sandstone and mudstone.	
									4.0
		3.00	SPT	N=19 (3,6/6,5,3,5)	3.20	71.47		Medium dense grey slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and sandstone.	
		3.50-3.60	D						
		4.00	SPT	N=21 (3,4/4,5,5,7)				<i>Becoming dense from 4.00m bgl.</i>	5.0
		4.60-4.70	D		4.50	70.17		Stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone and rare coal.	
		4.80	SPT	N=26 (7,7/6,6,6,8)					
					5.25	69.42	End of Borehole at 5.25m		
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Inspection pit excavated to 1.20m bgl. 3. Groundwater encountered at 3.00m bgl. 4. Installed with 0.60m plain pipe and 0.60m slotted pipe.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.		
									WS102		
									Sheet 1 of 1		
PROJECT NO: C5394							CO-ORDS: 378690E, 407687N		Hole Type		
									WS		
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 74.15m OD		Scale		
									1:30		
CLIENT: MORGAN SINDALL							DATES: 08/08/23		Logged	Checked	
									NA	NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.10-0.20	ES		0.20	73.95		MADE GROUND TOPSOIL: Grass over dark brown slightly sandy clay with rootlets. Sand is fine to coarse.	1.0		
		0.30-0.40	ES		0.50	73.65		MADE GROUND: Brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone and mudstone.			
								MADE GROUND: Greyish brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.			
		1.20	SPT	N=6 (2,1/2,1,1,2)	1.60	72.55		Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	2.0		
		1.90-2.00	D		2.20	71.95		Firm brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of mudstone and sandstone.			
		2.00	SPT	N=18 (4,4/5,5,3,5)	2.50	71.65		Medium dense grey gravelly SAND. Sand is fine to coarse. Gravel is sub-angular to sub-rounded of sandstone and mudstone.			
		2.30-2.40	D						3.0		
		2.60-2.80	D								
		3.00	SPT	N=13 (2,3/2,3,3,5)	4.00	70.15		Stiff greyish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, coal and mudstone.			
		3.80-3.90	D		4.30	69.85		End of Borehole at 4.30m	4.0		
		3.90	SPT	N≥50 (11,11/50 for 250mm)							
										5.0	
										6.0	
		Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Inspection pit excavated to 1.20m bgl. 3. Groundwater encountered at 2.10m bgl. 4. Terminated at 4.30m bgl due to refusal. 5. Installed with 0.50m plain pipe and 1.00m slotted pipe.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD							Borehole Log		Window Sampler No.
PROJECT NO: C5394							CO-ORDS: 378704E, 407661N		WS103
									Sheet 1 of 1
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.77m OD		Hole Type
									WS
CLIENT: MORGAN SINDALL							DATES: 08/08/23		Scale
									1:30
							Logged	Checked	
							PH	NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10-0.20	ES	N=24 (3,5/7,6,6,5)	0.20	73.57		MADE GROUND TOPSOIL: Grass over dark brown slightly sandy clay with rootlets. Sand is fine to coarse.	
		0.50	ES		MADE GROUND: Firm greyish dark brown slightly sandy slightly gravelly clay with low cobble content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, coal, sandstone and mudstone. Cobbles are sub-angular of brick up to 250mm in diameter.				
		1.20	SPT		1.80	71.97		Firm grey mottled orange slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.	
		1.50	ES					Medium dense grey slightly clayey sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone and mudstone.	
		1.90	D	2.00	71.77		Stiff grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of mudstone and sandstone.		
		2.00	SPT				End of Borehole at 4.45m		
		3.00	D SPT	N=26 (3,4/6,6,6,8)	4.00	69.77			
		4.00	SPT	N≥50 (5,8/50 for 275mm)					
		4.20	D						
					4.45	69.32			
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Inspection pit excavated to 1.20m bgl. 3. Groundwater encountered at 2.00m bgl. 4. Terminated at 4.425m bgl due to refusal. 5. Installed with 0.50m plain pipe and 1.00m slotted pipe.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

Borehole Log							Window Sampler No.			
							WS104			
							Sheet 1 of 1			
PROJECT NO: C5394							CO-ORDS: 378699E, 407620N			
PROJECT NAME: STAR ACADEMY, RADCLIFFE							Hole Type WS			
							Scale 1:30			
CLIENT: MORGAN SINDALL							DATES: 08/08/23			
							Logged PH	Checked NS		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.05			0.05	70.87		MADE GROUND: Black tarmacadam.		
		0.20	D					MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base).		
		0.40	ES		0.30	70.62		MADE GROUND: Loose black gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of coal, slag, metal, brick, mudstone and sandstone.		
		1.20	SPT	N=6 (2,1/1,2,1,2)				Firm grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.		
		1.40	ES							
		2.00	SPT	N=10 (3,4/3,2,3,2)	2.00	68.92				
		2.50	D					Firm grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.		
		3.00	SPT	N=18 (3,3/3,4,4,7)						
		3.50	D							
		4.00	SPT	N=25 (3,5/5,5,7,8)				Firm grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.		
		4.50	D							
		5.00	SPT	N=38 (5,6/6,7,9,16)						
		5.45			5.45	65.47	End of Borehole at 5.45m			
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. Inspection pit excavated to 1.20m bgl. 3. No groundwater encountered. 4. Installed with 1.00m plain pipe and 1.00m slotted pipe.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	



Window Sampler No.

Sheet 1 of 1

CO-ORDS: 378707E, 407696N

LEVEL: 74.01m OD

DATES: 08/08/23

Logged

Checked

NA

NS

1.0

2.0

3.0

4.0

5.0

6.0

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. Inspection pit excavated to 1.20m bgl.
3. Groundwater encountered at 1.80m bgl.
4. Backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane



Window Sampler No.

Sheet 1 of 1

CO-ORDS: 378739E, 407567N

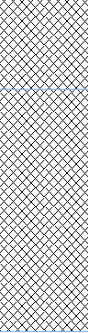
LEVEL: 70.47m OD

DATES: 08/08/23

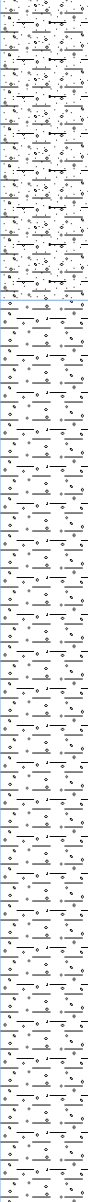
Logged	Checked
PH	

1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny.
2. Inspection pit excavated to 0.40m bgl, unable to be excavated further due to concrete obstruction.
3. No groundwater encountered.
4. Reinstated with cold-lay tarmacadam upon completion.

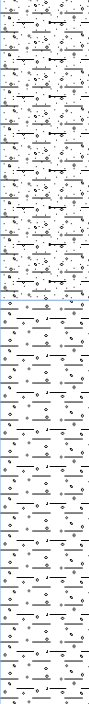
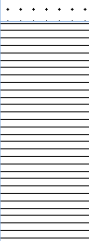
ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. HP101 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378787E, 407459N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 69.83m OD		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 08/08/23		Logged NA	Checked NS
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
	0.00-0.30	ES					MADE GROUND: Grass over black slightly gravelly clayey sand with rootlets. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone and sandstone.	1.0	
	0.30-1.10	ES		0.30	69.53		MADE GROUND: Black slightly clayey gravelly sand with moderate ash content and low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, slag, flint, coal, sandstone and mudstone. Cobbles are sub-angular of flint and sandstone up to 200mm in diameter.		
				1.10	68.73		End of Trial Pit at 1.10m	2.0	
								3.0	
								4.0	
								5.0	
Remarks		1. Clearance of services by BSL engineer using CAT & Genny. 2. No groundwater encountered. 3. Completed at 1.10m bgl. 4. Backfilled with arisings upon completion						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. HP102 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378681E, 407578N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 70.30m OD		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 11/08/23		Logged MB	Checked NS
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
							MADE GROUND: Black tarmacadam. MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (sub-base).		
	0.60 0.70-1.20	ES ES		0.60	69.70		MADE GROUND: Dark brown slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, coal, slag and mudstone.		
				1.20	69.10		End of Trial Pit at 1.20m		
Remarks 1. Clearance of services by BSL engineer using CAT & Genny. 2. Small groundwater seepage encountered at 1.10m bgl. 3. Completed at 1.20m bgl. 4. Reinstated with cold-lay tarmacadam upon completion. ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane									

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.						
									RO101						
									Sheet 1 of 2						
PROJECT NO: C5394							CO-ORDS: 378669E, 407721N		Hole Type						
									RO						
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 75.02m OD		Scale						
									1:125						
CLIENT: MORGAN SINDALL							DATES: 08/08/23		Logged	Checked					
									PH	NS					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description							
		Depth (m)	Type	Results											
					0.50	74.52		TOPSOIL (DRILLERS DESCRIPTION).		1.0					
								Sandy gravelly CLAY (DRILLERS DESCRIPTION).			2.0				
					5.50	69.52		Gravelly CLAY (DRILLERS DESCRIPTION).		3.0					
										4.0					
										5.0					
										6.0					
										7.0					
										8.0					
										9.0					
										10.0					
										11.0					
										12.0					
										13.0					
										14.0					
										15.0					
										16.0					
										17.0					
										18.0					
										19.0					
										20.0					
										20.50	54.52		MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).		21.0
															22.0
					23.0										
					24.0										
					25.0										
					Remarks										
1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane								

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.			
									RO101			
									Sheet 2 of 2			
PROJECT NO: C5394							CO-ORDS: 378669E, 407721N		Hole Type			
									RO			
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 75.02m OD		Scale			
									1:125			
CLIENT: MORGAN SINDALL							DATES: 08/08/23		Logged	Checked		
									PH	NS		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description				
		Depth (m)	Type	Results								
									26.0			
									27.0			
									28.0			
									29.0			
									30.0			
									31.0			
									32.0			
									33.0			
									34.0			
									35.0			
									36.0			
									37.0			
									38.0			
									39.0			
									40.0			
									40.50	34.52	COAL (DRILLERS DESCRIPTION). MUDSTONE (DRILLERS DESCRIPTION).	41.0
									40.70	34.32		
									42.0			
									42.50	32.52	SILTSTONE (DRILLERS DESCRIPTION).	43.0
									45.00	30.02	End of Borehole at 45.00m	45.0
												46.0
												47.0
												48.0
												49.0
						50.0						
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane			

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.					
									RO102					
									Sheet 1 of 2					
PROJECT NO: C5394							CO-ORDS: 378667E, 407687N		Hole Type					
									RO					
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 74.66m OD		Scale					
									1:125					
CLIENT: MORGAN SINDALL							DATES: 09/08/23		Logged	Checked				
									PH	NS				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description						
		Depth (m)	Type	Results										
					0.50	74.16		TOPSOIL (DRILLERS DESCRIPTION).	1.0					
					Sandy gravelly CLAY (DRILLERS DESCRIPTION).	2.0								
						Brown gravelly CLAY (DRILLERS DESCRIPTION).	3.0							
							4.0							
							5.0							
							5.50	69.16	6.0					
							7.0							
							8.0							
							9.0							
							10.0							
							11.0							
							12.0							
							12.50	62.16		SANDSTONE (DRILLERS DESCRIPTION).	13.0			
					14.00	60.66		Grey MUDSTONE ((DRILLERS DESCRIPTION).	14.0					
					15.0									
					16.0									
					17.0									
					17.80	56.86		COAL (DRILLERS DESCRIPTION)	18.0					
					18.00	56.66			Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	19.0				
						Orangish brown SILTSTONE (DRILLERS DESCRIPTION).	20.0							
							21.0							
							22.0							
							22.50	52.16	23.0					
							24.0							
						24.50	50.16	Grey SILTSTONE DRILLERS DESCRIPTION).	25.0					
						Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane



Rotary Open Hole Borehole No.

RO102

Sheet 2 of 2

PROJECT NO: C5394

CO-ORDS: 378667E, 407687N

Hole Type

Hole Type

PROJECT NAME: STAR ACADEMY, RADCLIFFE

LEVEL: 74.66m OD

Scale

1:125

CLIENT: MORGAN SINDALL

DATES: 09/08/23

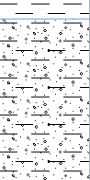
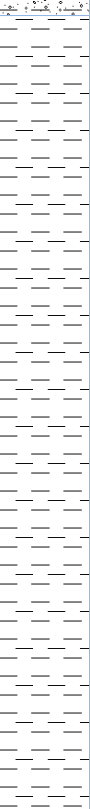
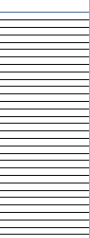
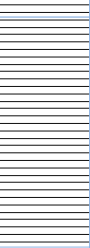
Logged

Checked

PH

NS

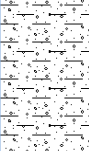
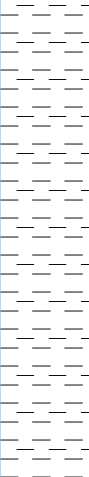
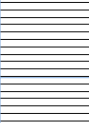
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description						
		Depth (m)	Type	Results										
					30.00	44.66	XXXXXXXXXX	Grey MUDSTONE (DRILLERS DESCRIPTION).	26.0					
							XXXXXXXXXX		27.0					
							XXXXXXXXXX		28.0					
							XXXXXXXXXX		29.0					
							XXXXXXXXXX		30.0					
							XXXXXXXXXX		31.0					
							XXXXXXXXXX		32.0					
							XXXXXXXXXX		33.0					
							XXXXXXXXXX		34.0					
							XXXXXXXXXX		35.0					
							XXXXXXXXXX		36.0					
							XXXXXXXXXX		37.0					
							XXXXXXXXXX		38.0					
							XXXXXXXXXX		39.0					
							XXXXXXXXXX		40.0					
							40.50		34.16	XXXXXXXXXX	Grey SILTSTONE (DRILLERS DESCRIPTION)	41.0		
										XXXXXXXXXX		42.0		
										XXXXXXXXXX		43.0		
										XXXXXXXXXX		44.0		
										XXXXXXXXXX		45.0		
					XXXXXXXXXX	46.0								
					XXXXXXXXXX	47.0								
					XXXXXXXXXX	48.0								
					XXXXXXXXXX	49.0								
					XXXXXXXXXX	50.0								
					45.00	29.66	XXXXXXXXXX	End of Borehole at 45.00m	45.0					
									46.0					
									47.0					
									48.0					
									49.0					
					Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

BROWNFIELD SOLUTIONS LTD							Rotary Open Hole Borehole No.		
							Borehole Log		
							RO103		
							Sheet 1 of 2		
PROJECT NO: C5394							CO-ORDS: 378687E, 407701N		
PROJECT NAME: STAR ACADEMY, RADCLIFFE							Hole Type		
							RO		
							Scale		
							1:125		
CLIENT: MORGAN SINDALL							DATES: 10/08/23		
							Logged	Checked	
							MB	NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	74.12		TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. CLAY (DRILLERS DESCRIPTION). Sandy gravelly CLAY (DRILLERS DESCRIPTION).	1.0
					1.00	73.32			2.0
									3.0
					3.90	70.42		CLAY (DRILLERS DESCRIPTION).	4.0
									5.0
									6.0
									7.0
									8.0
									9.0
									10.0
									11.0
									12.0
									13.0
									14.0
									15.0
									16.0
					17.20	57.12		Grey MUDSTONE (DRILLERS DESCRIPTION).	17.0
									18.0
									19.0
									20.0
					21.20	53.12		Brown MUDSTONE (DRILLERS DESCRIPTION).	21.0
									22.0
									23.0
									24.0
									25.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Borehole installed with 18m plain and 2m slotted pipe.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.	
									RO103	
									Sheet 2 of 2	
PROJECT NO: C5394							CO-ORDS: 378687E, 407701N		Hole Type	
									RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 74.32m OD		Scale	
									1:125	
CLIENT: MORGAN SINDALL							DATES: 10/08/23		Logged	Checked
									MB	NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					26.50	47.82		Grey MUDSTONE (DRILLERS DESCRIPTION).	26.0	
									27.0	
									28.0	
									29.0	
									30.0	
									31.0	
									32.0	
									33.0	
									34.0	
									35.0	
									36.0	
									37.0	
									38.0	
									39.0	
									40.0	
									41.0	
									42.0	
									43.0	
									44.0	
									45.0	
									46.0	
									47.0	
									48.0	
									49.0	
									50.0	

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.	
									RO104	
									Sheet 1 of 2	
PROJECT NO: C5394							CO-ORDS: 378702E, 407678N		Hole Type	
									RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.91m OD		Scale	
									1:125	
CLIENT: MORGAN SINDALL							DATES: 14/08/23		Logged	Checked
									MB	NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.20	73.71		MADE GROUND TOPSOIL : Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.	1.0	
					1.20	72.71		MADE GROUND: Brown slightly gravelly clayey sand with low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick and mudstone. Cobbles are sub-angular of brick up to 200mm in diameter.	2.0	
					3.80	70.11		Sandy gravelly CLAY (DRILLERS DESCRIPTION).	3.0	
								CLAY (DRILLERS DESCRIPTION).	4.0	
									5.0	
									6.0	
									7.0	
									8.0	
									9.0	
									10.0	
					16.70	57.21		Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	17.0	
									18.0	
									19.0	
									20.0	
									21.0	
									22.0	
									23.0	
									24.0	
									25.0	
										
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Borehole installed with 17.50m plain and 2.50m slotted pipe.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

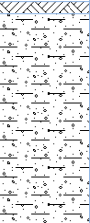
BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.	
									RO104	
									Sheet 2 of 2	
PROJECT NO: C5394							CO-ORDS: 378702E, 407678N		Hole Type	
									RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.91m OD		Scale	
									1:125	
CLIENT: MORGAN SINDALL							DATES: 14/08/23		Logged	Checked
									MB	NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					25.50	48.41		Brown MUDSTONE (DRILLERS DESCRIPTION).	26.0	
					27.0					
					28.0					
					29.0					
					30.0					
					31.0					
					32.0					
					33.0					
					34.0					
					35.0					
					36.00	37.91		Grey MUDSTONE (DRILLERS DESCRIPTION).	36.0	
					37.0					
					37.50	36.41		COAL (DRILLERS DESCRIPTION).	38.0	
					37.80	36.11				
								Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	39.0	
									40.0	
									41.0	
									42.0	
									43.0	
									44.0	
									45.0	
									46.0	
									47.0	
									48.0	
									49.0	
									50.0	
					45.00	28.91		End of Borehole at 45.00m	45.0	
					46.0					
					47.0					
					48.0					
					49.0					
					50.0					
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Borehole installed with 17.50m plain and 2.50m slotted pipe.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.	
									RO105	
									Sheet 1 of 2	
PROJECT NO: C5394							CO-ORDS: 378692E, 407652N		Hole Type	
									RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.52m OD		Scale	
									1:125	
CLIENT: MORGAN SINDALL							DATES: 15/08/23		Logged	Checked
									MB	NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.20	73.32		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.	1.0	
					1.20	72.32		MADE GROUND: Brown slightly gravelly clayey sans with low cobble content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick and mudstone. Cobbles are sub-angular of brick up to 200mm in diameter. Sandy gravelly CLAY (DRILLERS DESCRIPTION).	2.0	
					3.80	69.72		CLAY (DRILLERS DESCRIPTION).	3.0	
									4.0	
									5.0	
									6.0	
									7.0	
									8.0	
									9.0	
									10.0	
								11.0		
					11.80	61.72		Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	12.0	
									13.0	
									14.0	
									15.0	
									16.0	
									17.0	
									18.0	
									19.0	
								20.0		
								21.0		
					21.80	51.72		COAL (DRILLERS DESCRIPTION).	22.0	
					22.10	51.42		Grey MUDSTONE (DRILLERS DESCRIPTION).	23.0	
									24.0	
									25.0	
			24.20	49.32	Brown MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).					
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with water flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

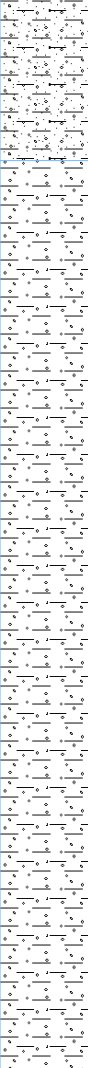
BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.
PROJECT NO: C5394							CO-ORDS: 378692E, 407652N		RO105
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.52m OD		Sheet 2 of 2
CLIENT: MORGAN SINDALL							DATES: 15/08/23		Hole Type
									RO
									Scale
									1:125
							Logged	Checked	
							MB	NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
Depth (m)	Type	Results							
									26.0
									27.0
									28.0
									29.0
									30.0
									31.0
									32.0
									33.0
									34.0
									35.0
					35.80	37.72			36.0
					36.10	37.42		COAL (DRILLERS DESCRIPTION).	36.0
								Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	37.0
									38.0
									39.0
									40.0
									41.0
									42.0
									43.0
									44.0
					45.00	28.52		End of Borehole at 45.00m	45.0
									46.0
									47.0
									48.0
									49.0
									50.0
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with water flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No. RO106 Sheet 1 of 2	
PROJECT NO: C5394							CO-ORDS: 378712E, 407639N		Hole Type RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 71.06m OD		Scale 1:125	
CLIENT: MORGAN SINDALL							DATES: 11/08/23		Logged MB Checked NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results	0.20	70.86		MADE GROUND: Black tarmacadam.	1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0 21.0 22.0 23.0 24.0 25.0	
					0.90	70.16		MADE GROUND: Brown sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick and sandstone.		
					2.50	68.56		Sandy gravelly CLAY (DRILLERS DESCRIPTION).		
										CLAY (DRILLERS DESCRIPTION).
					11.20	59.86		Grey MUDSTOE AND SILTSTONE (DRILLERS DESCRIPTION).		
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with water flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.					
									RO106					
									Sheet 2 of 2					
PROJECT NO: C5394							CO-ORDS: 378712E, 407639N		Hole Type					
									RO					
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 71.06m OD		Scale					
									1:125					
CLIENT: MORGAN SINDALL							DATES: 11/08/23		Logged	Checked				
									MB	NS				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description						
		Depth (m)	Type	Results										
					25.50	45.56		COAL (DRILLERS DESCRIPTION). Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	26.0					
					25.80	45.26								
														27.0
														28.0
														29.0
					29.50	41.56		Reddish brown MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	30.0					
									31.0					
									32.0					
									33.0					
									34.0					
									35.0					
									36.0					
									37.0					
									38.0					
									39.0					
					39.50	31.56		COAL (DRILLERS DESCRIPTION). Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	40.0					
					39.80	31.26								
									41.0					
									42.0					
									43.0					
									44.0					
					45.00	26.06		End of Borehole at 45.00m	45.0					
									46.0					
									47.0					
									48.0					
									49.0					
									50.0					
Remarks		1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with water flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.							ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane					

BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.		
									RO107		
									Sheet 1 of 2		
PROJECT NO: C5394							CO-ORDS: 378708E, 407667N		Hole Type		
									RO		
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.72m OD		Scale		
									1:125		
CLIENT: MORGAN SINDALL							DATES: 10/08/23		Logged	Checked	
									MB	NS	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					0.20	73.52		TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Sandy gravelly CLAY (DRILLERS DESCRIPTION).	1.0		
										2.0	
										3.0	
					3.80	69.92			CLAY (DRILLERS DESCRIPTION)	4.0	
										5.0	
										6.0	
										7.0	
										8.0	
										9.0	
										10.0	
										11.0	
										12.0	
										13.0	
										14.0	
										15.0	
										16.0	
					16.30	57.42				Grey MUDSTONE (DRILLERS DESCRIPTION).	17.0
											18.0
											19.0
											20.0
											21.0
											22.0
											23.0
									24.0		
									25.0		

BROWNFIELD SOLUTIONS LTD							Borehole Log			Rotary Open Hole Borehole No.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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										Sheet 2 of 2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
PROJECT NO: C5394							CO-ORDS: 378708E, 407667N			Hole Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 73.72m OD			Scale																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
										1:125																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
CLIENT: MORGAN SINDALL							DATES: 10/08/23			Logged	Checked																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		Depth (m)	Type	Results																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
					25.70	48.02		COAL (DRILLERS DESCRIPTION). Grey MUDSTONE (DRILLERS DESCRIPTION).	26.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
					25.90	47.82			27.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
					28.30	45.42		Reddish brown MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	28.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									29.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									30.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									31.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									32.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									33.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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					39.00	34.72		Grey mudstone and siltstone (DRILLERS DESCRIPTION)	40.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
					40.50	33.22				COAL (DRILLERS DESCRIPTION). Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	41.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
					40.80	32.92	42.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

 BROWNFIELD SOLUTIONS LTD							Borehole Log		Rotary Open Hole Borehole No.	
									RO108	
									Sheet 1 of 2	
PROJECT NO: C5394							CO-ORDS: 378709E, 407707N		Hole Type	
									RO	
PROJECT NAME: STAR ACADEMY, RADCLIFFE							LEVEL: 74.16m OD		Scale	
									1:125	
CLIENT: MORGAN SINDALL							DATES: 09/08/23		Logged	Checked
									PH	NS
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					1.20	72.96		CLAY (DRILLERS DESCRIPTION).	1.0	
								Brown sandy gravelly CLAY (DRILLERS DESCRIPTION).	2.0	
					4.00	70.16		Brown gravelly CLAY (DRILLERS DESCRIPTION).	3.0	
									4.0	
									5.0	
									6.0	
									7.0	
									8.0	
									9.0	
									10.0	
									11.0	
									12.0	
									13.0	
									14.0	
									15.0	
									16.0	
									17.0	
					19.20	54.96		Grey MUDSTONE AND SILTSTONE (DRILLERS DESCRIPTION).	18.0	
									19.0	
					20.50	53.66		Grey MUDSTONE (DRILLERS DESCRIPTION).	20.0	
									21.0	
									22.0	
									23.0	
									24.0	
									25.0	

Remarks	1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.	ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane
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Rotary Open Hole Borehole No.

RO108

Sheet 2 of 2

PROJECT NO: C5394

CO-ORDS: 378709E, 407707N

Hole Type

Hole Type

PROJECT NAME: STAR ACADEMY, RADCLIFFE

LEVEL: 74.16m OD

Scale

1:125

CLIENT: MORGAN SINDALL

DATES: 09/08/23

Logged

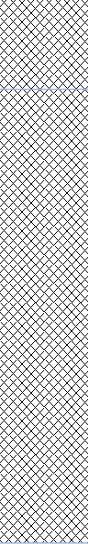
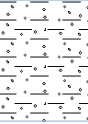
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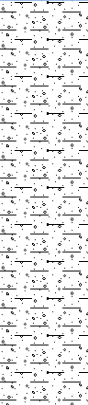
PH

NS

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description									
		Depth (m)	Type	Results													
					25.50 25.70	48.66 48.46		COAL (DRILLERS DESCRIPTION)	26.0								
								Grey MUDSTONE (DRILLERS DESCRIPTION).	27.0								
					27.50 27.70	46.66 46.46		COAL (DRILLERS DESCRIPTION)	28.0								
								Grey MUDSTONE (DRILLERS DESCRIPTION).	29.0								
					29.50	44.66	X X	Grey SILTSTONE (DRILLERS DESCRIPTION).	30.0								
									31.0								
									32.0								
									33.0								
									34.0								
									35.0								
									35.50	38.66		Grey MUDSTONE (DRILLERS DESCRIPTION).	36.0				
													37.0				
													38.0				
													39.0				
													40.0				
													41.0				
													41.30	32.86	X X	Orangish brown SILTSTONE (DRILLERS DESCRIPTION).	42.0
																	43.0
																	44.0
																	45.00
					46.0												
					47.0												
					48.0												
					49.0												
					50.0												
					Remarks												
					1. Utility clearance undertaken utilising EM and GPR techniques by GeoUK engineers. Hole also scanned out with CAT & Genny. 2. No groundwater encountered. 3. Open hole drilling with air flush. 4. Borehole completed at 45.00m bgl. 5. No recorded loss of flush. 6. Backfilled with arisings upon completion.												
					ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane												

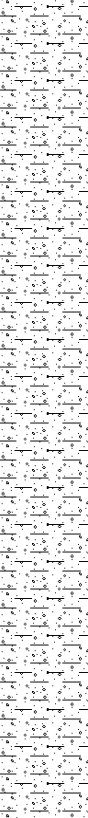
 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. SA101 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378665E, 407649N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL:		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged PH	Checked NS
Water Strikes	Sample and In Situ Testing			Depth (m) 0.30 1.10 2.10	Level (m OD)	Legend	Stratum Description		1.0 2.0 3.0 4.0 5.0
	Depth (m)	Type	Results			TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.			
						Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.			
						Grey sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of flint, sandstone, mudstone and quartz.			
End of Trial Pit at 2.10m									
Remarks		1. Hole also scanned out with CAT & Genny by a BSL engineer. 2. No groundwater encountered. 3. Completed at 2.10m bgl. 4. Soakaway testing undertaken within trial pit. 5. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

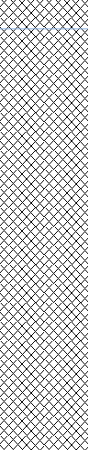
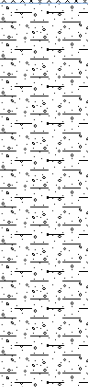
 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. SA102 Sheet 1 of 1 Hole Type TP Scale 1:25 Logged PH Checked NS	
PROJECT NO: C5394						CO-ORDS: 378642E, 407720N			
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL:			
CLIENT: MORGAN SINDALL						DATES: 08/11/23			
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
				0.30			MADE GROUND TOPSOIL: Grass over dark brownish black slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of brick, coal, mudstone, sandstone, glass and metal. MADE GROUND: Dark brownish black slightly clayey gravelly sand. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of brick, coal, mudstone, sandstone, glass and metal.		1.0
				1.80			Stiff grey gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.		2.0
				2.20			End of Trial Pit at 2.20m		3.0
									4.0
									5.0
Remarks		1. Hole also scanned out with CAT & Genny by a BSL engineer. 2. No groundwater encountered. 3. Completed at 2.20m bgl. 4. Soakaway testing undertaken within trial pit. 5. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD					Trial Pit Log		No. SA103 Sheet 1 of 1	
PROJECT NO: C5394					CO-ORDS: 378649E, 407714N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE					LEVEL:		Scale 1:25	
CLIENT: MORGAN SINDALL					DATES: 08/11/23		Logged PH Checked NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
				0.30			TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.	
				1.65			Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	
							End of Trial Pit at 1.65m	
Remarks 1. Hole also scanned out with CAT & Genny by a BSL engineer. 2. No groundwater encountered. 3. Completed at 1.65m bgl. 4. Soakaway testing undertaken within trial pit. 5. Backfilled with arisings upon completion. ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane								

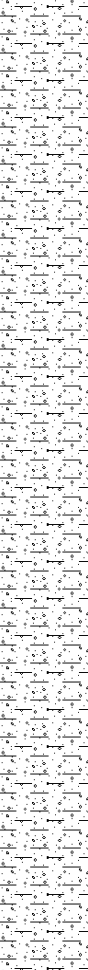
BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
								TP201
								Sheet 1 of 1
PROJECT NO: C5394						CO-ORDS: 378670E, 407716N		Hole Type
								TP
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.85m OD		Scale
								1:25
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged
								Checked
								PH
								NS
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
▼				0.10	74.75		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, brick, sandstone with rare glass and metal. MADE GROUND: Orangish brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone and mudstone. Firm orangish brown slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	1.0
				0.20	74.65			
				2.10	72.75		Brown sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone, flint and quartz.	2.0
				3.00	71.85		End of Trial Pit at 3.00m	3.0
								4.0
								5.0
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer. 2. No groundwater encountered during initial excavation. After collapse groundwater was recorded at 1.40m bgl. 3. Completed at 3.00m bgl. 4. Side collapse from 0.20m to 3.00m bgl. 5. Backfilled with arisings upon completion.					ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

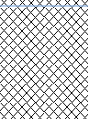
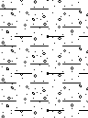
 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP201A Sheet 1 of 1 Hole Type TP Scale 1:25 Logged PH Checked NS	
PROJECT NO: C5394						CO-ORDS: 378669E, 407714N			
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.85m OD			
CLIENT: MORGAN SINDALL						DATES: 08/11/23			
Water Strikes 	Sample and In Situ Testing			Depth (m) 0.10 1.40 1.70	Level (m OD) 74.75 73.45 73.15	Legend  TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Firm orangish brown sandy CLAY. Sand is fine to coarse.  Brown sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone, flint and quartz. End of Trial Pit at 1.70m	Stratum Description		
	Depth (m)	Type	Results						
Remarks 1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Groundwater encountered at 1.60m bgl during initial excavation. After 25 minutes 350mm of groundwater in pit. 3. Completed at 1.70m bgl. 4. Backfilled with arisings upon completion.								ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

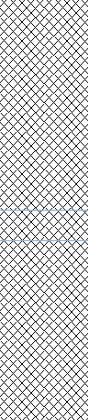
 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP202 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378714E, 407711N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.14m OD		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged PH Checked NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
▼				0.10	74.04	 	TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone. Stiff orange mottled grey slightly gravelly slightly sandy CLAY. Sand is fine to coarse. Gravel is angular to sub-rounded of sandstone and mudstone.		
							Becoming stiff from 1.50m bgl.		1.0
				3.00	71.14		End of Trial Pit at 3.00m		3.0
									4.0
									5.0
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Water ingress observed from the surface. No groundwater encountered during initial excavation. After 3.5 hours groundwater recorded at 2.80m bgl. 3. Completed at 3.00m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

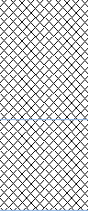
BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
PROJECT NO: C5394						CO-ORDS: 378663E, 407692N		TP203
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.67m OD		Sheet 1 of 1
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Hole Type
								TP
								Scale
								1:25
						Logged	Checked	
						PH	NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
				0.10	74.57		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, brick, sandstone with rare glass and metal. MADE GROUND: Black/brown slightly sandy gravelly clay with low ash content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, mudstone, sandstone, slag, ceramic and metal. <i>Slight organic odour from 0.10m to 1.5m bgl.</i>	1.0
				1.50	73.17		Firm grey mottled orange slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.	2.0
				2.80	71.87		Brown sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone, flint and quartz.	3.0
				3.00	71.67		End of Trial Pit at 3.00m	4.0
								5.0
Remarks						1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Major side collapse from 0.20m to 3.00m bgl. 3. Groundwater encountered initially at 3.00m bgl. After 2.5 hours groundwater encountered at 1.50m bgl. 4. Completed at 3.00m bgl. 5. Backfilled with arisings upon completion.		
						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP203A Sheet 1 of 1 Hole Type TP Scale 1:25 Logged Checked PH NS	
PROJECT NO: C5394						CO-ORDS: 378667E, 407696N			
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 74.67m OD			
CLIENT: MORGAN SINDALL						DATES: 08/11/23			
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
				0.10	74.57		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, brick, sandstone with rare glass and metal. MADE GROUND: Black slightly clayey gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, slag, flint, coal, sandstone and mudstone.	1.0	
				1.50	73.17		Firm grey sandy CLAY. Sand is fine to coarse.		
				1.90	72.77		End of Trial Pit at 1.90m	2.0	
								3.0	
								4.0	
								5.0	
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Groundwater encountered at 1.50m bgl during initial excavation. After 25 minutes 200mm of groundwater in pit. 3. Completed at 1.90m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TP204 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378702E, 407687N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 73.82m OD		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged PH Checked NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
				0.10	73.72		TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone.		
				0.20	73.62		Brown sandy CLAY. Sand is fine to coarse.		
							Firm grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.		
									
									
									
									
									
									

BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No.
PROJECT NO: C5394						CO-ORDS: 378699E, 407655N		TP205
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 73.63m OD		Sheet 1 of 1
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Hole Type
								TP
								Scale
								1:25
						Logged	Checked	
						PH	NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
				0.10	73.53		MADE GROUND TOPSOIL: Grass over dark brown slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, brick, sandstone with rare glass and metal. MADE GROUND: Orangish brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of brick, sandstone and mudstone.	
				1.00	72.63		MADE GROUND: Black/brown slightly sandy gravelly clay with low ash content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, mudstone, sandstone, slag, timber, ceramic and metal.	1.0
				2.00	71.63		Firm grey slightly gravelly CLAY. Gravel is sub-rounded fine to coarse of sandstone and mudstone.	2.0
				2.50	71.13		Brown sandy GRAVEL. Sand is fine to coarse. Gravel is sub-rounded fine to coarse of sandstone, mudstone, flint and quartz.	
				2.80	70.83		End of Trial Pit at 2.80m	3.0
								4.0
								5.0
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Groundwater encountered at 2.70m bgl during initial excavation. After 1.5 hours groundwater recorded at 1.90m bgl. 3. Completed at 2.80m bgl. 4. Backfilled with arisings upon completion.					ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TT01 Sheet 1 of 1	
PROJECT NO: C5394						CO-ORDS: 378788E, 407734N		Hole Type TP	
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 72.10m OD		Scale 1:25	
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged PH Checked NS	
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description		
	Depth (m)	Type	Results						
				0.70	71.40		MADE GROUND: Vegetation over slightly gravelly slightly sandy clay. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, ceramic, concrete, sandstone and mudstone.		
				0.80	71.30		MADE GROUND: Grey/yellow sandy gravel. Sand is fine to coarse. Gravel is sub-rounded to sub-angular fine to coarse of granite, limestone and sandstone (MOT/Sub-base).		1.0
							MADE GROUND: Black gravelly sand with moderate ash content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, concrete , timber, ceramic, glass and metal.		
				1.40	70.70		Stiff gravelly CLAY. Gravel is sub-rounded fine to coarse of mudstone and sandstone.		
				1.50	70.60		End of Trial Pit at 1.50m		
									2.0
									3.0
									4.0
									5.0
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer. 2. Moderate groundwater seepage encountered at 1.50m bgl within western section of the trench. 3. Completed at 1.5m bgl. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane	

 BROWNFIELD SOLUTIONS LTD						Trial Pit Log		No. TT02 Sheet 1 of 1		
PROJECT NO: C5394						CO-ORDS: 378770E, 407652N		Hole Type TP		
PROJECT NAME: STAR ACADEMY, RADCLIFFE						LEVEL: 70.86m OD		Scale 1:25		
CLIENT: MORGAN SINDALL						DATES: 08/11/23		Logged PH Checked NS		
Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description			
	Depth (m)	Type	Results							
				0.40	70.46		MADE GROUND: Grey slightly sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone (MOT/sub-base).		1.0	
				0.70	70.16		MADE GROUND: Black gravelly sand with high ash content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, concrete , timber, ceramic, glass and metal.			
								End of Trial Pit at 0.70m		
										2.0
										3.0
										4.0
										5.0
Remarks		1. Hole scanned out with CAT & Genny by a BSL engineer but large sections of the proposed trench unable to be carried out due to services picked up. 2. No groundwater encountered. 3. Terminated at 0.70m bgl due to historic manhole encountered. Manhole of brick construction approximately 0.90m deep with 400mm of water. 4. Backfilled with arisings upon completion.						ES = Environmental Sample D = Disturbed Sample B = Bulk Sample LB = Large Bulk Sample U = Undisturbed Sample UT = Undisturbed Thin Wall Sample SPT = Standard Penetration Test PID = Photoionization Detector (ppm) PPM = Part Per Million HSV = Hand Shear Vane		

APPENDIX C

Chemical Testing Results

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Analytical Report Number : 23-52916

Project / Site name:	Star Academy	Samples received on:	24/08/2023
Your job number:	C5394	Samples instructed on/ Analysis started on:	24/08/2023
Your order number:	MB C5394 4490	Analysis completed by:	31/08/2023
Report Issue Number:	1	Report issued on:	01/09/2023
Samples Analysed:	8 soil samples		


Signed:

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-52916
Project / Site name: Star Academy
Your Order No: MB C5394 4490

Lab Sample Number				2791526	2791527	2791528	2791529	2791530
Sample Reference				WS101	WS103	WS106	TP101	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.60	1.50	0.15-1.20	0.00-0.20	0.00-0.20
Date Sampled				08/08/2023	10/08/2023	10/08/2023	10/08/2023	08/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	0.01	NONE	11	14
Total mass of sample received				kg	0.001	NONE	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	PDO	PDO	PDO

General Inorganics

pH - Manual	pH Units	N/A	MCERTS	7	-	9.8	-	-
pH - Automated	pH Units	N/A	MCERTS	7	7.2	12	5.4	6.1
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	35	190	20	10	44
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0177	0.0969	0.0099	0.0051	0.0221
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	17.7	96.9	9.9	5.1	22.1
Organic Matter (automated)	%	0.1	MCERTS	2	2.3	1.4	5.9	4.8

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.13	0.7	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.59	< 0.05	0.07
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.09	0.42	< 0.05	0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.25	0.68	3.7	0.37	0.5
Anthracene	mg/kg	0.05	MCERTS	0.05	0.14	1	0.09	0.1
Fluoranthene	mg/kg	0.05	MCERTS	0.39	0.99	5.4	0.69	0.97
Pyrene	mg/kg	0.05	MCERTS	0.36	0.89	5.3	0.7	0.92
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.2	0.46	2.4	0.37	0.46
Chrysene	mg/kg	0.05	MCERTS	0.23	0.51	2.2	0.38	0.59
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.27	0.5	2.5	0.49	0.68
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.09	0.29	1.2	0.2	0.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.2	0.44	2.5	0.41	0.52
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.12	0.21	0.98	0.19	0.27
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.12	0.26	1.2	0.23	0.32

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.28	5.74	30.2	4.12	5.75
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	13	8.1	13	16
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	34	18	21	14	16
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	34	18	21	15	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	63	29	39	56
Lead (aqua regia extractable)	mg/kg	1	MCERTS	53	49	23	100	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	22	11	13	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	210	100	57	80	110

Analytical Report Number: 23-52916

Project / Site name: Star Academy

Your Order No: MB C5394 4490

Lab Sample Number				2791526	2791527	2791528	2791529	2791530
Sample Reference				WS101	WS103	WS106	TP101	TP103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20-0.60	1.50	0.15-1.20	0.00-0.20	0.00-0.20
Date Sampled				08/08/2023	10/08/2023	10/08/2023	10/08/2023	08/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	mg/kg	0.005	MCERTS	-	< 0.005	< 0.005	-	-
Toluene	mg/kg	0.005	MCERTS	-	< 0.005	< 0.005	-	-
Ethylbenzene	mg/kg	0.005	MCERTS	-	< 0.005	< 0.005	-	-
p & m-xylene #	mg/kg	0.005	NONE	-	< 0.005	< 0.005	-	-
o-xylene	mg/kg	0.005	MCERTS	-	< 0.005	< 0.005	-	-
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	NONE	-	< 0.005	< 0.005	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	-	< 1.0	3	-	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	-	< 2.0	14	-	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	< 8.0	22	-	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	< 8.0	68	-	-
TPH-CWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	-	< 10	90	-	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-	< 10	110	-	-

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.1	NONE	-	< 0.10	< 0.10	-	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	-	< 1.0	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	-	< 2.0	6.1	-	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	< 10	27	-	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	12	110	-	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-	17	140	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-52916

Project / Site name: Star Academy

Your Order No: MB C5394 4490

Lab Sample Number				2791531	2791532	2791533
Sample Reference				TP106	TP108	HP101
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				040-1.25	0.10-1.00	0.30-1.10
Date Sampled				09/08/2023	09/08/2023	09/08/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	15	17
Total mass of sample received	kg	0.001	NONE	1	1.2	0.4

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	PDO

General Inorganics

pH - Manual	pH Units	N/A	MCERTS	-	6.5	-
pH - Automated	pH Units	N/A	MCERTS	7.7	7.1	7.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	88	640	680
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0441	0.322	0.339
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	44.1	322	339
Organic Matter (automated)	%	0.1	MCERTS	5.3	6	6.7

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1	0.32	2.6
Acenaphthylene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1.6	0.21	0.57
Fluorene	mg/kg	0.05	MCERTS	1.4	0.17	0.53
Phenanthrene	mg/kg	0.05	MCERTS	11	2	6
Anthracene	mg/kg	0.05	MCERTS	3	0.37	1.1
Fluoranthene	mg/kg	0.05	MCERTS	13	3	7.3
Pyrene	mg/kg	0.05	MCERTS	12	2.7	6.6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	6.1	1.4	3.1
Chrysene	mg/kg	0.05	MCERTS	5.7	1.4	3.1
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	6.9	1.6	3.8
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	2.4	0.78	1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.7	1.5	3.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.5	0.64	1.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.65	0.21	0.33
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.8	0.76	1.6

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	76	17.2	42
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	27	43	43
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	35	18	17
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	18	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	190	380	530
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	140	130
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	38	67	64
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	83	140	270

Analytical Report Number: 23-52916

Project / Site name: Star Academy

Your Order No: MB C5394 4490

Lab Sample Number				2791531	2791532	2791533
Sample Reference				TP106	TP108	HP101
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				040-1.25	0.10-1.00	0.30-1.10
Date Sampled				09/08/2023	09/08/2023	09/08/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Monoaromatics & Oxygenates						
Benzene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	-
Toluene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	-
Ethylbenzene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	-
p & m-xylene #	mg/kg	0.005	NONE	< 0.005	< 0.005	-
o-xylene	mg/kg	0.005	MCERTS	< 0.005	< 0.005	-
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.005	NONE	< 0.005	< 0.005	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	4.8	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	-
TPH-CWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	< 10	< 10	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	-

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	7.8	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	35	13	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	62	30	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	100	43	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-52916
Project / Site name: Star Academy

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2791526	WS101	None Supplied	0.20-0.60	Brown loam and sand with gravel.
2791527	WS103	None Supplied	1.5	Brown clay and loam.
2791528	WS106	None Supplied	0.15-1.20	Brown loam and sand with gravel and brick.
2791529	TP101	None Supplied	0.00-0.20	Brown loam and sand with gravel and vegetation.
2791530	TP103	None Supplied	0.00-0.20	Brown loam and sand with gravel and vegetation.
2791531	TP106	None Supplied	0.40-1.25	Brown gravelly loam.
2791532	TP108	None Supplied	0.10-1.00	Brown gravelly loam.
2791533	HP101	None Supplied	0.30-1.10	Brown gravelly loam.

Analytical Report Number : 23-52916

Project / Site name: Star Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS

Analytical Report Number : 23-52916

Project / Site name: Star Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

- Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.

Sample Deviation Report



Analytical Report Number : 23-52916

Project / Site name: Star Academy

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP106	None Supplied	S	2791531	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP106	None Supplied	S	2791531	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP106	None Supplied	S	2791531	c	TPH in (Soil)	L076-PL	c
TP108	None Supplied	S	2791532	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP108	None Supplied	S	2791532	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP108	None Supplied	S	2791532	c	TPH in (Soil)	L076-PL	c
WS103	None Supplied	S	2791527	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
WS103	None Supplied	S	2791527	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
WS103	None Supplied	S	2791527	c	TPH in (Soil)	L076-PL	c
WS106	None Supplied	S	2791528	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
WS106	None Supplied	S	2791528	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
WS106	None Supplied	S	2791528	c	TPH in (Soil)	L076-PL	c

APPENDIX D

Geotechnical Testing Results

Peter Holland
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

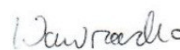
i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

e: p.holland@brownfield-solutions.co.uk

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 23-52906

Project / Site name:	Star Academy	Samples received on:	24/08/2023
Your job number:	C5394	Samples instructed on/ Analysis started on:	24/08/2023
Your order number:	NS C5394 110	Analysis completed by:	31/08/2023
Report Issue Number:	1	Report issued on:	01/09/2023
Samples Analysed:	9 soil samples		



Signed:

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-52906

Project / Site name: Star Academy

Your Order No: NS C5394 110

Lab Sample Number				2791479	2791480	2791481	2791482	2791483
Sample Reference				WS101	WS102	WS103	WS104	TP101
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.60-4.70	2.30-2.40	4.20	3.50-3.60	0.50
Date Sampled				08/08/2023	08/08/2023	08/08/2023	08/08/2023	09/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.7	12	9	9.8	12
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.6	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	6.9	8.4	8.3	7.3
Total Sulphate as SO ₄	%	0.005	MCERTS	0.024	-	0.023	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0687	0.0226	0.0617	0.0547	< 0.0013
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	68.7	-	61.7	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	2.9	-	3.2	-	-
Total Sulphur	%	0.005	MCERTS	0.092	-	0.09	-	-
Ammoniacal Nitrogen as NH ₄	mg/kg	0.5	MCERTS	< 0.5	-	0.7	-	-
Ammonium as NH ₄ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	-	0.07	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	-	< 2.0	-	-

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	14	-	11	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	7.1	-	5.7	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-52906

Project / Site name: Star Academy

Your Order No: NS C5394 110

Lab Sample Number				2791484	2791485	2791486	2791487
Sample Reference				TP104	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50-1.00	1.50-1.60	2.10	1.60-2.00
Date Sampled				10/08/2023	10/08/2023	09/08/2023	09/08/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	48
Moisture Content	%	0.01	NONE	8.7	24	16	3.9
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.6	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	7.4	6.8	7.4
Total Sulphate as SO ₄	%	0.005	MCERTS	-	-	-	0.018
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0821	0.0406	0.0484	0.0286
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	28.6
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	1.4
Total Sulphur	%	0.005	MCERTS	-	-	-	0.013
Ammoniacal Nitrogen as NH ₄	mg/kg	0.5	MCERTS	-	-	-	2.1
Ammonium as NH ₄ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	0.21
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	2.4

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	7
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	3.5

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-52906
Project / Site name: Star Academy

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2791479	WS101	None Supplied	4.60-4.70	Brown clay.
2791480	WS102	None Supplied	2.30-2.40	Brown clay.
2791481	WS103	None Supplied	4.2	Brown clay.
2791482	WS104	None Supplied	3.50-3.60	Brown clay.
2791483	TP101	None Supplied	0.5	Brown sandy loam with vegetation.
2791484	TP104	None Supplied	0.50-1.00	Brown clay.
2791485	TP107	None Supplied	1.50-1.60	Brown clay.
2791486	TP108	None Supplied	2.1	Brown clay.
2791487	TP109	None Supplied	1.60-2.00	Brown loam and sand with gravel and stones.

Analytical Report Number : 23-52906

Project / Site name: Star Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

TEST REPORT

Client Brownfield Solutions Ltd

Address William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Contract C5394 -
Star Academy, Radcliffe

Job Number MRN 4573/19
Date of Issue 31 October 2023
Page 1 of 28

Approved Signatories

S J Hutchings, O P Davies

Notes

- 1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.
- 2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.
- 3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.
- 4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.
- 5 The results included within the report are representative of the samples submitted for analysis.
- 6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.



Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 475 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8523 1999

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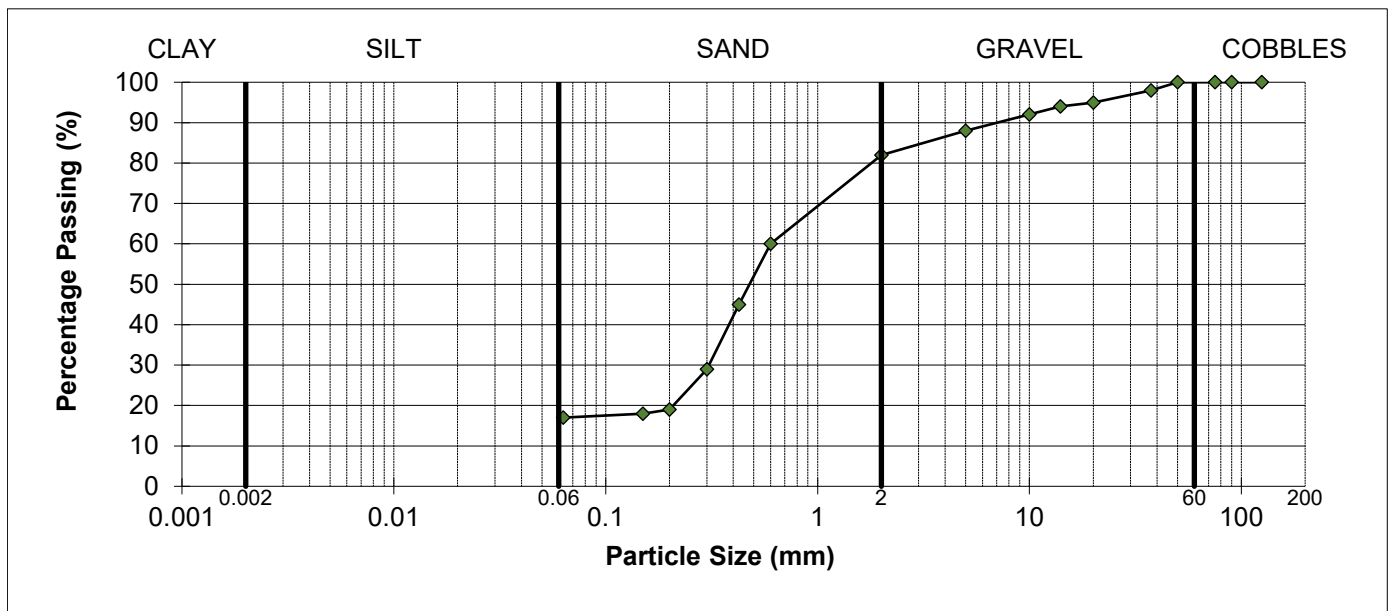
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP102 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132369	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	88	
90	100		2	82	
75	100		0.6	60	
50	100		0.425	45	
37.5	98		0.3	29	
20	95		0.2	19	
14	94		0.15	18	
10	92		0.063	17	



REMARKS

As received water content = 23.7%

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 31-Oct-23

TEST CERTIFICATE
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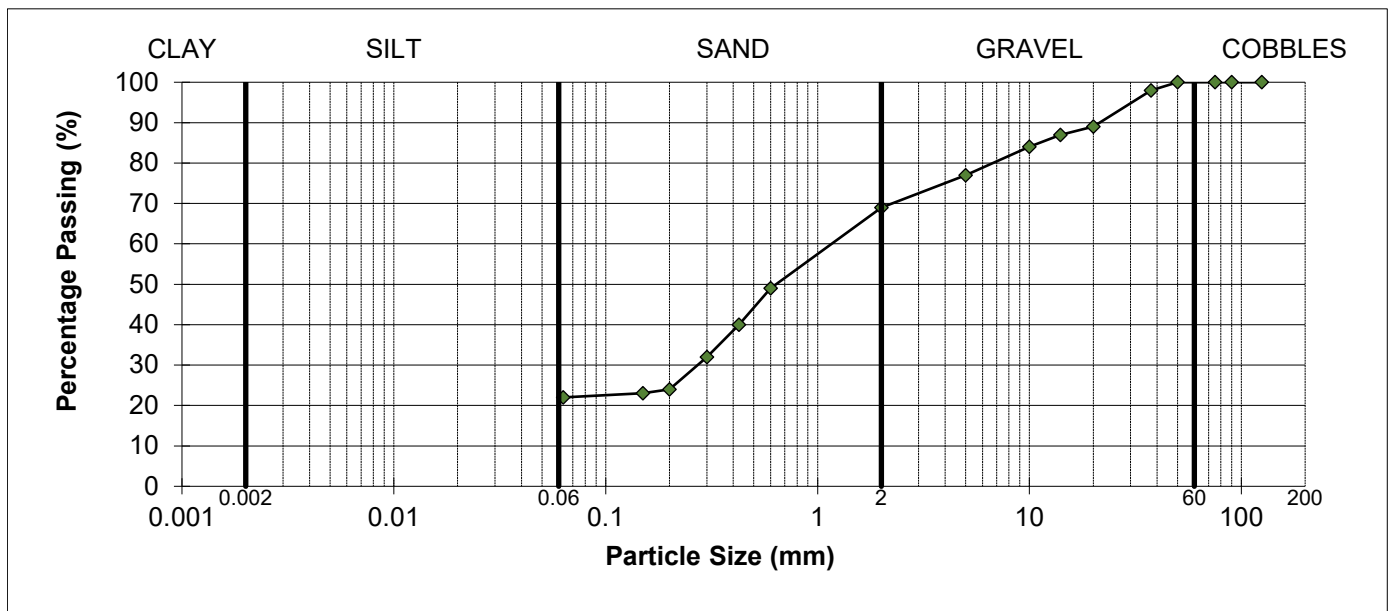
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP111 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132370	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	77	
90	100		2	69	
75	100		0.6	49	
50	100		0.425	40	
37.5	98		0.3	32	
20	89		0.2	24	
14	87		0.15	23	
10	84		0.063	22	



REMARKS

As received water content = 23.1%

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 31-Oct-23

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

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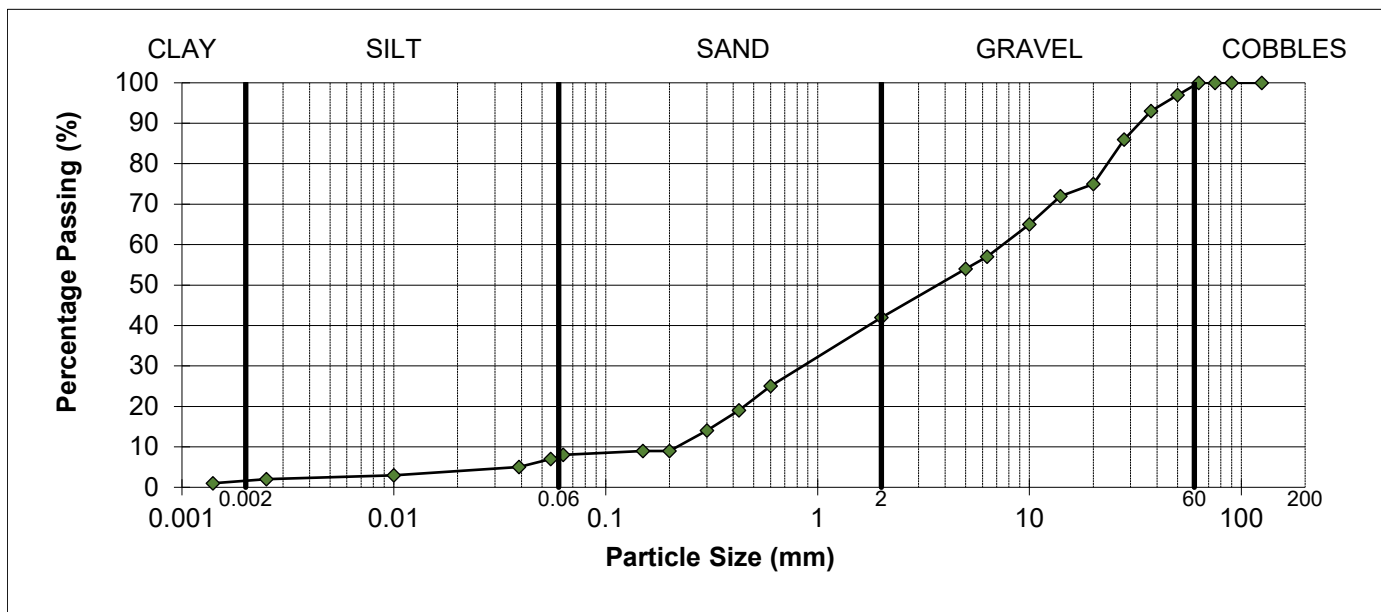
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy, Radcliffe		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP102 1.700	DATE SAMPLED	Not advised
LAB SAMPLE No	132371	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL		
ADVISED SOURCE	Site Investigation Sample		

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	42	
90	100		0.6	25	
75	100		0.425	19	
63	100		0.3	14	
50	97		0.2	9	
37.5	93		0.15	9	
28	86		0.063	8	
20	75		0.055	7	
14	72		0.039	5	
10	65		0.01	3	
6.3	57		0.0025	2	
5	54		0.0014	1	



REMARKS

As received water content = 11.7%

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

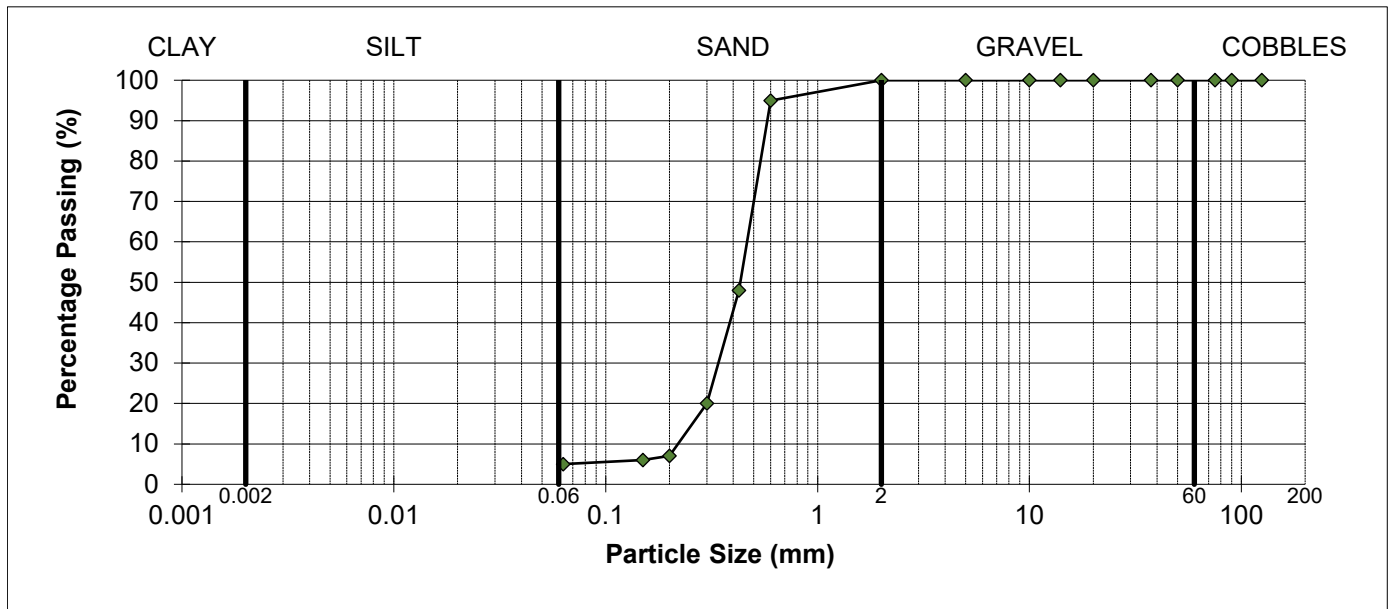
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP101S 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132372	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	100	
90	100		2	100	
75	100		0.6	95	
50	100		0.425	48	
37.5	100		0.3	20	
20	100		0.2	7	
14	100		0.15	6	
10	100		0.063	5	



REMARKS

As received water content = 20.4%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

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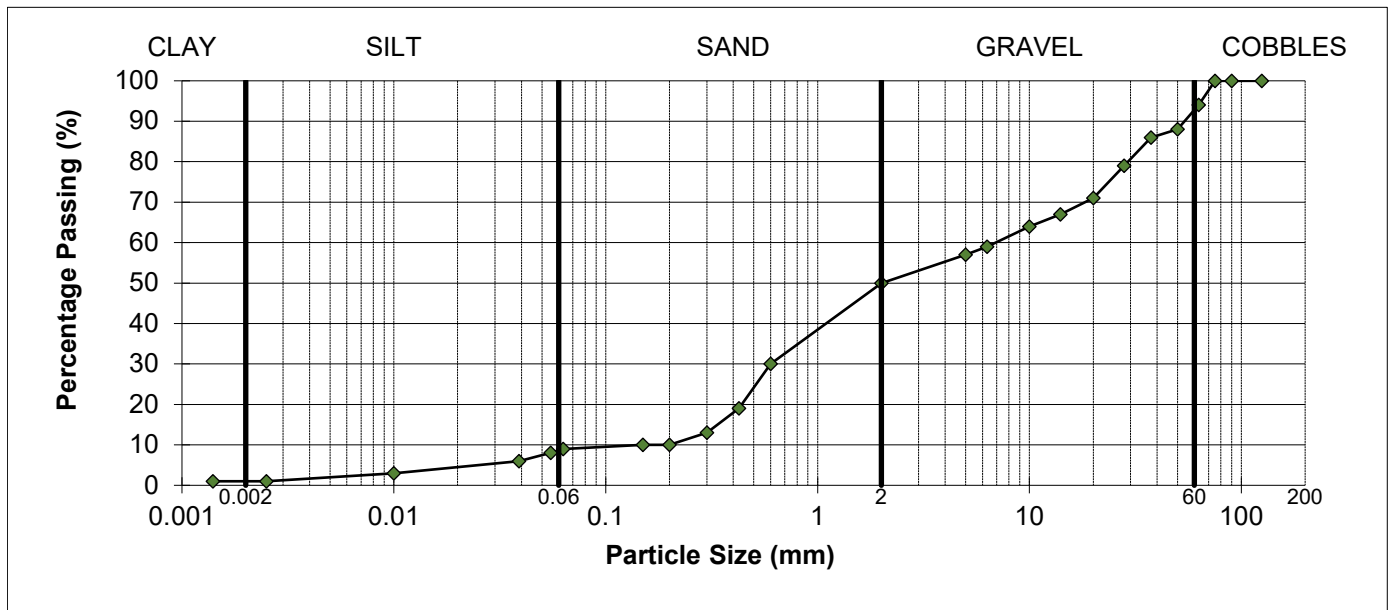
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 1.300	DATE SAMPLED	Not advised
LAB SAMPLE No	132373	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		2	50	
90	100		0.6	30	
75	100		0.425	19	
63	94		0.3	13	
50	88		0.2	10	
37.5	86		0.15	10	
28	79		0.063	9	
20	71		0.055	8	
14	67		0.039	6	
10	64		0.01	3	
6.3	59		0.0025	1	
5	57		0.0014	1	



REMARKS

As received water content = 11.2%

SIGNED

NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

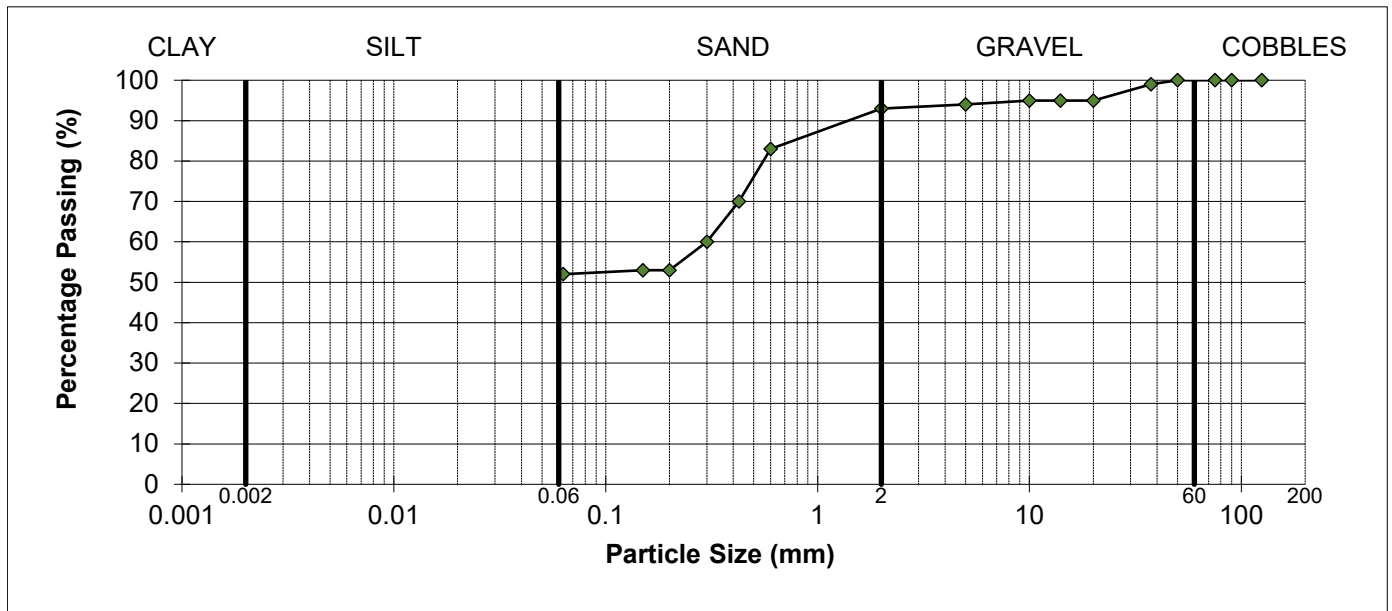
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132374	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown very silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	94	
90	100		2	93	
75	100		0.6	83	
50	100		0.425	70	
37.5	99		0.3	60	
20	95		0.2	53	
14	95		0.15	53	
10	95		0.063	52	



REMARKS

As received water content = 18.2%

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

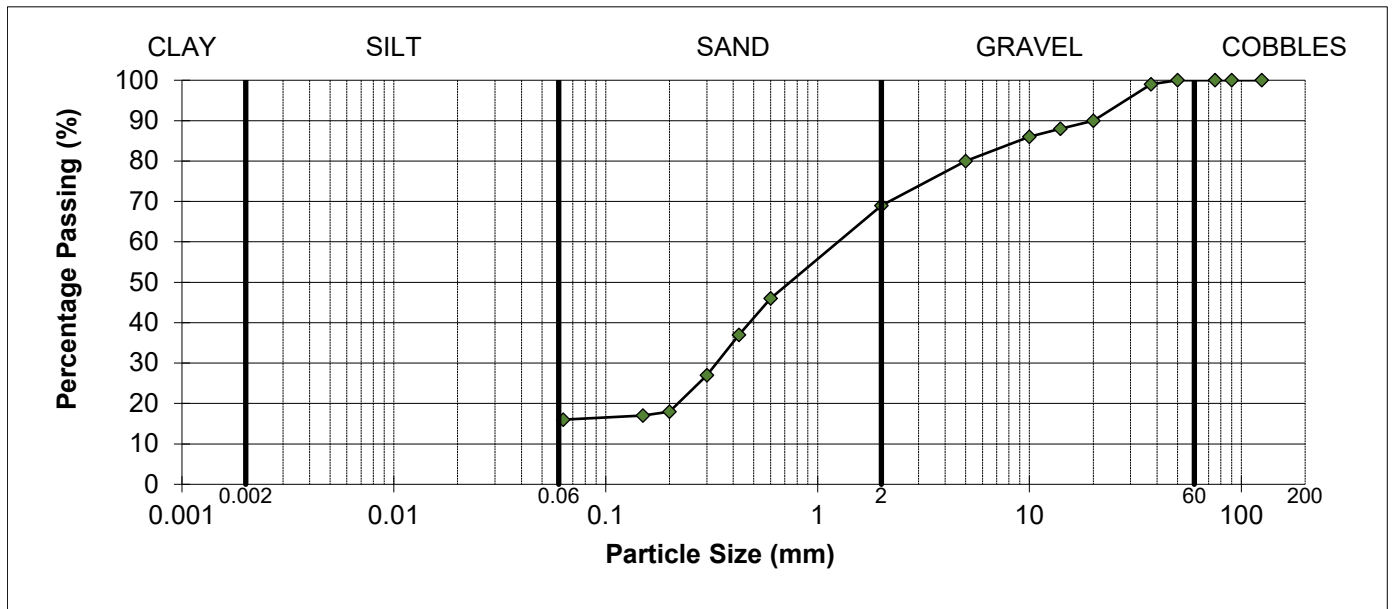
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP110 0.5-1.00	DATE SAMPLED	Not advised
LAB SAMPLE No	132375	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty very gravelly SAND
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	80	
90	100		2	69	
75	100		0.6	46	
50	100		0.425	37	
37.5	99		0.3	27	
20	90		0.2	18	
14	88		0.15	17	
10	86		0.063	16	



REMARKS

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

TEST CERTIFICATE
PARTICLE SIZE DISTRIBUTION

BS EN ISO 17892-4:2016

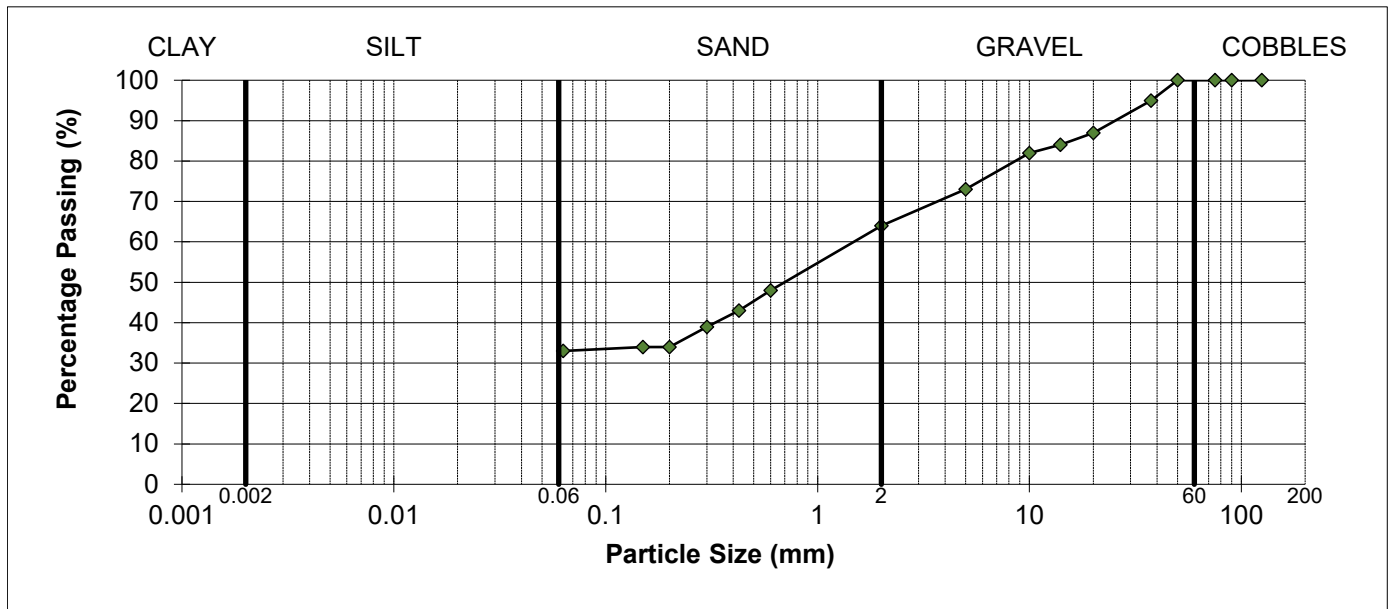
Determination of Water Content in accordance with BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP1 0.3-1.00	DATE SAMPLED	Not advised
LAB SAMPLE No	132376	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client

MATERIAL	Brown very silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		5	73	
90	100		2	64	
75	100		0.6	48	
50	100		0.425	43	
37.5	95		0.3	39	
20	87		0.2	34	
14	84		0.15	34	
10	82		0.063	33	



REMARKS

SIGNED



NAME

O.P. Davies BA (Hons)
(Laboratory Manager)

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF DENSITY, ONE POINT COMPACTION 2.5kg RAMMER METHOD

MOISTURE CONTENT METHOD BS 1377 : Part 2 CLAUSE 3.2 : 1990 (OVEN DRY)

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

DATE SAMPLED	Not advised	DATE RECEIVED	11-Oct-23
DATE TESTED	17-Oct-23	SAMPLED BY	Client
SAMPLE LOCATION	See Sample Label	MATERIAL SOURCE	Site Investigation Samples

Sample Number	Sample Label	Material	Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)
132369	TP102 0.500	Brown silty slightly gravelly SAND	1.91	N/A	N/A
132370	TP111 0.500	Brown silty gravelly SAND	1.79	N/A	N/A
132371	TP102 1.700	Brown silty SAND & GRAVEL	2.19	N/A	N/A
132372	TP101S 0.500	Brown silty SAND	2.12	N/A	N/A
132373	TP103 0.500	Brown silty SAND & GRAVEL	2.16	N/A	N/A
132374	TP103 1.300	Brown very silty gravelly SAND	2.04	N/A	N/A

REMARKS/ABNORMALITIES

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED



DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

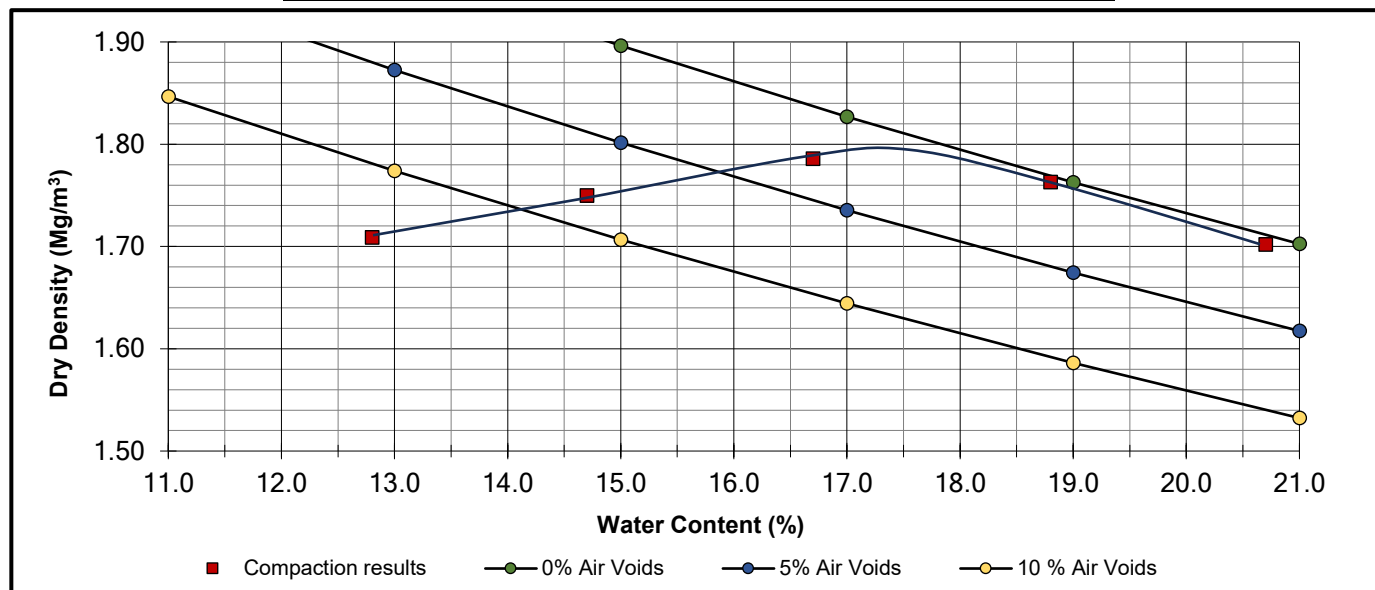
CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP102 0.500	DATE SAMPLED	Not advised
SAMPLE NUMBER	132369	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND		
ADVISED SOURCE	Site Investigation Sample		
PRE TREATMENT	Air Dried / Single Sample		

RETAINED 37.5mm	2	%	GRADING ZONE	Zone 4	
RETAINED 20mm	5	%	PARTICLE DENSITY	2.65	Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	12.8	1.709
2	14.7	1.750
3	16.7	1.786
4	18.8	1.763
5	20.7	1.702



OPTIMUM WATER CONTENT	17	(%)
MAXIMUM DRY DENSITY	1.79	(Mg/m ³)

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

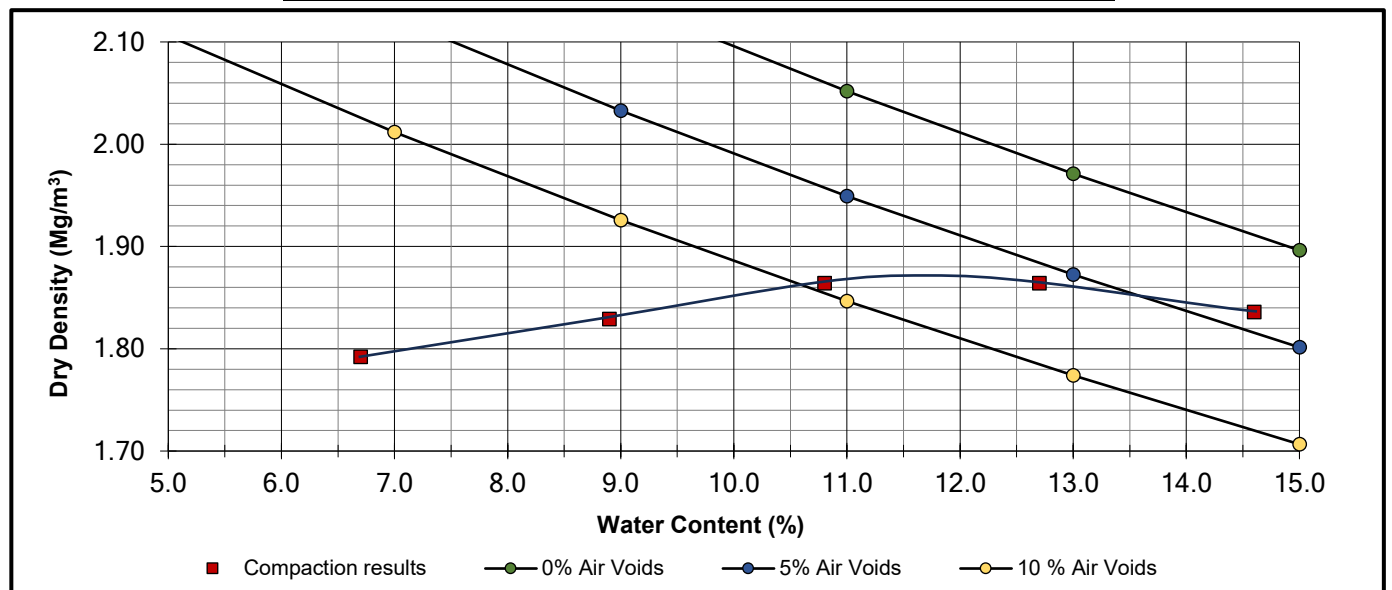
CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP111 0.500	DATE SAMPLED	Not advised
SAMPLE NUMBER	132370	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty gravelly SAND		
ADVISED SOURCE	Site Investigation Sample		
PRE TREATMENT	Air Dried / Single Sample		

RETAINED 37.5mm	2	%	GRADING ZONE	Zone 4	
RETAINED 20mm	11	%	PARTICLE DENSITY	2.65	Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	6.7	1.792
2	8.9	1.829
3	10.8	1.864
4	12.7	1.864
5	14.6	1.836



OPTIMUM WATER CONTENT	12	(%)
MAXIMUM DRY DENSITY	1.87	(Mg/m ³)

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

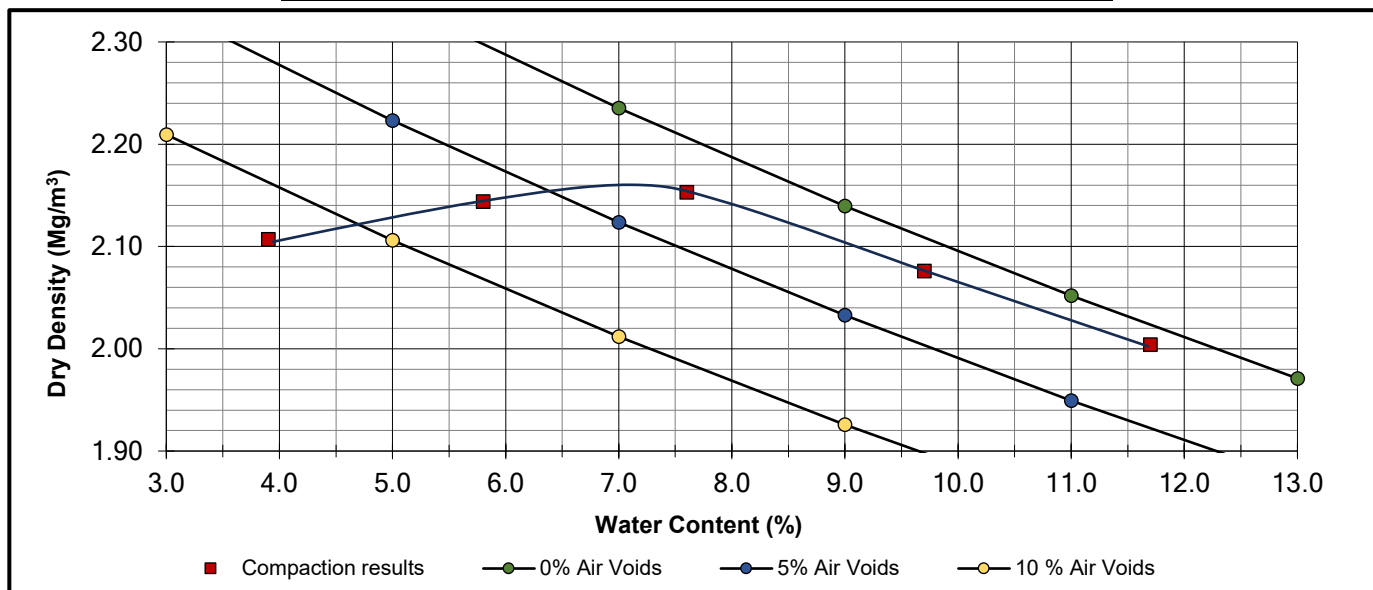
CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP102 1.700	DATE SAMPLED	Not advised
SAMPLE NUMBER	132371	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL		
ADVISED SOURCE	Site Investigation Sample		
PRE TREATMENT	Air Dried / Single Sample		

RETAINED 37.5mm	7 %	GRADING ZONE	Zone 5
RETAINED 20mm	14 %	PARTICLE DENSITY	2.65 Mg/m ³ (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	3.9	2.107
2	5.8	2.144
3	7.6	2.153
4	9.7	2.076
5	11.7	2.004



OPTIMUM WATER CONTENT	7.0 (%)
MAXIMUM DRY DENSITY	2.16 (Mg/m ³)

REMARKS

Material unsuitable for H.S.V. testing.

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

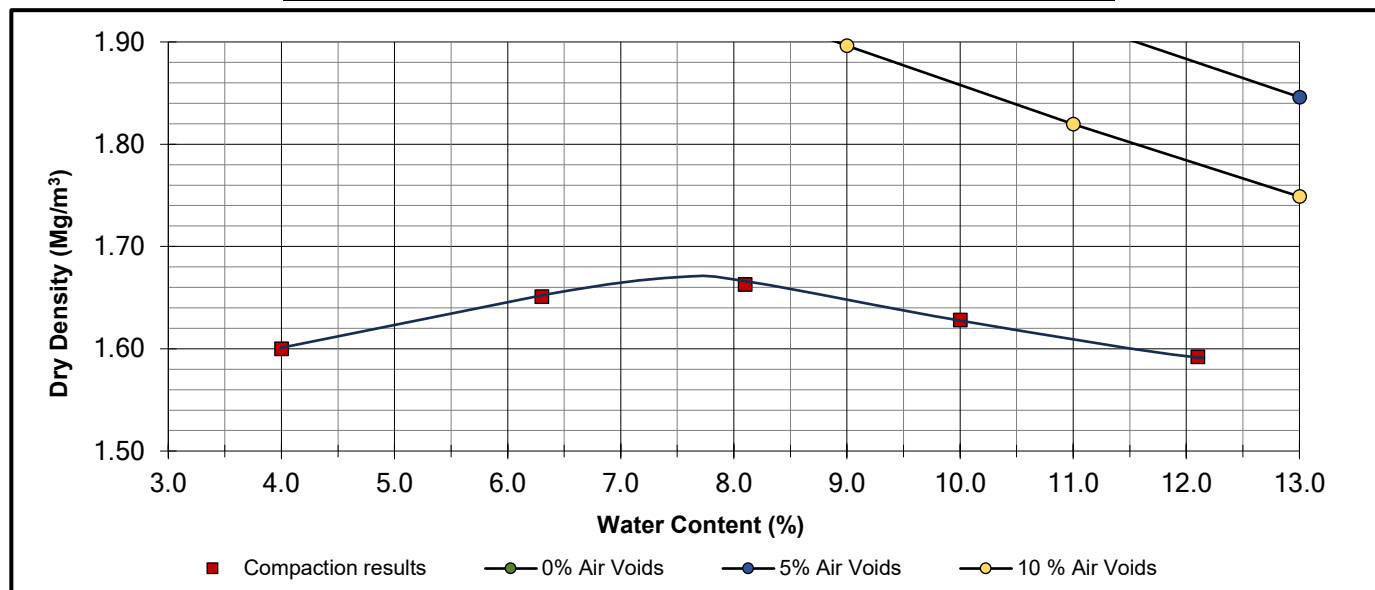
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP101S 0.500	DATE SAMPLED	Not advised
SAMPLE NUMBER	131372	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried / Single Sample

RETAINED 37.5mm	0 %	GRADING ZONE	Zone 1
RETAINED 20mm	0 %	PARTICLE DENSITY	2.60 Mg/m3 (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	4.0	1.600
2	6.3	1.651
3	8.1	1.663
4	10.0	1.628
5	12.1	1.592



OPTIMUM WATER CONTENT	7.7 (%)
MAXIMUM DRY DENSITY	1.67 (Mg/m ³)

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

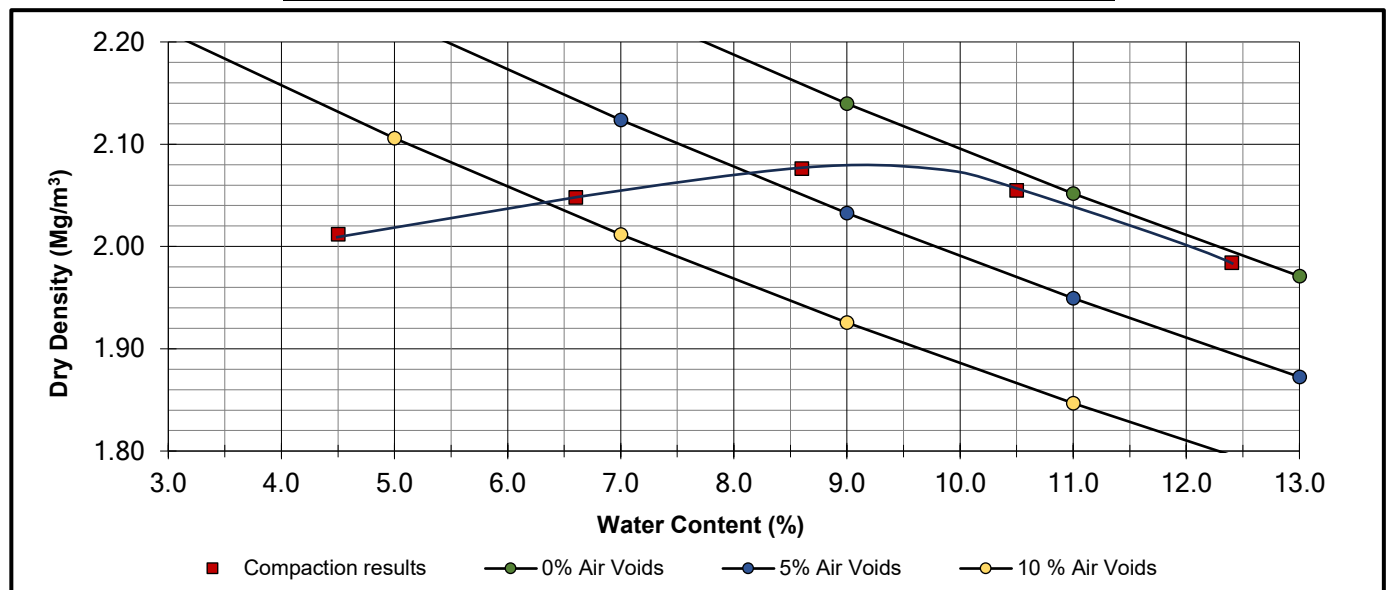
CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP103 1.300	DATE SAMPLED	Not advised
SAMPLE NUMBER	131373	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL		
ADVISED SOURCE	Site Investigation Sample		
PRE TREATMENT	Air Dried / Single Sample		

RETAINED 37.5mm	14 %	GRADING ZONE	Zone X
RETAINED 20mm	29 %	PARTICLE DENSITY	2.65 Mg/m ³ (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	4.5	2.012
2	6.6	2.048
3	8.6	2.076
4	10.5	2.055
5	12.4	1.984



OPTIMUM WATER CONTENT	9.2 (%)
MAXIMUM DRY DENSITY	2.08 (Mg/m ³)

REMARKS

Material unsuitable for H.S.V. testing.

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

DRY DENSITY/WATER CONTENT RELATIONSHIP 4.5kg RAMMER

BS 1377-2:2022 Cl.11

PARTICLE DENSITY METHOD BS 1377-2:2022 Cl.9.2

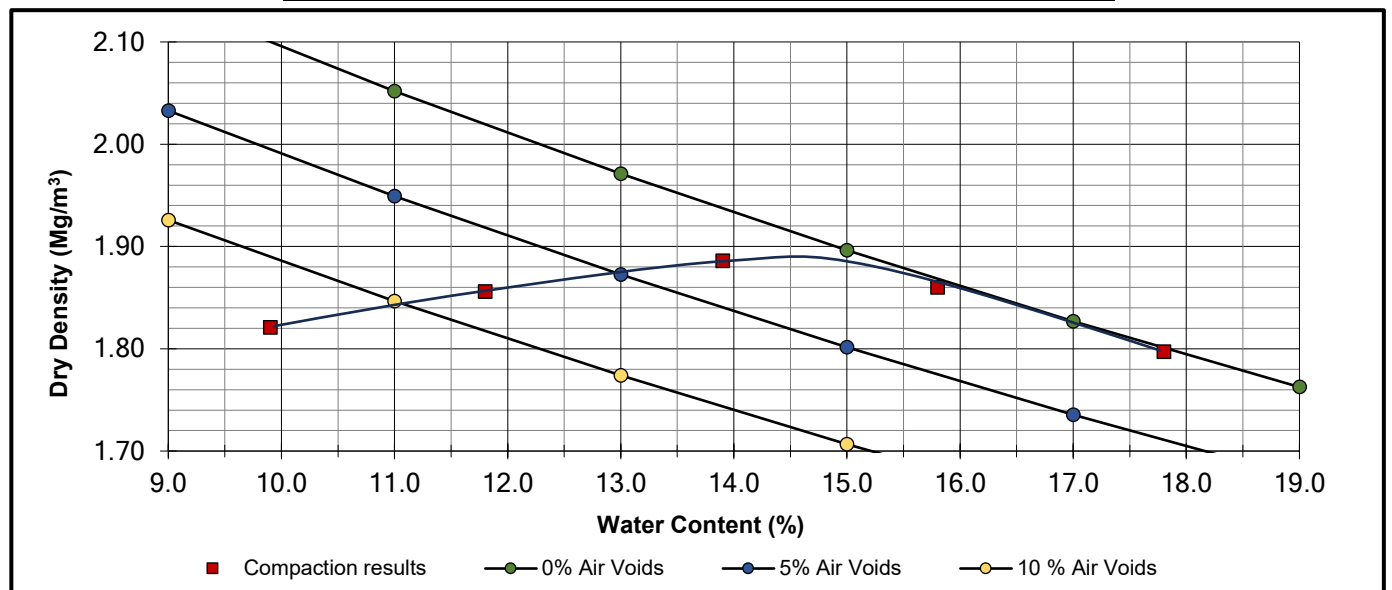
CLIENT	Brownfield Solutions Ltd		
SITE	C5394 - Star Academy		
JOB NUMBER	MRN 4573/19		

SAMPLE LABEL	TP103 0.500	DATE SAMPLED	Not advised
SAMPLE NUMBER	131374	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown very silty gravelly SAND		
ADVISED SOURCE	Site Investigation Sample		
PRE TREATMENT	Air Dried / Single Sample		

RETAINED 37.5mm	1 %	GRADING ZONE	Zone 4
RETAINED 20mm	5 %	PARTICLE DENSITY	2.65 Mg/m ³ (Assumed)

POINT NUMBER	WATER CONTENT (%)	DRY DENSITY (Mg/m ³)
1	9.9	1.821
2	11.8	1.856
3	13.9	1.886
4	15.8	1.860
5	17.8	1.797



OPTIMUM WATER CONTENT	15 (%)
MAXIMUM DRY DENSITY	1.89 (Mg/m ³)

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE 31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE MOISTURE CONDITION VALUE BS 1377-2:2022 Cl. 13

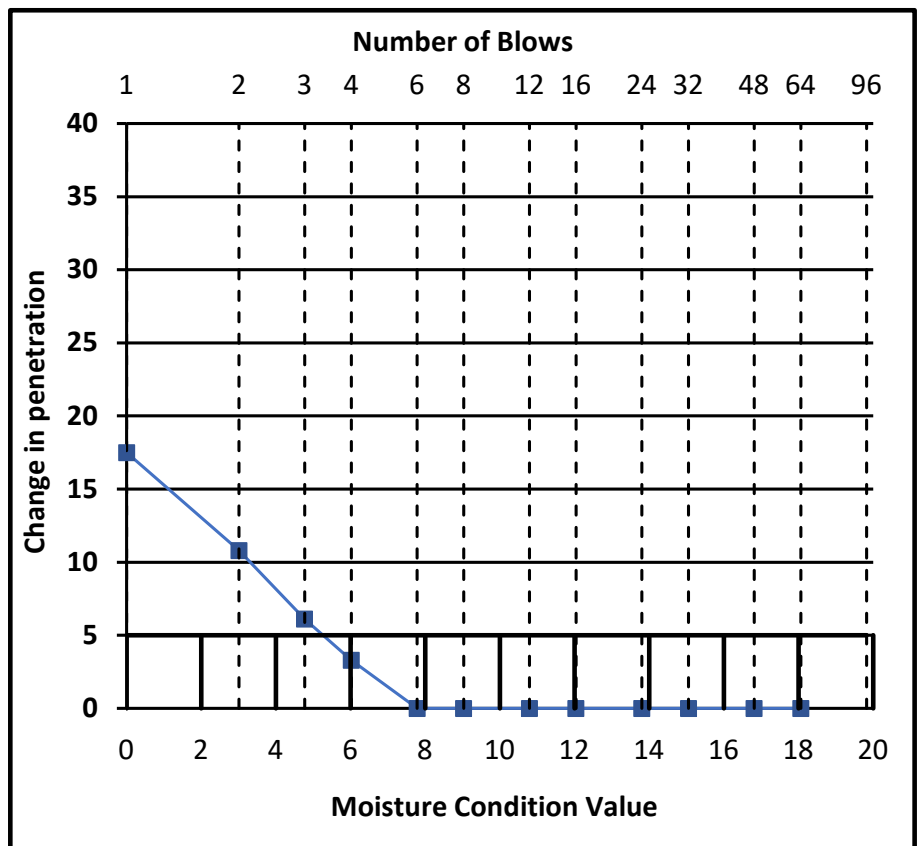
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP102 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132369	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	5%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	90.7	17.5
2	81.0	10.8
3	76.1	6.1
4	73.2	3.3
6	70.6	
8	70.2	
12	70.0	
16	69.9	
24		
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

5.3

MOISTURE CONTENT

24.1

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

TEST CERTIFICATE
MOISTURE CONDITION VALUE
BS 1377-2:2022 Cl. 13

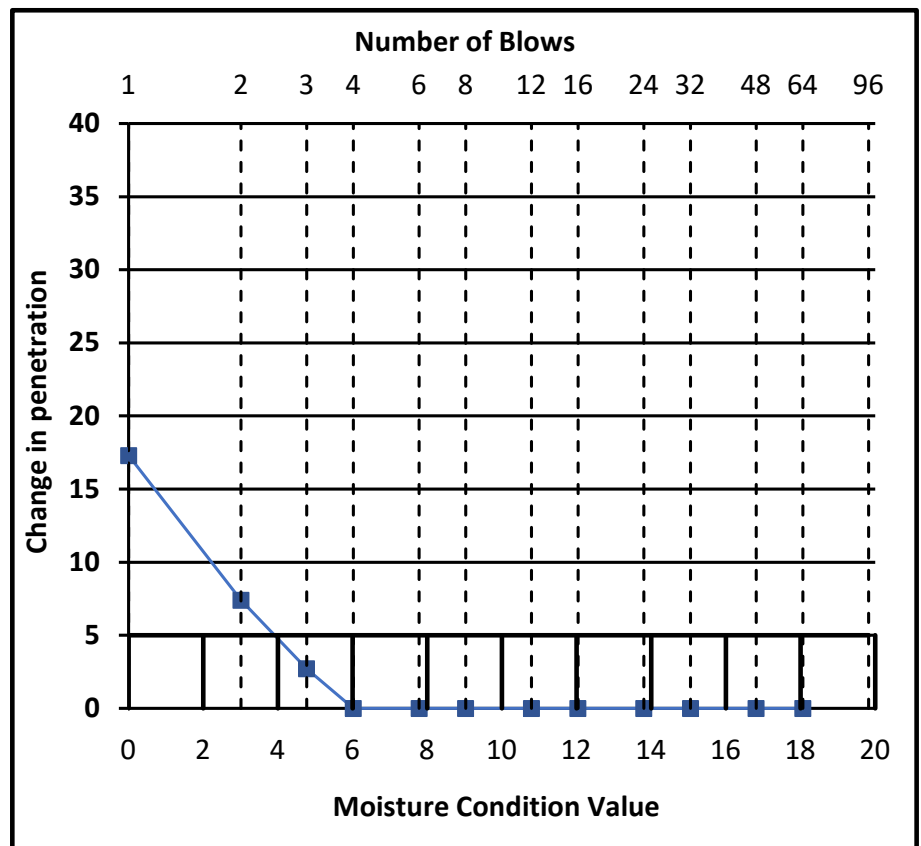
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP111 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132370	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	11%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	85.8	17.3
2	75.1	7.4
3	70.3	2.7
4	68.5	
6	68.0	
8	67.7	
12	67.6	
16		
24		
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

4.0

MOISTURE CONTENT

24.1

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED



DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE MOISTURE CONDITION VALUE BS 1377-2:2022 Cl. 13

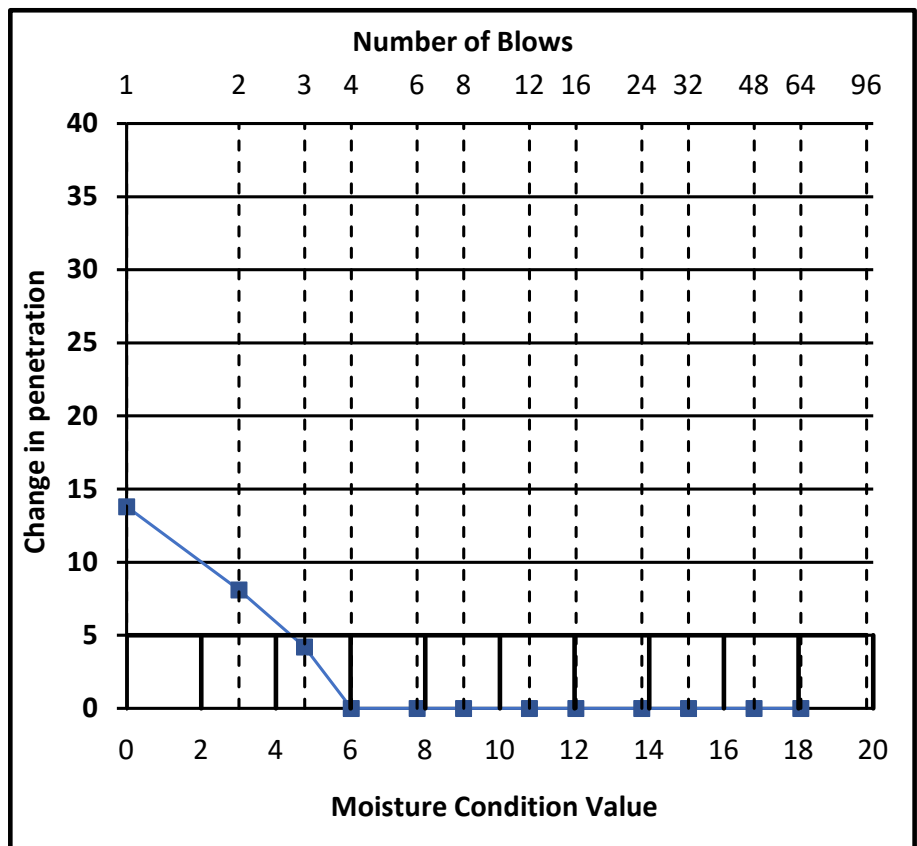
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP102 1.700	DATE SAMPLED	Not advised
LAB SAMPLE No	132371	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	25%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	72.1	13.8
2	64.1	8.1
3	59.8	4.2
4	58.3	
6	56.5	
8	56.0	
12	55.6	
16		
24		
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

4.3

MOISTURE CONTENT

12.2

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE MOISTURE CONDITION VALUE BS 1377-2:2022 Cl. 13

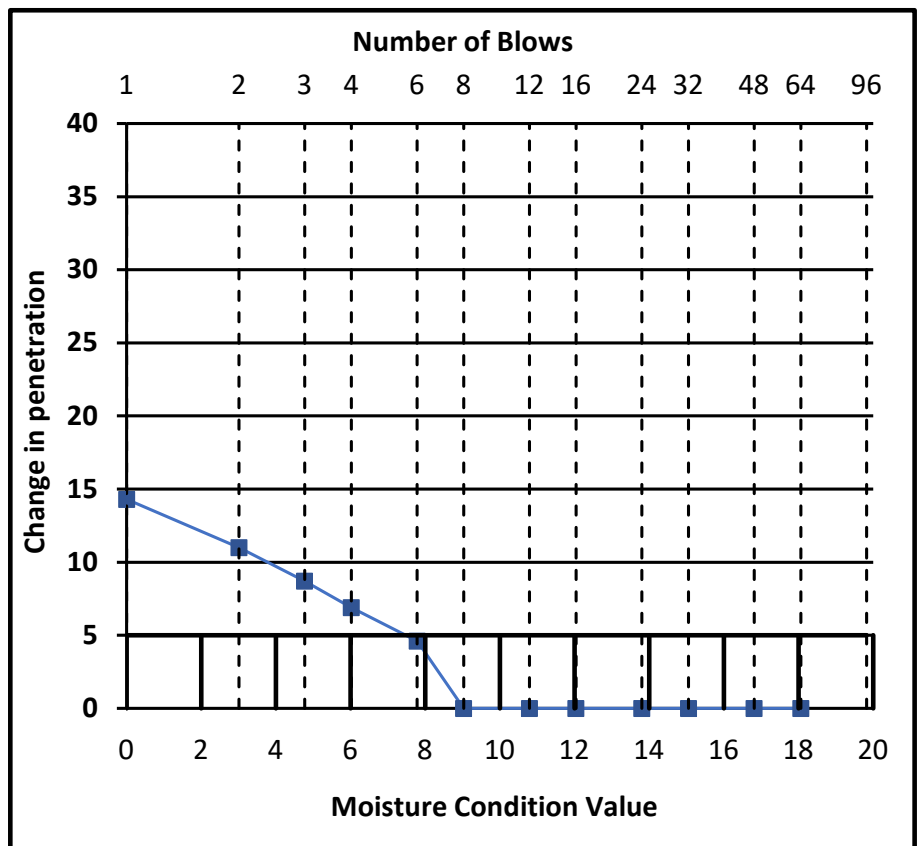
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP101S 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132372	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	0%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	89.4	14.3
2	81.3	11.0
3	77.7	8.7
4	75.1	6.9
6	71.8	4.6
8	70.3	
12	69.0	
16	68.2	
24	67.2	
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

7.5

MOISTURE CONTENT

20.4

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE MOISTURE CONDITION VALUE BS 1377-2:2022 Cl. 13

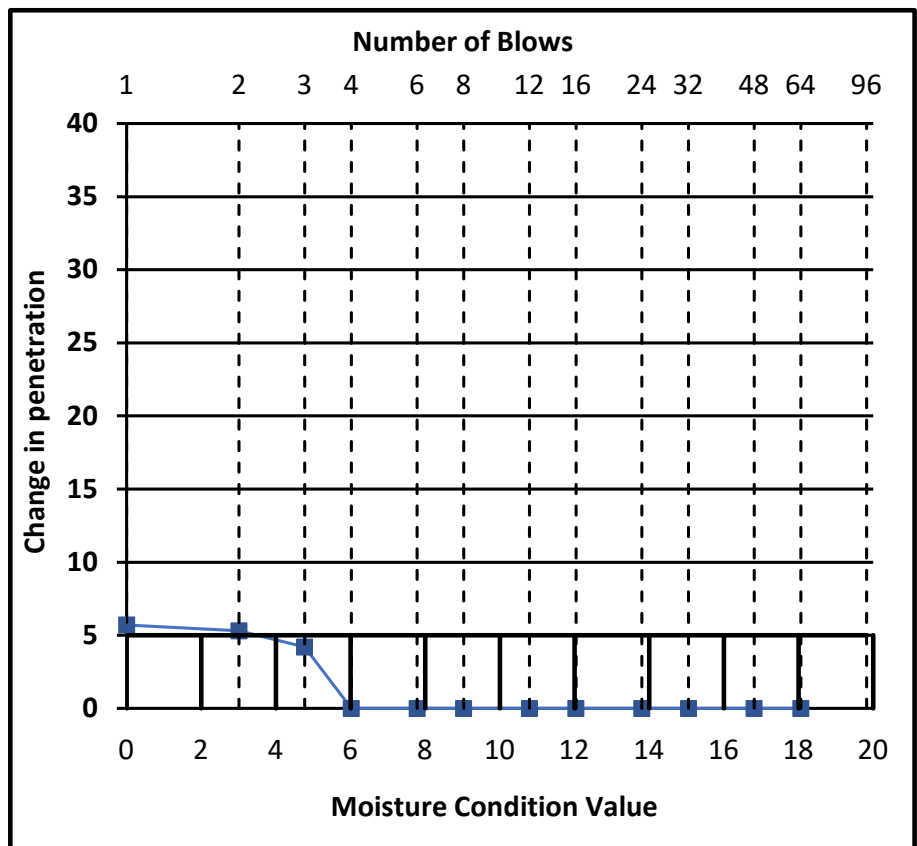
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 1.300	DATE SAMPLED	Not advised
LAB SAMPLE No	132373	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	29%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	66.5	5.7
2	63.7	5.3
3	62.0	4.2
4	60.8	
6	59.4	
8	58.4	
12	57.8	
16		
24		
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

3.7

MOISTURE CONTENT

13.2

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE MOISTURE CONDITION VALUE BS 1377-2:2022 Cl. 13

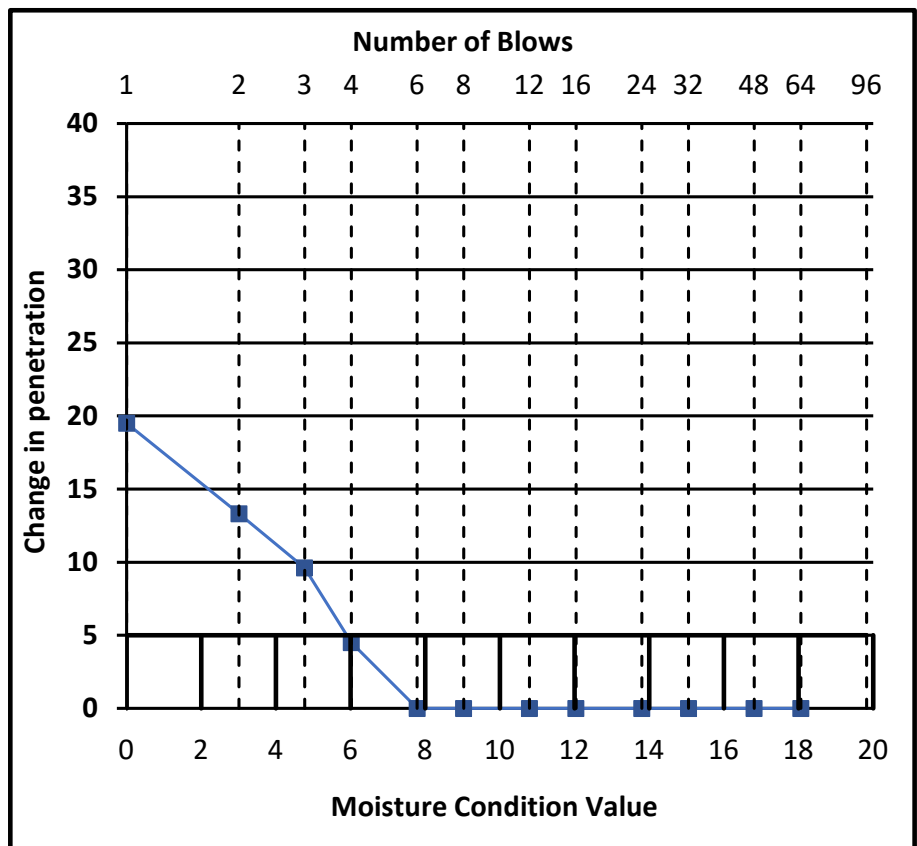
DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022

CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132374	DATE RECEIVED	11-Oct-23
DATE TESTED	24-Oct-23	SAMPLED BY	Client

MATERIAL	Brown very silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample
INTERPRETATION OF TEST CURVE	Straight line through 5mm change in penetration
PROPORTION LARGER THAN 20mm	5%

Total number of blows n	Penetration or protusion mm	Change in penetration n to 4 n mm
1	87.2	19.5
2	77.2	13.3
3	72.9	9.6
4	67.7	4.5
6	65.4	
8	63.9	
12	63.3	
16	63.2	
24		
32		
48		
64		
96		
128		
192		
256		



MOISTURE CONDITION VALUE

5.9

MOISTURE CONTENT

20.1

%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

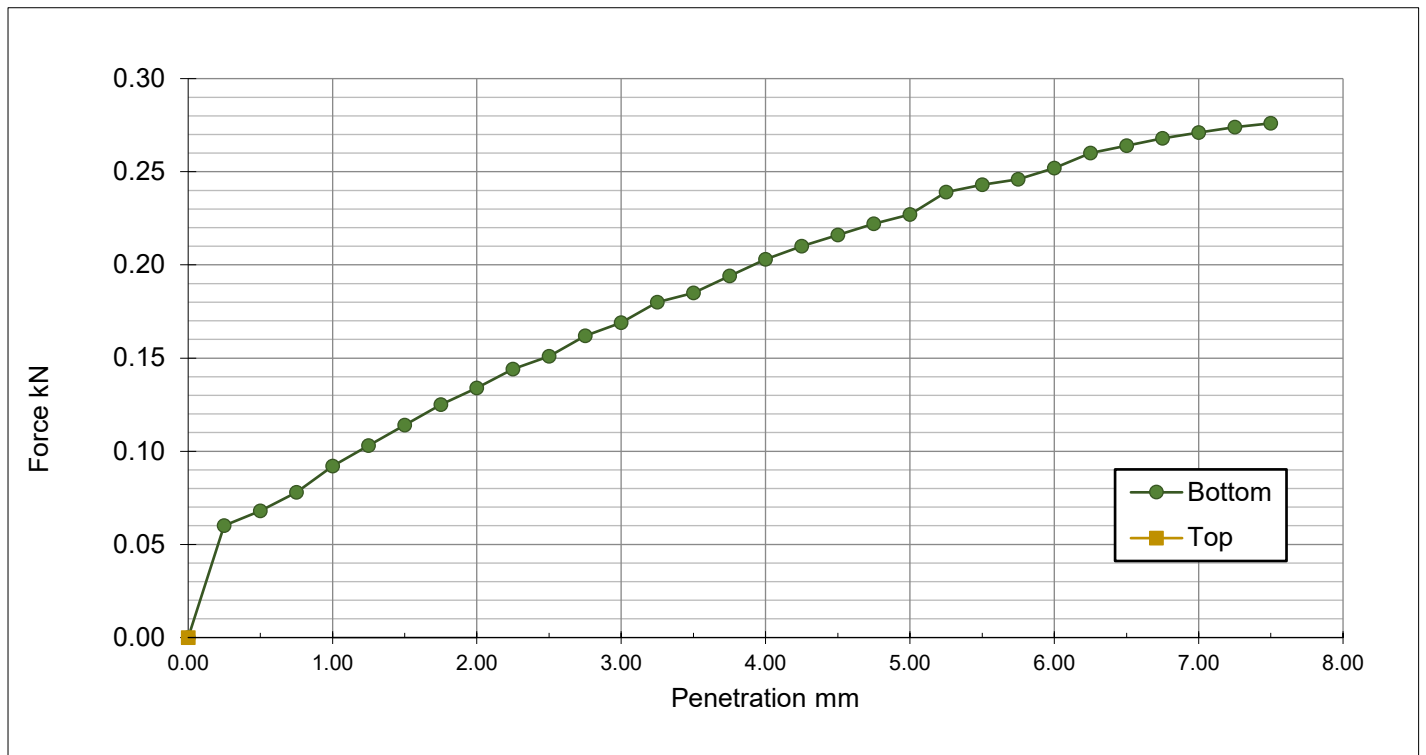
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP102 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132369	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Effort, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	5 %				
BULK DENSITY	1.91 Mg/m ³	MOISTURE CONTENT	23.9 %	DRY DENSITY	1.54 Mg/m ³
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top	N/A	%
Bottom	1.1	%

ORIGIN CORRECTION

Top	N/A	mm
Bottom	N/A	mm

FINAL MOISTURE CONTENT

Top	N/A	%
Bottom	23.9	%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

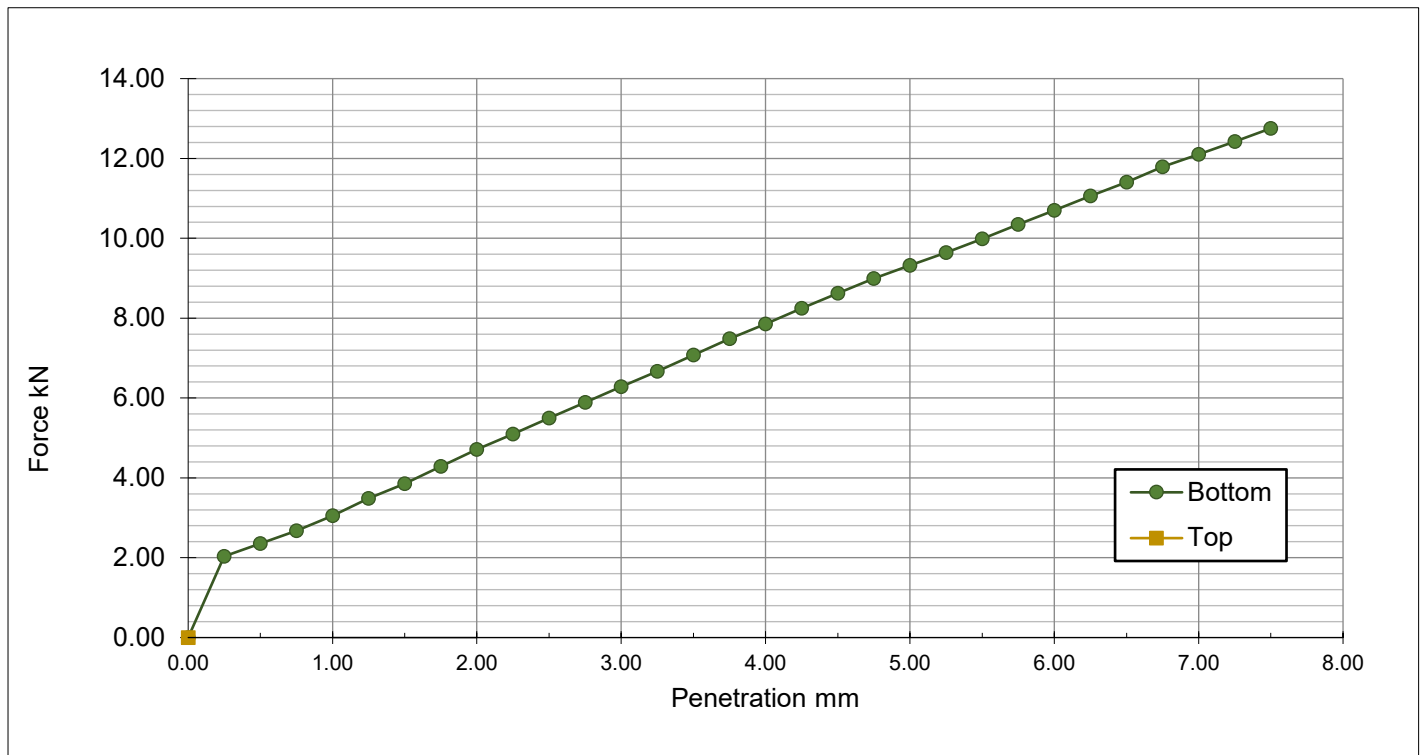
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP111 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132370	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Density, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	11 %				
BULK DENSITY	2.10 Mg/m ³	MOISTURE CONTENT	12.0 %	DRY DENSITY	1.87 Mg/m ³
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top N/A %
Bottom 46.6 %

ORIGIN CORRECTION

Top N/A mm
Bottom N/A mm

FINAL MOISTURE CONTENT

Top N/A %
Bottom 12.0 %

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

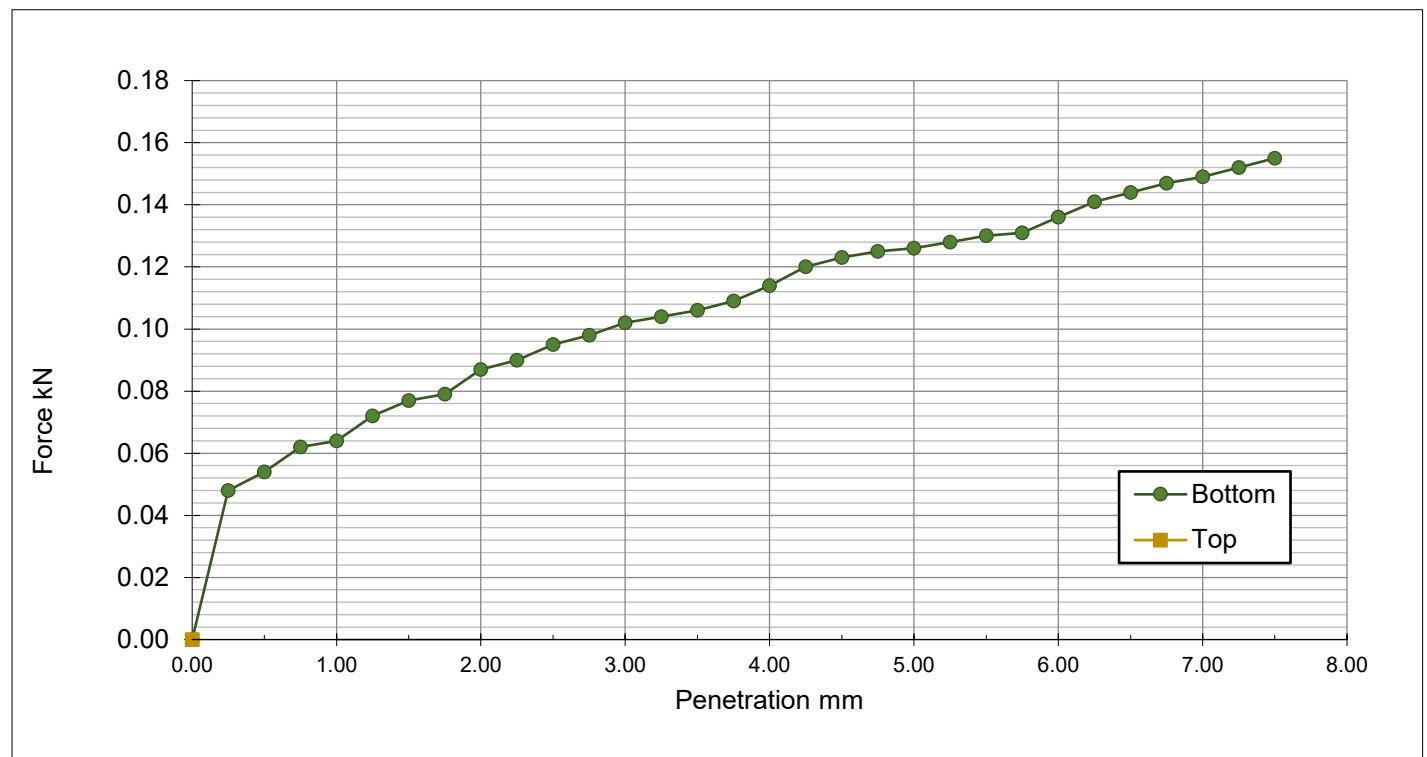
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP102 1.700	DATE SAMPLED	Not advised
LAB SAMPLE No	132371	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Effort, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	25 %				
BULK DENSITY	2.19 Mg/m3	MOISTURE CONTENT	11.8 %	DRY DENSITY	1.96 Mg/m3
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top N/A %
Bottom 0.7 %

ORIGIN CORRECTION

Top N/A mm
Bottom N/A mm

FINAL MOISTURE CONTENT

Top N/A %
Bottom 11.8 %

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

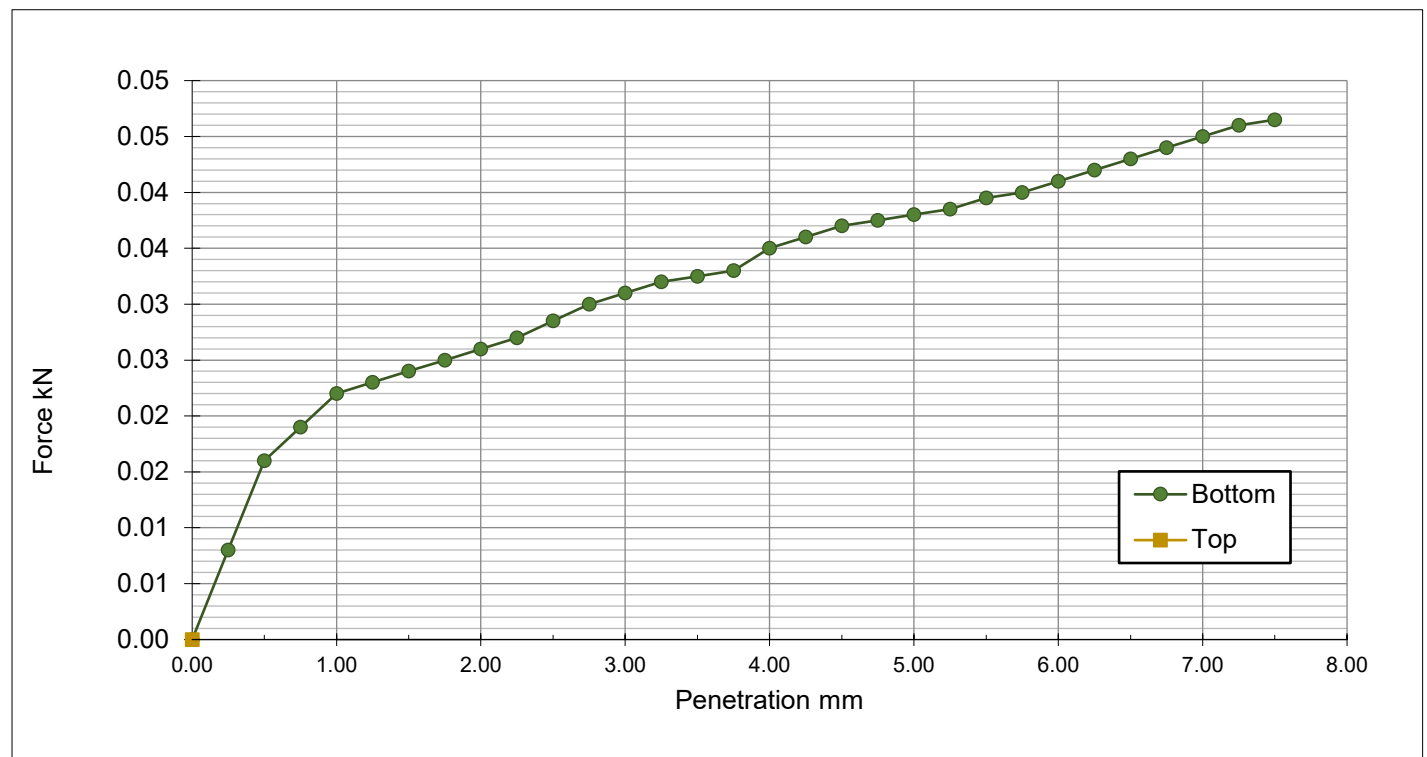
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP101S 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	131372	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty slightly gravelly SAND
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Effort, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	5 %				
BULK DENSITY	2.12 Mg/m3	MOISTURE CONTENT	20.8 %	DRY DENSITY	1.76 Mg/m3
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top	N/A	%
Bottom	0.2	%

ORIGIN CORRECTION

Top	N/A	mm
Bottom	N/A	mm

FINAL MOISTURE CONTENT

Top	N/A	%
Bottom	20.8	%

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

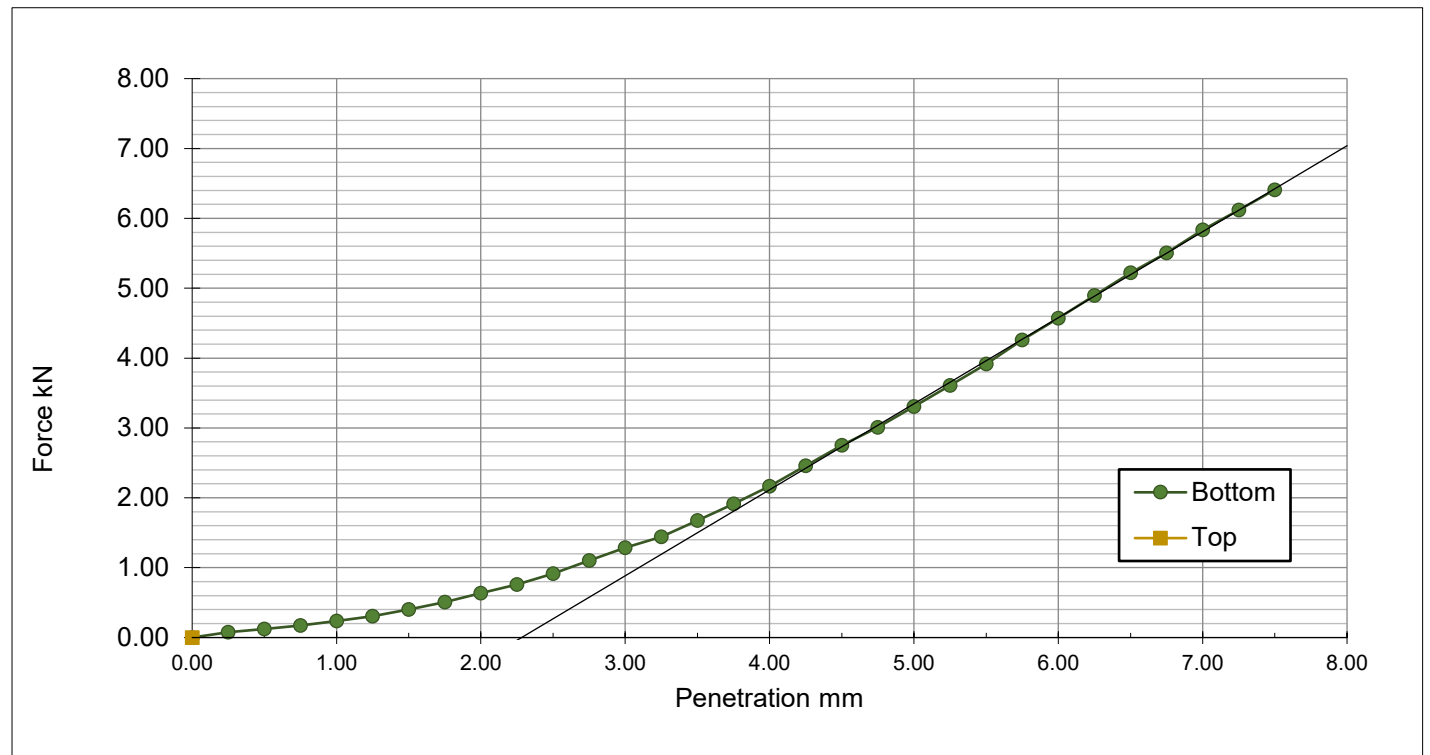
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 1.300	DATE SAMPLED	Not advised
LAB SAMPLE No	132373	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown silty SAND & GRAVEL
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Density, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	29 %				
BULK DENSITY	2.28 Mg/m3	MOISTURE CONTENT	9.2 %	DRY DENSITY	2.09 Mg/m3
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top N/A %
Bottom 30.6 %

ORIGIN CORRECTION

Top N/A mm
Bottom N/A mm

FINAL MOISTURE CONTENT

Top N/A %
Bottom 9.2 %

REMARKS

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

31-Oct-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870



TEST CERTIFICATE

CALIFORNIA BEARING RATIO (CBR)

BS 1377-2:2022 Cl. 15

DETERMINATION OF WATER CONTENT - BS EN ISO 17892-1:2014+A1:2022 (Oven Dry)

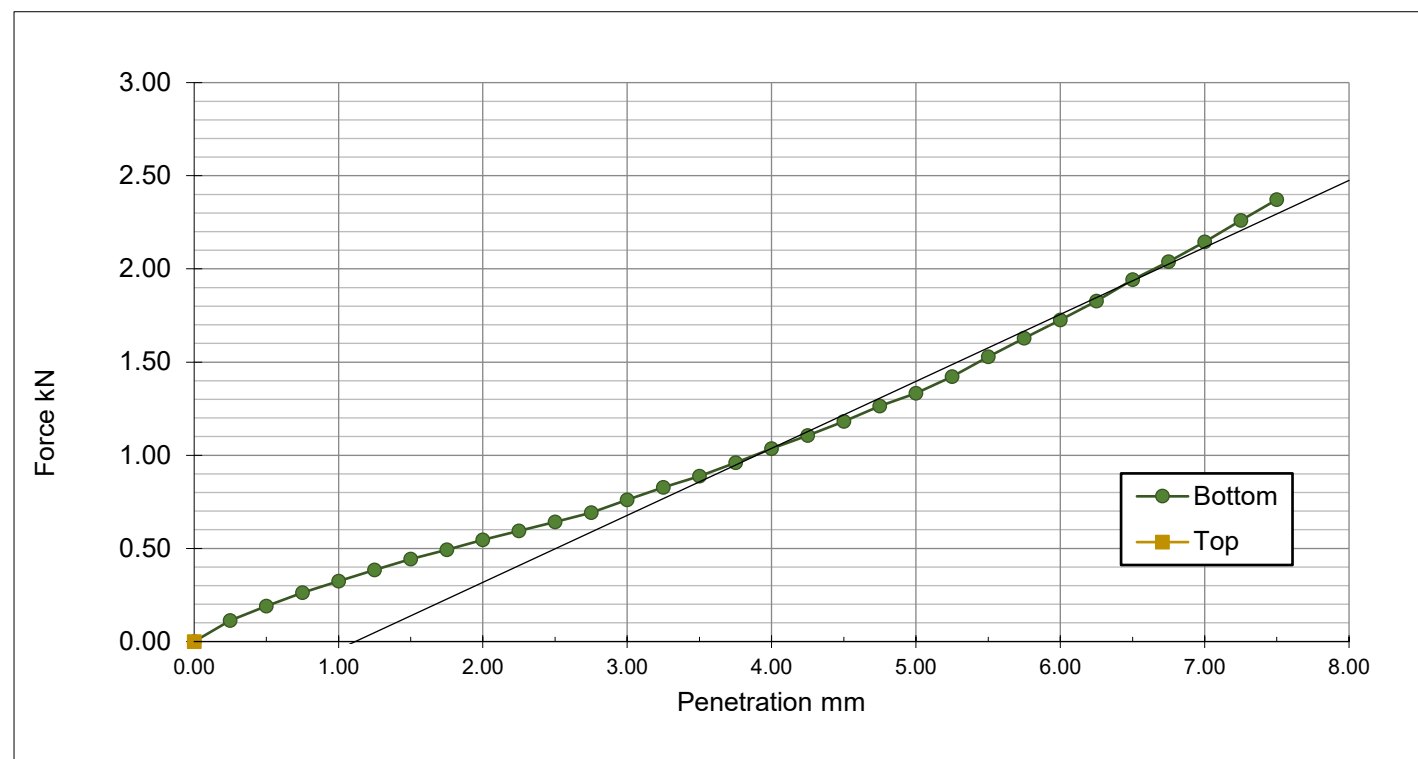
CLIENT	Brownfield Solutions Ltd
SITE	C5394 - Star Academy, Radcliffe
JOB NUMBER	MRN 4573/19

SAMPLE LABEL	TP103 0.500	DATE SAMPLED	Not advised
LAB SAMPLE No	132374	DATE RECEIVED	11-Oct-23
DATE TESTED	20-Oct-23	SAMPLED BY	Client

MATERIAL	Brown very silty gravelly SAND
ADVISED SOURCE	Site Investigation Sample

INITIAL CONDITIONS

SAMPLE PREPARATION	Dynamic Compaction, Specified Density, 4.5 kg Rammer				
GREATER THAN 20 mm REMOVED	5 %				
BULK DENSITY	2.15 Mg/m ³	MOISTURE CONTENT	14.8 %	DRY DENSITY	1.87 Mg/m ³
TEST CONDITION	Unsoaked	MEASURED SWELL	N/A mm	SURCHARGE	2 kg



CBR VALUE

Top N/A %
Bottom 8.6 %

ORIGIN CORRECTION

Top N/A mm
Bottom N/A mm

FINAL MOISTURE CONTENT

Top N/A %
Bottom 14.8 %

REMARKS

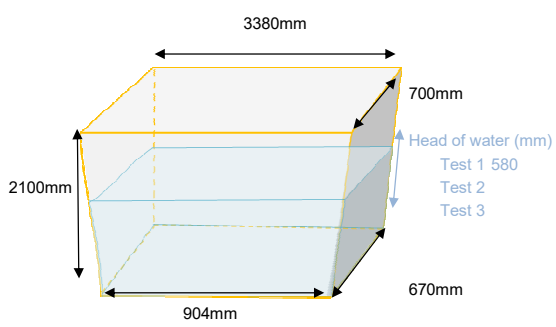
NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED

DATE

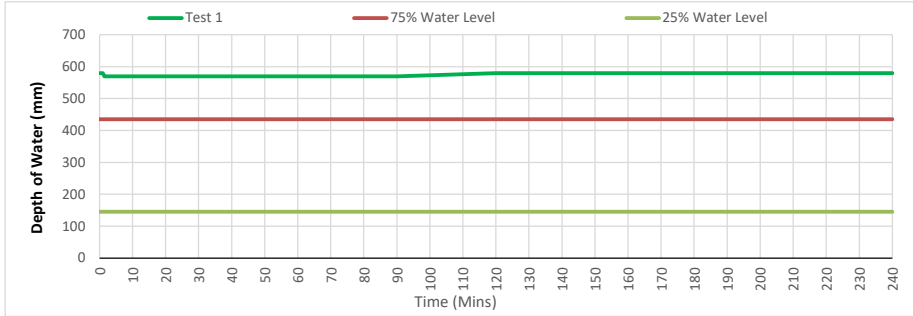
31-Oct-23

Percolation Test	MORGAN SINDALL		Date of Test: 08/11/2023	 BROWNFIELD SOLUTIONS LTD
	STAR ACADEMY, RADCLIFFE		Logged By: LH	
	SA101	C5394	Checked By: NS	

Dimensions (mm)		TEST 1	TEST 2	TEST 3	
Length at Top		3380	-	-	
Length at Bottom		904	-	-	
Width at Top		700	-	-	
Width at Bottom		670	-	-	
Depth Tested (Head of Water)		580			
Depth of Excavation		2100	-	-	
Volume of Water (m3)		0.8617872			
Void Ratio		1	-	-	
Factored Volume of Water (m3)		0.8617872			

Strata Description	Grey sandy GRAVEL
Pit Details	Open with no stone filling 500L drained straight from pit, and then began to gain a head of water

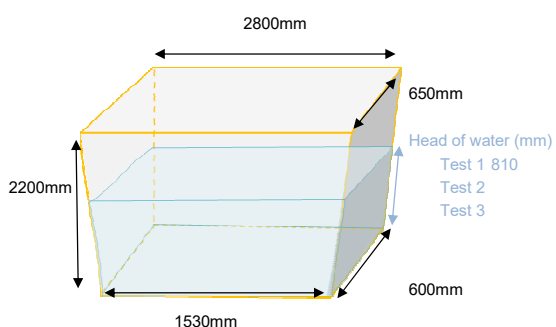
Site Recorded Data								
Test 1			Test 2			Test 3		
Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)
0	1520	580						
0.5	1520	580						
1	1520	580						
1.5	1530	570						
2	1530	570						
2.5	1530	570						
3	1530	570						
3.5	1530	570						
4	1530	570						
4.5	1530	570						
5	1530	570						
6	1530	570						
7	1530	570						
8	1530	570						
9	1530	570						
10	1530	570						
15	1530	570						
20	1530	570						
25	1530	570						
30	1530	570						
45	1530	570						
60	1530	570						
75	1530	570						
90	1530	570						
120	1520	580						
150	1520	580						
180	1520	580						
210	1520	580						
240	1520	580						

Data Analysis		
	Test 1	75% Water Level
	25% Water Level	

Soil Infiltration Rate Calculation				
Water Level 1 (mm)	(WL1)	Test 1	Test 2	Test 3
Water Level 2 (mm)	(WL2)	580	-	-
Time to drain from WL1 to WL2		570	-	-
Volume of Water Discharged (m3)		1.500	-	-
Discharge Area (m3)		0.0146727	-	-
Soil Infiltration Rate (m/min)		3.857	-	-
Soil Infiltration Rate (m/sec)		0.0025363	-	-
		4.23E-05	-	-

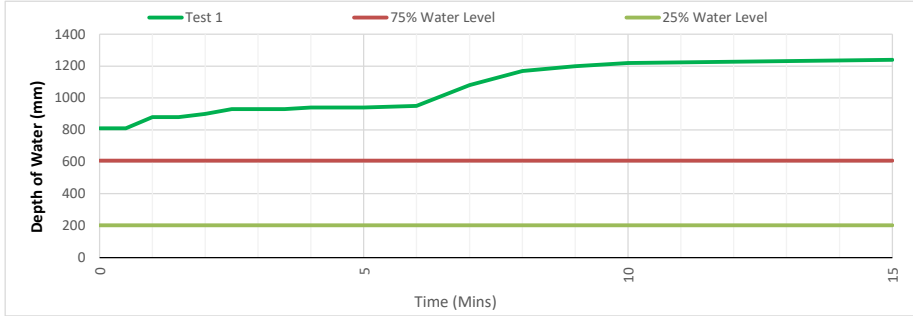
Compliance Check			
Water Level at 75% effective depth (mm)	Test 1	Test 2	Test 3
Water Level at 25% effective depth (mm)	435		
	145		
	Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth		

Percolation Test	MORGAN SINDALL	Date of Test: 08/11/2023		 BROWNFIELD SOLUTIONS LTD
	STAR ACADEMY, RADCLIFFE	Logged By: LH		
	SA102	C5394	Checked By: NS	

Dimensions (mm)	TEST 1	TEST 2	TEST 3	
Length at Top	2800	-	-	
Length at Bottom	1530	-	-	
Width at Top	650	-	-	
Width at Bottom	600	-	-	
Depth Tested (Head of Water)	810			
Depth of Excavation	2200	-	-	
Volume of Water (m3)	1.10889			
Void Ratio	1	-	-	
Factored Volume of Water (m3)	1.10889			

Strata Description	Gravelly CLAY
Pit Details	Open with no stone filling. Pit started collapsing after 60 seconds of starting the test & resulted in total failure of side walls within 15 mins - test abandoned.

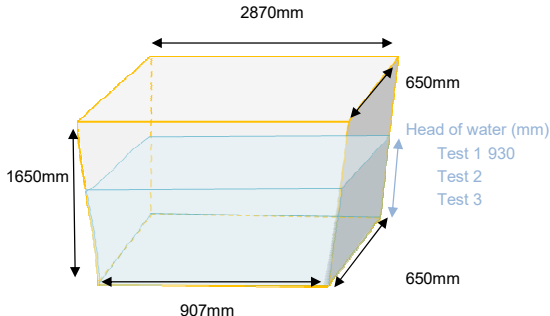
Site Recorded Data								
Test 1			Test 2			Test 3		
Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)
0	1390	810						
0.5	1390	810						
1	1320	880						
1.5	1320	880						
2	1300	900						
2.5	1270	930						
3	1270	930						
3.5	1270	930						
4	1260	940						
4.5	1260	940						
5	1260	940						
6	1250	950						
7	1120	1080						
8	1030	1170						
9	1000	1200						
10	980	1220						
15	960	1240						

Data Analysis	
	

Soil Infiltration Rate Calculation				
Water Level 1 (mm)	(WL1)	Test 1	Test 2	Test 3
Water Level 2 (mm)	(WL2)	810	-	-
Time to drain from WL1 to WL2		1240	-	-
Volume of Water Discharged (m3)		15.000	-	-
Discharge Area (m3)		-0.5818438	-	-
Soil Infiltration Rate (m/min)		6.638	-	-
Soil Infiltration Rate (m/sec)		-0.0058440	-	-
		-9.74E-05	-	-

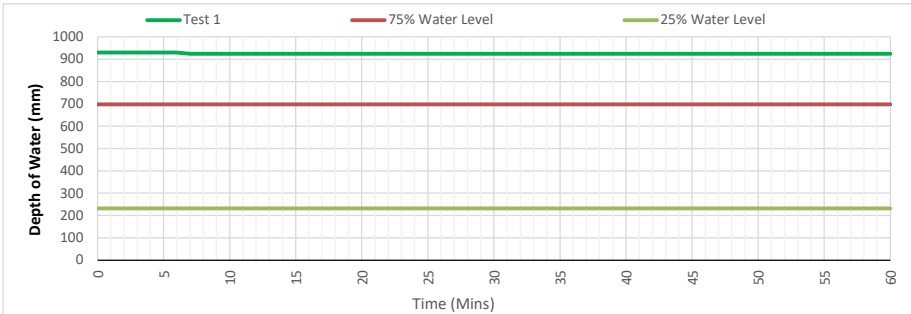
Compliance Check			
Water Level at 75% effective depth (mm)	Test 1	Test 2	Test 3
Water Level at 25% effective depth (mm)	607.5		
	202.5		
	Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth		

Percolation Test	MORGAN SINDALL	Date of Test: 08/11/2023	 BROWNFIELD SOLUTIONS LTD
	STAR ACADEMY, RADCLIFFE	Logged By: LH	
	C5394	Checked By: NS	

Dimensions (mm)	TEST 1	TEST 2	TEST 3	
Length at Top	2870	-	-	
Length at Bottom	907	-	-	
Width at Top	650	-	-	
Width at Bottom	650	-	-	
Depth Tested (Head of Water)	930			
Depth of Excavation	1650	-	-	
Volume of Water (m3)	1.14159825			
Void Ratio	1	-	-	
Factored Volume of Water (m3)	1.14159825			

Strata Description	Slightly gravelly slightly sandy CLAY
Pit Details	Open with no stone filling.

Site Recorded Data								
Test 1			Test 2			Test 3		
Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)	Time (mins)	Depth to water (mm)	Head of water (mm)
0	720	930						
0.5	720	930						
1	720	930						
1.5	720	930						
2	720	930						
2.5	720	930						
3	720	930						
3.5	720	930						
4	720	930						
4.5	720	930						
5	720	930						
6	720	930						
7	725	925						
8	725	925						
9	725	925						
10	725	925						
15	725	925						
20	725	925						
25	725	925						
30	725	925						
45	725	925						
60	725	925						

Data Analysis	
	

Soil Infiltration Rate Calculation				
Water Level 1 (mm)	(WL1)	Test 1	Test 2	Test 3
Water Level 2 (mm)	(WL2)	930	-	-
Time to drain from WL1 to WL2		925	-	-
Volume of Water Discharged (m3)		60.000	-	-
Discharge Area (m3)		0.0061376	-	-
Soil Infiltration Rate (m/min)		5.298	-	-
Soil Infiltration Rate (m/sec)		0.0000193	-	-
		3.22E-07	-	-

Compliance Check			
Water Level at 75% effective depth (mm)	Test 1	Test 2	Test 3
Water Level at 25% effective depth (mm)	697.5		
	232.5		
Not Compliant with BRE 365 - Insufficient time to drain past 25% effective depth			

APPENDIX E

Monitoring Results

Ground Gas Monitoring Results



CLIENT:	Date	Operator	Analysr	Weather Observations			Temp (°C)	Pressure Trend	Min Barometric Pressure (mb)	Notes
MORGAN SINDALL	30/08/2023	SJ	GFM436	Intermittent cloud	Light breeze	Cool	17	Rising	1007	
JOB NO.	13/09/2023	NHA	GFM436	Sunny	Light breeze	Cool	17	Rising	1010	
C5394	27/09/2023	PH	GFM436	Light rain	Light breeze	Cool	17	Falling	1001	
SITE:										
STAR ACADEMY, RADCLIFFE										

Notes: mb = milibars; CH₄ = methane; LEL = lower explosive limit = 5%v/v; CO₂ = carbon dioxide; O₂ = oxygen; CO=carbon monoxide; H₂S = hydrogen sulphide; TVOC= Total volatile organic compounds; PPM = parts per million. Where the flow is less than the limit of detection of the instrument, the detection limit is reported (Highlighted in green). Gas Screening Values (GSVs) are rounded to 3 decimal places. Calibration Records for analysers used available on request.

Date	Time	Location	Response zone (m)	Pressures (mb)		Gas flows (l/hr)		CH ₄ (%v/v)		CH ₄ (%LEL)		CO ₂ (%v/v)		O ₂ (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH ₄) (l/hr)	Gas Screening Value (CO ₂) (l/hr)	Notes		
				Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H ₂ S	TVOC (PID)							
				Summary Statistics																					
Max. values:				1015	55.0	21.7	37.8	41.6	26.1	832.0	522.0	11.7	9.6	21.5	20.8	22.0	1.0	1.0	6.1	20.0	0.000	0.832	Highlight Box - Methane >1.0% v/v		
Min. values:				996	-4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.7	0.0	0.0	0.0	0.6	1.2	0.000	0.000	Highlight Box - Carbon Dioxide >5.0% v/v		
Top Bottom				Worst-case GSVs based on maximum recorded steady flow and maximum individual peak concentrations:																		15.725	4.423	Highlight Box - Water above Response Zone	
30/08/2023	PM	Ambient Start			999			0.0		0.0		0.0		20.9									Oxygen rapidly decreased and ch4 rapidly increased on peak readings. Steady readings same but at slower rate.		
		WS101	0.60	1.20		55.0	0.0	0.0	32.3	26.1	646.0	522.0	2.4	2.3	0.5	4.7	0.0	0.0		0.86	1.22	0.000		0.000	
	WS102	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.9	3.7	12.0	0.0	0.0		0.90	1.50	0.000	0.000			
	WS103	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.8	17.4	19.6	10.0	0.0		0.70	1.50	0.000	0.000			
	WS104	1.00	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	5.0	10.6	11.0	10.0	0.0		1.28	2.07	0.000	0.000			
	RO103	18.00	20.00		0.0		5.7	0.0	0.0	0.0	0.0		0.0		20.6	0.0	0.0		0.73	19.73	0.000	0.000			
	RO104	17.50	20.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	18.8	20.7	22.0	0.0		3.15	19.17	0.000	0.000			
	PM	Ambient End			996			0.0		0.0		0.0		20.8											
	13/09/2023	AM	Ambient			1015	0.0	0.0		0.0		0.0		0.0		21.4									
WS101			0.60	1.20		0.0	0.0	0.0	41.6	9.0	832.0	180.0	3.2	1.8	0.1	14.9	10.0	0.0	>300 / 7.80	0.85	2.10	0.000	0.000	Hole purged prior to steady measurements	
WS102		0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.9	13.8	18.4	0.0	1.0	1.0	0.87	1.40	0.000	0.000	Hole purged prior to steady measurements		
WS103		0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.2	14.3	15.4	0.0	0.0	1.0	0.60	1.45	0.000	0.000	Hole purged prior to steady measurements		
WS104		1.00	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.7	2.4	5.6	16.4	1.0	0.0	0.0	1.25	1.95	0.000	0.000	Hole purged prior to steady measurements		
RO103		18.00	20.00		-4.0	a	0.0	0.0	0.0	0.0	0.0	1.8	1.2	18.1	19.6	0.0	0.0	1.0	1.37	18.84	0.000	0.000	Hole purged prior to steady measurements		
RO104		17.50	20.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	19.8	20.8	0.0	0.0	1.0	6.08	18.70	0.000	0.000	Hole purged prior to steady measurements		
PM		Ambient End			1010		0.0		0.0		0.0		0.0		20.8										
27/09/2023	AM	Ambient			1001			0.0		0.0		0.0		21.2											
		WS101	0.60	1.20		0.0	15.5	0.0	23.9	4.2	478.0	84.0	4.6	0.4	0.1	19.0	0.0	0.0	>>>	0.70	2.00	0.000	0.000	Hole purged prior to steady measurements	
	WS102	0.50	1.50		0.0	21.7	0.3	0.0	0.0	0.0	0.0	4.8	0.0	7.1	19.3	0.0	0.0	1.0	1.00	1.50	0.000	0.014	Hole purged prior to steady measurements		
	WS103	0.50	1.50		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	3.4	15.2	15.2	0.0	0.0	1.0	0.73	1.50	0.000	0.000	Hole purged prior to steady measurements		
	WS104	1.00	2.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	9.6	7.6	6.1	0.0	0.0	1.0	1.34	2.00	0.000	0.000	Hole purged prior to steady measurements		
	RO103	18.00	20.00		0.0	19.5	37.8	0.0	0.0	0.0	0.0	2.2	0.3	17.1	20.6	0.0	0.0	0.0	0.60	19.30	0.000	0.832	Hole purged prior to steady measurements		
	RO104	17.50	20.00		0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	15.6	20.4	0.0	0.0	0.0	4.10	20.00	0.000	0.000	Increased steady likely due to rising GW after purge.		
	PM	Ambient End			996			0.0		0.0		0.0		21.5											

APPENDIX F

Waste Assessment Report

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



GPAM2-MXR2Z-RQT5X

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

Star Academy, Radcliffe

Description/Comments

Project

C5394

Site

Classified by

Name: **Jake Wheaton**
 Date: **12 Oct 2023 09:39 GMT**
 Telephone: **01606334844**
 Company: **Brownfield Solutions Limited**
Brownfield Solutions Ltd
173-183 Witton Street
Northwich
CW9 5LP

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

07 Oct 2021

Next 3 year Refresher due by Oct 2024

Purpose of classification

2 - Material Characterisation

Address of the waste

Spring Lane, Radcliffe, Manchester

Post Code **M26 2SZ**

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

Construction of a 'super teaching block' with a sports hall annexe and extensive MUGA / Sports Pitches

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils for foundations and earthworks.

Description of the waste

Mixture of slightly gravelly slightly sandy CLAY, slightly sandy CLAY, slightly sandy GRAVEL, Tarmacadam, gravelly SAND, slightly clayey gravelly SAND.



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	BH03	0.5	Non Hazardous		3
2	BH03[2]	2	Non Hazardous		5
3	BH03A	2	Non Hazardous		7
4	BH01	0.5	Non Hazardous		9
5	HD03	1	Non Hazardous		11
6	DCP07	0.2	Non Hazardous		13
7	DCP08	0.2	Non Hazardous		16
8	HDP04	0.5	Non Hazardous		19
9	HD01	1	Non Hazardous		22
10	DCP05	0.5	Non Hazardous		25
11	BH02	0.5	Non Hazardous		28
12	DS01[2]	0.5	Non Hazardous		31
13	DS04	0.5	Non Hazardous		34
14	DS05	0.5	Non Hazardous		37
15	HD02	0.5	Non Hazardous		40
16	BH04	1	Non Hazardous		43

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jake Wheaton

Created date: 12 Oct 2023 09:39 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	45
Appendix B: Rationale for selection of metal species	46
Appendix C: Version	46



Classification of sample: BH03

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

Sample details

Sample name:	LoW Code:
BH03	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.2	pH		7.2	pH	7.2 pH		
2	arsenic { arsenic trioxide }				13	mg/kg	1.32	17.164	mg/kg	0.00172 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				40	mg/kg	1.126	45.036	mg/kg	0.0045 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	42	mg/kg	1.56	65.512	mg/kg	0.0042 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				20	mg/kg	1.579	31.59	mg/kg	0.00316 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.5	mg/kg	1.405	0.703	mg/kg	0.0000703 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				110	mg/kg	2.774	305.156	mg/kg	0.0305 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.36	mg/kg		0.36	mg/kg	0.000036 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				0.03	mg/kg		0.03	mg/kg	0.000003 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				0.39	mg/kg		0.39	mg/kg	0.000039 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.36	mg/kg		0.36	mg/kg	0.000036 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				1.6	mg/kg		1.6	mg/kg	0.00016 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.37	mg/kg		0.37	mg/kg	0.000037 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		1.7 mg/kg		1.7 mg/kg	0.00017 %	✓	
17	pyrene	204-927-3	129-00-0		1.4 mg/kg		1.4 mg/kg	0.00014 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.37 mg/kg		0.37 mg/kg	0.000037 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.5 mg/kg		0.5 mg/kg	0.00005 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.4 mg/kg		0.4 mg/kg	0.00004 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.3 mg/kg		0.3 mg/kg	0.00003 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.1 mg/kg		0.1 mg/kg	0.00001 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.04 mg/kg		0.04 mg/kg	0.000004 %	✓	
25	benzo[ghi]perylene	205-883-8	191-24-2		0.13 mg/kg		0.13 mg/kg	0.000013 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		0.3 mg/kg		0.3 mg/kg	0.00003 %	✓	
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0487 %		

Key

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



Classification of sample: BH03[2]

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

Sample details

Sample name:	LoW Code:	
BH03[2]	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2 m		

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				6.6	pH		6.6	pH	6.6 pH		
2	arsenic { arsenic trioxide }				7.2	mg/kg	1.32	9.506	mg/kg	0.000951 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				22	mg/kg	1.462	32.154	mg/kg	0.00322 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				21	mg/kg	1.126	23.644	mg/kg	0.00236 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	14	mg/kg	1.56	21.837	mg/kg	0.0014 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				26	mg/kg	1.579	41.067	mg/kg	0.00411 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.7	mg/kg	1.405	0.983	mg/kg	0.0000983 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				82	mg/kg	2.774	227.48	mg/kg	0.0227 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.21	mg/kg		0.21	mg/kg	0.000021 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.12	mg/kg		0.12	mg/kg	0.000012 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				0.06	mg/kg		0.06	mg/kg	0.000006 %	✓	
		201-581-5	85-01-8									
15	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0362 %		

Key

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



Classification of sample: BH03A

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

Sample details

Sample name:	LoW Code:
BH03A	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				6.1	pH		6.1	pH	6.1 pH		
2	arsenic { arsenic trioxide }				8.9	mg/kg	1.32	11.751	mg/kg	0.00118 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				19	mg/kg	1.126	21.392	mg/kg	0.00214 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	18	mg/kg	1.56	28.077	mg/kg	0.0018 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				16	mg/kg	1.579	25.272	mg/kg	0.00253 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				89	mg/kg	2.774	246.899	mg/kg	0.0247 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
15	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0362 %		

Key

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



Classification of sample: BH01

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

Sample details

Sample name:	LoW Code:
BH01	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				6.8	pH		6.8	pH	6.8 pH		
2	arsenic { arsenic trioxide }				7.5	mg/kg	1.32	9.902	mg/kg	0.00099 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14	mg/kg	1.462	20.462	mg/kg	0.00205 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				21	mg/kg	1.126	23.644	mg/kg	0.00236 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	17	mg/kg	1.56	26.517	mg/kg	0.0017 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				18	mg/kg	1.579	28.431	mg/kg	0.00284 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				60	mg/kg	2.774	166.449	mg/kg	0.0166 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
15	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.028 %		

Key

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



Classification of sample: HD03

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

Sample details

Sample name:	LoW Code:
HD03	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.4	pH		7.4	pH	7.4 pH		
2	arsenic { arsenic trioxide }				7.3	mg/kg	1.32	9.638	mg/kg	0.000964 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15	mg/kg	1.462	21.923	mg/kg	0.00219 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				27	mg/kg	1.126	30.399	mg/kg	0.00304 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	16	mg/kg	1.56	24.957	mg/kg	0.0016 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				30	mg/kg	1.579	47.385	mg/kg	0.00474 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				61	mg/kg	2.774	169.223	mg/kg	0.0169 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.1	mg/kg		0.1	mg/kg	0.00001 %	✓	
		201-581-5	85-01-8									
15	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		0.15 mg/kg		0.15 mg/kg	0.000015 %	✓	
17	pyrene	204-927-3	129-00-0		0.14 mg/kg		0.14 mg/kg	0.000014 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.05 mg/kg		0.05 mg/kg	0.000005 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.07 mg/kg		0.07 mg/kg	0.000007 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.06 mg/kg		0.06 mg/kg	0.000006 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.05 mg/kg		0.05 mg/kg	0.000005 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0309 %		

Key

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



Classification of sample: DCP07

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

Sample details

Sample name:	LoW Code:
DCP07	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.2 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				6.8	pH		6.8	pH	6.8 pH		
2	arsenic { arsenic trioxide }				14	mg/kg	1.32	18.485	mg/kg	0.00185 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18	mg/kg	1.462	26.308	mg/kg	0.00263 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				74	mg/kg	1.126	83.316	mg/kg	0.00833 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	70	mg/kg	1.56	109.187	mg/kg	0.007 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				25	mg/kg	1.579	39.487	mg/kg	0.00395 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.2	mg/kg	1.405	1.686	mg/kg	0.000169 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				180	mg/kg	2.774	499.346	mg/kg	0.0499 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.07	mg/kg		0.07	mg/kg	0.000007 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.17	mg/kg		0.17	mg/kg	0.000017 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.12	mg/kg		0.12	mg/kg	0.000012 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				1.5	mg/kg		1.5	mg/kg	0.00015 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.33	mg/kg		0.33	mg/kg	0.000033 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		2.3 mg/kg		2.3 mg/kg	0.00023 %	✓	
17	pyrene	204-927-3	129-00-0		1.7 mg/kg		1.7 mg/kg	0.00017 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.55 mg/kg		0.55 mg/kg	0.000055 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.66 mg/kg		0.66 mg/kg	0.000066 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.52 mg/kg		0.52 mg/kg	0.000052 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.21 mg/kg		0.21 mg/kg	0.000021 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.36 mg/kg		0.36 mg/kg	0.000036 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.2 mg/kg		0.2 mg/kg	0.00002 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		14.84 mg/kg		14.84 mg/kg	0.00148 %	✓	
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0765 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00148%)



Classification of sample: DCP08



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

Sample details

Sample name:	LoW Code:
DCP08	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.2 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH		PH		6.8	pH		6.8	pH	6.8 pH		
2	arsenic { arsenic trioxide }				9.7	mg/kg	1.32	12.807	mg/kg	0.00128 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				20	mg/kg	1.462	29.231	mg/kg	0.00292 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	34.903	mg/kg	0.00349 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	41	mg/kg	1.56	63.952	mg/kg	0.0041 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				20	mg/kg	1.579	31.59	mg/kg	0.00316 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulfoxeselenide and those specified elsewhere in this Annex }				0.7	mg/kg	1.405	0.983	mg/kg	0.0000983 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				150	mg/kg	2.774	416.122	mg/kg	0.0416 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.05	mg/kg		0.05	mg/kg	0.000005 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.05	mg/kg		0.05	mg/kg	0.000005 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				0.7	mg/kg		0.7	mg/kg	0.00007 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.23	mg/kg		0.23	mg/kg	0.000023 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		1.6 mg/kg		1.6 mg/kg	0.00016 %	✓	
17	pyrene	204-927-3	129-00-0		1.3 mg/kg		1.3 mg/kg	0.00013 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.38 mg/kg		0.38 mg/kg	0.000038 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.42 mg/kg		0.42 mg/kg	0.000042 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.32 mg/kg		0.32 mg/kg	0.000032 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.15 mg/kg		0.15 mg/kg	0.000015 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.23 mg/kg		0.23 mg/kg	0.000023 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.13 mg/kg		0.13 mg/kg	0.000013 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.11 mg/kg		0.11 mg/kg	0.000011 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		16.93 mg/kg		16.93 mg/kg	0.00169 %	✓	
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0592 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00169%)



Classification of sample: HDP04

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

Sample details

Sample name:	LoW Code:
HDP04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.8	pH		7.8	pH	7.8 pH		
2	arsenic { arsenic trioxide }				18	mg/kg	1.32	23.766	mg/kg	0.00238 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				81	mg/kg	1.126	91.197	mg/kg	0.00912 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	130	mg/kg	1.56	202.776	mg/kg	0.013 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				21	mg/kg	1.579	33.169	mg/kg	0.00332 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.9	mg/kg	1.405	1.265	mg/kg	0.000126 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				110	mg/kg	2.774	305.156	mg/kg	0.0305 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.53	mg/kg		0.53	mg/kg	0.000053 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				1.2	mg/kg		1.2	mg/kg	0.00012 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.8	mg/kg		0.8	mg/kg	0.00008 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				9.5	mg/kg		9.5	mg/kg	0.00095 %	✓	
		201-581-5	85-01-8									
15	anthracene				2.3	mg/kg		2.3	mg/kg	0.00023 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		12 mg/kg		12 mg/kg	0.0012 %	✓	
17	pyrene	204-927-3	129-00-0		11 mg/kg		11 mg/kg	0.0011 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		3.9 mg/kg		3.9 mg/kg	0.00039 %	✓	
19	chrysene	601-048-00-0	205-923-4		4.2 mg/kg		4.2 mg/kg	0.00042 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		3.4 mg/kg		3.4 mg/kg	0.00034 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		1.6 mg/kg		1.6 mg/kg	0.00016 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		2.9 mg/kg		2.9 mg/kg	0.00029 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		1.2 mg/kg		1.2 mg/kg	0.00012 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.34 mg/kg		0.34 mg/kg	0.000034 %	✓	
25	benzo[ghi]perylene	205-883-8	191-24-2		1.1 mg/kg		1.1 mg/kg	0.00011 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		191.1 mg/kg		191.1 mg/kg	0.0191 %	✓	
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0859 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0191%)



Classification of sample: HD01



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

Sample details

Sample name:	LoW Code:
HD01	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1 m	

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH		PH		8.1	pH		8.1	pH	8.1 pH		
2	arsenic { arsenic trioxide }				24	mg/kg	1.32	31.688	mg/kg	0.00317 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				150	mg/kg	1.126	168.883	mg/kg	0.0169 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	33	mg/kg	1.56	51.474	mg/kg	0.0033 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				49	mg/kg	1.579	77.395	mg/kg	0.00774 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulfoxeselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				61	mg/kg	2.774	169.223	mg/kg	0.0169 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.09	mg/kg		0.09	mg/kg	0.000009 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.13	mg/kg		0.13	mg/kg	0.000013 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		0.38 mg/kg		0.38 mg/kg	0.000038 %	✓	
17	pyrene	204-927-3	129-00-0		0.44 mg/kg		0.44 mg/kg	0.000044 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.21 mg/kg		0.21 mg/kg	0.000021 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.27 mg/kg		0.27 mg/kg	0.000027 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.09 mg/kg		0.09 mg/kg	0.000009 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.2 mg/kg		0.2 mg/kg	0.00002 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.08 mg/kg		0.08 mg/kg	0.000008 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.08 mg/kg		0.08 mg/kg	0.000008 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		15.76 mg/kg		15.76 mg/kg	0.00158 %	✓	
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0526 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00158%)



Classification of sample: DCP05

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

Sample details

Sample name:	LoW Code:
DCP05	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				9.7	pH		9.7	pH	9.7 pH		
2	arsenic { arsenic trioxide }				7.3	mg/kg	1.32	9.638	mg/kg	0.000964 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				9.9	mg/kg	1.462	14.469	mg/kg	0.00145 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				44	mg/kg	1.126	49.539	mg/kg	0.00495 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	40	mg/kg	1.56	62.393	mg/kg	0.004 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				14	mg/kg	1.579	22.113	mg/kg	0.00221 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				57	mg/kg	2.774	158.126	mg/kg	0.0158 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.11	mg/kg		0.11	mg/kg	0.000011 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.38	mg/kg		0.38	mg/kg	0.000038 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.29	mg/kg		0.29	mg/kg	0.000029 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				2.4	mg/kg		2.4	mg/kg	0.00024 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.78	mg/kg		0.78	mg/kg	0.000078 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		3.6 mg/kg		3.6 mg/kg	0.00036 %	✓	
17	pyrene	204-927-3	129-00-0		3.3 mg/kg		3.3 mg/kg	0.00033 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		1.1 mg/kg		1.1 mg/kg	0.00011 %	✓	
19	chrysene	601-048-00-0	205-923-4		1.3 mg/kg		1.3 mg/kg	0.00013 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.5 mg/kg		1.5 mg/kg	0.00015 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.5 mg/kg		0.5 mg/kg	0.00005 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.1 mg/kg		1.1 mg/kg	0.00011 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.33 mg/kg		0.33 mg/kg	0.000033 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.09 mg/kg		0.09 mg/kg	0.000009 %	✓	
25	benzo[ghi]perylene	205-883-8	191-24-2		0.42 mg/kg		0.42 mg/kg	0.000042 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		47.16 mg/kg		47.16 mg/kg	0.00472 %	✓	
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0361 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00472%)



Classification of sample: BH02



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

Sample details

Sample name:	LoW Code:
BH02	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.5 m	

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH		PH		6.7	pH		6.7	pH	6.7 pH		
2	arsenic { arsenic trioxide }				4.1	mg/kg	1.32	5.413	mg/kg	0.000541 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				7.6	mg/kg	1.462	11.108	mg/kg	0.00111 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				6	mg/kg	1.126	6.755	mg/kg	0.000676 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	8.4	mg/kg	1.56	13.102	mg/kg	0.00084 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				4.3	mg/kg	1.579	6.792	mg/kg	0.000679 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulfoxeselenide and those specified elsewhere in this Annex }				0.5	mg/kg	1.405	0.703	mg/kg	0.0000703 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				81	mg/kg	2.774	224.706	mg/kg	0.0225 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
15	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
17	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	TPH (C6 to C40) petroleum group		TPH		12.93 mg/kg		12.93 mg/kg	0.00129 %	✓	
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.028 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00129%)



Classification of sample: DS01[2]



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

Sample details

Sample name:	LoW Code:
DS01[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				5.9	pH		5.9	pH	5.9 pH		
2	arsenic { arsenic trioxide }				130	mg/kg	1.32	171.642	mg/kg	0.0172 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				160	mg/kg	1.462	233.849	mg/kg	0.0234 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				190	mg/kg	1.126	213.919	mg/kg	0.0214 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	380	mg/kg	1.56	592.73	mg/kg	0.038 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				31	mg/kg	1.579	48.964	mg/kg	0.0049 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.4	mg/kg	1.405	1.967	mg/kg	0.000197 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				220	mg/kg	2.774	610.312	mg/kg	0.061 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.41	mg/kg		0.41	mg/kg	0.000041 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.54	mg/kg		0.54	mg/kg	0.000054 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.26	mg/kg		0.26	mg/kg	0.000026 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				2.2	mg/kg		2.2	mg/kg	0.00022 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.41	mg/kg		0.41	mg/kg	0.000041 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		2.1 mg/kg		2.1 mg/kg	0.00021 %	✓	
17	pyrene	204-927-3	129-00-0		1.9 mg/kg		1.9 mg/kg	0.00019 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		0.41 mg/kg		0.41 mg/kg	0.000041 %	✓	
19	chrysene	601-048-00-0	205-923-4		0.45 mg/kg		0.45 mg/kg	0.000045 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.28 mg/kg		0.28 mg/kg	0.000028 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.07 mg/kg		0.07 mg/kg	0.000007 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.16 mg/kg		0.16 mg/kg	0.000016 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.06 mg/kg		0.06 mg/kg	0.000006 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.06 mg/kg		0.06 mg/kg	0.000006 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		44.69 mg/kg		44.69 mg/kg	0.00447 %	✓	
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		0.9 mg/kg		0.9 mg/kg	0.00009 %	✓	
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.172 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Relatively low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00447%)



Classification of sample: DS04

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

Sample details

Sample name:	LoW Code:
DS04	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.5 m	

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH		PH		7.6	pH		7.6	pH	7.6 pH		
2	arsenic { arsenic trioxide }				12	mg/kg	1.32	15.844	mg/kg	0.00158 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19	mg/kg	1.462	27.77	mg/kg	0.00278 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				48	mg/kg	1.126	54.043	mg/kg	0.0054 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	39	mg/kg	1.56	60.833	mg/kg	0.0039 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				23	mg/kg	1.579	36.328	mg/kg	0.00363 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulfoxeselenide and those specified elsewhere in this Annex }				0.5	mg/kg	1.405	0.703	mg/kg	0.0000703 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				90	mg/kg	2.774	249.673	mg/kg	0.025 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.04	mg/kg		0.04	mg/kg	0.000004 %	✓	
		201-469-6	83-32-9									
13	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
14	phenanthrene				0.27	mg/kg		0.27	mg/kg	0.000027 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.07	mg/kg		0.07	mg/kg	0.000007 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		0.44 mg/kg		0.44 mg/kg	0.000044 %	✓	
17	pyrene	204-927-3	129-00-0		0.43 mg/kg		0.43 mg/kg	0.000043 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.2 mg/kg		0.2 mg/kg	0.00002 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.05 mg/kg		0.05 mg/kg	0.000005 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.1 mg/kg		0.1 mg/kg	0.00001 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.05 mg/kg		0.05 mg/kg	0.000005 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.05 mg/kg		0.05 mg/kg	0.000005 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		18.1 mg/kg		18.1 mg/kg	0.00181 %	✓	
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0446 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Relatively low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00181%)



Classification of sample: DS05

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

Sample details

Sample name:	LoW Code:
DS05	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.5 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.8	pH		7.8	pH	7.8 pH		
2	arsenic { arsenic trioxide }				28	mg/kg	1.32	36.969	mg/kg	0.0037 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				29	mg/kg	1.462	42.385	mg/kg	0.00424 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				190	mg/kg	1.126	213.919	mg/kg	0.0214 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	180	mg/kg	1.56	280.767	mg/kg	0.018 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				37	mg/kg	1.579	58.441	mg/kg	0.00584 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				170	mg/kg	2.774	471.605	mg/kg	0.0472 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				21	mg/kg		21	mg/kg	0.0021 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				1	mg/kg		1	mg/kg	0.0001 %	✓	
		205-917-1	208-96-8									
12	acenaphthene				21	mg/kg		21	mg/kg	0.0021 %	✓	
		201-469-6	83-32-9									
13	fluorene				15	mg/kg		15	mg/kg	0.0015 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				65	mg/kg		65	mg/kg	0.0065 %	✓	
		201-581-5	85-01-8									
15	anthracene				14	mg/kg		14	mg/kg	0.0014 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		79 mg/kg		79 mg/kg	0.0079 %	✓	
17	pyrene	204-927-3	129-00-0		73 mg/kg		73 mg/kg	0.0073 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6		23 mg/kg		23 mg/kg	0.0023 %	✓	
19	chrysene	601-048-00-0	205-923-4		30 mg/kg		30 mg/kg	0.003 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9		23 mg/kg		23 mg/kg	0.0023 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6		10 mg/kg		10 mg/kg	0.001 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		19 mg/kg		19 mg/kg	0.0019 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		8.8 mg/kg		8.8 mg/kg	0.00088 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8		2.1 mg/kg		2.1 mg/kg	0.00021 %	✓	
25	benzo[ghi]perylene	205-883-8	191-24-2		8.9 mg/kg		8.9 mg/kg	0.00089 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		594.9 mg/kg		594.9 mg/kg	0.0595 %	✓	
27	benzene	601-020-00-8	200-753-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7		1.2 mg/kg		1.2 mg/kg	0.00012 %	✓	
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.202 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Relatively low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0595%)



Classification of sample: HD02



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

Sample details

Sample name:	LoW Code:
HD02	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.5 m	

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH		PH		8.8	pH		8.8	pH	8.8 pH		
2	arsenic { arsenic trioxide }				9.7	mg/kg	1.32	12.807	mg/kg	0.00128 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				43	mg/kg	1.126	48.413	mg/kg	0.00484 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	22	mg/kg	1.56	34.316	mg/kg	0.0022 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				17	mg/kg	1.579	26.851	mg/kg	0.00269 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulfoxeselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
9	zinc { zinc chromate }				49	mg/kg	2.774	135.933	mg/kg	0.0136 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.11	mg/kg		0.11	mg/kg	0.000011 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.2	mg/kg		0.2	mg/kg	0.00002 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.11	mg/kg		0.11	mg/kg	0.000011 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				1.3	mg/kg		1.3	mg/kg	0.00013 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.37	mg/kg		0.37	mg/kg	0.000037 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		1.9 mg/kg		1.9 mg/kg	0.00019 %	✓	
17	pyrene	204-927-3	129-00-0		2 mg/kg		2 mg/kg	0.0002 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.65 mg/kg		0.65 mg/kg	0.000065 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.65 mg/kg		0.65 mg/kg	0.000065 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.58 mg/kg		0.58 mg/kg	0.000058 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.22 mg/kg		0.22 mg/kg	0.000022 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.41 mg/kg		0.41 mg/kg	0.000041 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.11 mg/kg		0.11 mg/kg	0.000011 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.04 mg/kg		0.04 mg/kg	0.000004 %	✓	
25	benzo[ghi]perylene	205-883-8	191-24-2		0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		19.05 mg/kg		19.05 mg/kg	0.00191 %	✓	
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.0293 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Relatively low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."



Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00191%)



Classification of sample: BH04

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

Sample details

Sample name:	LoW Code:
BH04	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				7.5	pH		7.5	pH	7.5 pH		
2	arsenic { arsenic trioxide }				15	mg/kg	1.32	19.805	mg/kg	0.00198 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14	mg/kg	1.462	20.462	mg/kg	0.00205 %	✓	
		215-160-9	1308-38-9									
5	copper { dicopper oxide; copper (I) oxide }				130	mg/kg	1.126	146.365	mg/kg	0.0146 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	12	mg/kg	1.56	18.718	mg/kg	0.0012 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	nickel { nickel dihydroxide }				40	mg/kg	1.579	63.18	mg/kg	0.00632 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.7	mg/kg	1.405	0.983	mg/kg	0.0000983 %	✓	
	034-002-00-8											
9	zinc { zinc chromate }				22	mg/kg	2.774	61.031	mg/kg	0.0061 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	naphthalene				0.04	mg/kg		0.04	mg/kg	0.000004 %	✓	
	601-052-00-2	202-049-5	91-20-3									
11	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
12	acenaphthene				0.04	mg/kg		0.04	mg/kg	0.000004 %	✓	
		201-469-6	83-32-9									
13	fluorene				0.04	mg/kg		0.04	mg/kg	0.000004 %	✓	
		201-695-5	86-73-7									
14	phenanthrene				0.47	mg/kg		0.47	mg/kg	0.000047 %	✓	
		201-581-5	85-01-8									
15	anthracene				0.1	mg/kg		0.1	mg/kg	0.00001 %	✓	
		204-371-1	120-12-7									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	fluoranthene	205-912-4	206-44-0		0.57 mg/kg		0.57 mg/kg	0.000057 %	✓	
17	pyrene	204-927-3	129-00-0		0.57 mg/kg		0.57 mg/kg	0.000057 %	✓	
18	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.31 mg/kg		0.31 mg/kg	0.000031 %	✓	
19	chrysene	601-048-00-0	205-923-4	218-01-9	0.41 mg/kg		0.41 mg/kg	0.000041 %	✓	
20	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.4 mg/kg		0.4 mg/kg	0.00004 %	✓	
21	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.17 mg/kg		0.17 mg/kg	0.000017 %	✓	
22	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.34 mg/kg		0.34 mg/kg	0.000034 %	✓	
23	indeno[123-cd]pyrene	205-893-2	193-39-5		0.28 mg/kg		0.28 mg/kg	0.000028 %	✓	
24	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	benzo[ghi]perylene	205-883-8	191-24-2		0.25 mg/kg		0.25 mg/kg	0.000025 %	✓	
26	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
27	benzene	601-020-00-8	200-753-7	71-43-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
28	toluene	601-021-00-3	203-625-9	108-88-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
29	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
30	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
31	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
32	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
Total:								0.034 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

• pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

• chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

• acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

• fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

■ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

■ **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead chromate}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc chromate}

Worst case species based on hazard statements

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.283.5774.10667 (10 Oct 2023)
HazWasteOnline Database: 2023.283.5774.10667 (10 Oct 2023)



This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



7ZBNN-RPGUP-BGWSK

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

C5394 Star Academy, Radcliffe

Description/Comments

Project

Star Academy, Radcliffe

Site

C5394

Classified by

Name: **Jack Mather**
Date: **07 Sep 2023 14:09 GMT**
Telephone: **01606334844**
Company: **Brownfield Solutions Limited**
173-183 Witton Street
Northwich
CW9 5LP

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

09 Feb 2023

Next 3 year Refresher due by Feb 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Spring Lane, Radcliffe, Manchester

Post Code M26 2SZ

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

"The construction of a 'super teaching block' with a sports hall annex and extensive MUGA / Sports Pitches"

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils for foundations and earthworks.

Description of the waste

Slightly gravelly slightly sandy CLAY, slightly sandy CLAY, slightly sandy GRAVEL, Tarmacadam, gravelly SAND, slightly clayey gravelly SAND.



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS101	0.20-0.60	Non Hazardous	HP 8	3
2	WS103	1.50	Non Hazardous		5
3	WS106	0.15-1.20	Hazardous		7
4	TP101	0.00-0.20	Non Hazardous		10
5	TP103	0.00-0.20	Non Hazardous		12
6	TP106	0.40-1.25	Non Hazardous		14
7	TP108	0.10-1.00	Non Hazardous		16
8	HP101	0.30-1.10	Non Hazardous		18

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jack Mather

Created date: 07 Sep 2023 14:09 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	20
Appendix B: Rationale for selection of metal species	21
Appendix C: Version	21



Classification of sample: WS101

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

Sample details

Sample name:	LoW Code:	
WS101	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.20-0.60 m		
Moisture content:		
11%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7 pH		7	pH	7pH		
2	arsenic { arsenic trioxide }				12 mg/kg	1.32	14.101	mg/kg	0.00141 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				34 mg/kg	1.462	44.227	mg/kg	0.00442 %	✓	
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				33 mg/kg	1.126	33.067	mg/kg	0.00331 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	53 mg/kg		47.17	mg/kg	0.00472 %	✓	
	082-001-00-6										
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				38 mg/kg	1.579	53.419	mg/kg	0.00534 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	zinc { zinc oxide }				210 mg/kg	1.245	232.637	mg/kg	0.0233 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
12	naphthalene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8								
14	acenaphthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	phenanthrene	201-581-5	85-01-8		0.25 mg/kg		0.223 mg/kg	0.0000222 %	✓	
17	anthracene	204-371-1	120-12-7		0.05 mg/kg		0.0445 mg/kg	0.00000445 %	✓	
18	fluoranthene	205-912-4	206-44-0		0.39 mg/kg		0.347 mg/kg	0.0000347 %	✓	
19	pyrene	204-927-3	129-00-0		0.36 mg/kg		0.32 mg/kg	0.000032 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.2 mg/kg		0.178 mg/kg	0.0000178 %	✓	
21	chrysene	601-048-00-0	205-923-4		0.23 mg/kg		0.205 mg/kg	0.0000205 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.27 mg/kg		0.24 mg/kg	0.000024 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.09 mg/kg		0.0801 mg/kg	0.00000801 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.2 mg/kg		0.178 mg/kg	0.0000178 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.12 mg/kg		0.107 mg/kg	0.0000107 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.12 mg/kg		0.107 mg/kg	0.0000107 %	✓	
Total:								0.0431 %		

Key

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



Classification of sample: WS103

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

Sample details

Sample name:	LoW Code:
WS103	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.50 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH				7.2 pH		7.2	pH	7.2 pH		
2	arsenic { arsenic trioxide }				13 mg/kg	1.32	14.761	mg/kg	0.00148 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	22.625	mg/kg	0.00226 %	✓	
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				63 mg/kg	1.126	61.001	mg/kg	0.0061 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	49 mg/kg		42.14	mg/kg	0.00421 %	✓	
	082-001-00-6										
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				22 mg/kg	1.579	29.884	mg/kg	0.00299 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8										
11	zinc { zinc oxide }				100 mg/kg	1.245	107.045	mg/kg	0.0107 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
12	naphthalene				0.13 mg/kg		0.112	mg/kg	0.0000112 %	✓	
	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8								
14	acenaphthene				0.15 mg/kg		0.129	mg/kg	0.0000129 %	✓	
		201-469-6	83-32-9								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		0.09 mg/kg		0.0774 mg/kg	0.00000774 %	✓	
16	phenanthrene	201-581-5	85-01-8		0.68 mg/kg		0.585 mg/kg	0.0000585 %	✓	
17	anthracene	204-371-1	120-12-7		0.14 mg/kg		0.12 mg/kg	0.000012 %	✓	
18	fluoranthene	205-912-4	206-44-0		0.99 mg/kg		0.851 mg/kg	0.0000851 %	✓	
19	pyrene	204-927-3	129-00-0		0.89 mg/kg		0.765 mg/kg	0.0000765 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.46 mg/kg		0.396 mg/kg	0.0000396 %	✓	
21	chrysene	601-048-00-0	205-923-4		0.51 mg/kg		0.439 mg/kg	0.0000439 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.5 mg/kg		0.43 mg/kg	0.000043 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.29 mg/kg		0.249 mg/kg	0.0000249 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.44 mg/kg		0.378 mg/kg	0.0000378 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.21 mg/kg		0.181 mg/kg	0.0000181 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.26 mg/kg		0.224 mg/kg	0.0000224 %	✓	
28	TPH (C6 to C40) petroleum group		TPH		12 mg/kg		10.32 mg/kg	0.00103 %	✓	
29	benzene	601-020-00-8	200-753-7		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
30	toluene	601-021-00-3	203-625-9		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
31	ethylbenzene	601-023-00-4	202-849-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
32	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
Total:								0.0297 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00103%)



Classification of sample: WS106

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
WS106	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.15-1.20 m	Entry:
Moisture content:	17 05 03 * (Soil and stones containing hazardous substances)
6.7%	
(wet weight correction)	

Hazard properties

HP 8: Corrosive "waste which on application can cause skin corrosion"

pH; pH "Assumed to be irritant/corrosive because of pH value"

Because of determinand:

pH: (conc.: 12 pH)

Determinands

Moisture content: 6.7% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	pH				12	pH		12	pH	12pH		
2	arsenic { arsenic trioxide }				8.1	mg/kg	1.32	9.978	mg/kg	0.000998 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
3	cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6									
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				21	mg/kg	1.462	28.636	mg/kg	0.00286 %	✓	
		215-160-9	1308-38-9									
6	copper { dicopper oxide; copper (I) oxide }				29	mg/kg	1.126	30.463	mg/kg	0.00305 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	23	mg/kg		21.459	mg/kg	0.00215 %	✓	
	082-001-00-6											
8	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel dihydroxide }				11	mg/kg	1.579	16.21	mg/kg	0.00162 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
	034-002-00-8											
11	zinc { zinc oxide }				57	mg/kg	1.245	66.195	mg/kg	0.00662 %	✓	
	030-013-00-7	215-222-5	1314-13-2									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
12	naphthalene				0.7 mg/kg		0.653 mg/kg	0.0000653 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				0.05 mg/kg		0.0466 mg/kg	0.00000466 %	✓	
		205-917-1	208-96-8							
14	acenaphthene				0.59 mg/kg		0.55 mg/kg	0.000055 %	✓	
		201-469-6	83-32-9							
15	fluorene				0.42 mg/kg		0.392 mg/kg	0.0000392 %	✓	
		201-695-5	86-73-7							
16	phenanthrene				3.7 mg/kg		3.452 mg/kg	0.000345 %	✓	
		201-581-5	85-01-8							
17	anthracene				1 mg/kg		0.933 mg/kg	0.0000933 %	✓	
		204-371-1	120-12-7							
18	fluoranthene				5.4 mg/kg		5.038 mg/kg	0.000504 %	✓	
		205-912-4	206-44-0							
19	pyrene				5.3 mg/kg		4.945 mg/kg	0.000494 %	✓	
		204-927-3	129-00-0							
20	benzo[a]anthracene				2.4 mg/kg		2.239 mg/kg	0.000224 %	✓	
	601-033-00-9	200-280-6	56-55-3							
21	chrysene				2.2 mg/kg		2.053 mg/kg	0.000205 %	✓	
	601-048-00-0	205-923-4	218-01-9							
22	benzo[b]fluoranthene				2.5 mg/kg		2.333 mg/kg	0.000233 %	✓	
	601-034-00-4	205-911-9	205-99-2							
23	benzo[k]fluoranthene				1.2 mg/kg		1.12 mg/kg	0.000112 %	✓	
	601-036-00-5	205-916-6	207-08-9							
24	benzo[a]pyrene; benzo[def]chrysene				2.5 mg/kg		2.333 mg/kg	0.000233 %	✓	
	601-032-00-3	200-028-5	50-32-8							
25	indeno[123-cd]pyrene				0.98 mg/kg		0.914 mg/kg	0.0000914 %	✓	
		205-893-2	193-39-5							
26	dibenz[a,h]anthracene				0.25 mg/kg		0.233 mg/kg	0.0000233 %	✓	
	601-041-00-2	200-181-8	53-70-3							
27	benzo[ghi]perylene				1.2 mg/kg		1.12 mg/kg	0.000112 %	✓	
		205-883-8	191-24-2							
28	TPH (C6 to C40) petroleum group				250.1 mg/kg		233.343 mg/kg	0.0233 %	✓	
			TPH							
29	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
30	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
31	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
32	xylene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0439 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"



Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0233%)



Classification of sample: TP101



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

Sample details

Sample name:	LoW Code:
TP101	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.00-0.20 m	
Moisture content:	
22%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		5.4 pH		5.4 pH	5.4 pH		
2	arsenic { arsenic trioxide }				13 mg/kg	1.32	13.388 mg/kg	0.00134 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14 mg/kg	1.462	15.96 mg/kg	0.0016 %	✓	
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				39 mg/kg	1.126	34.25 mg/kg	0.00342 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	100 mg/kg		78 mg/kg	0.0078 %	✓	
	082-001-00-6									
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				13 mg/kg	1.579	16.016 mg/kg	0.0016 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	zinc { zinc oxide }				80 mg/kg	1.245	77.67 mg/kg	0.00777 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
12	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	phenanthrene	201-581-5	85-01-8		0.37 mg/kg		0.289 mg/kg	0.0000289 %	✓	
17	anthracene	204-371-1	120-12-7		0.09 mg/kg		0.0702 mg/kg	0.0000702 %	✓	
18	fluoranthene	205-912-4	206-44-0		0.69 mg/kg		0.538 mg/kg	0.0000538 %	✓	
19	pyrene	204-927-3	129-00-0		0.7 mg/kg		0.546 mg/kg	0.0000546 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.37 mg/kg		0.289 mg/kg	0.0000289 %	✓	
21	chrysene	601-048-00-0	205-923-4		0.38 mg/kg		0.296 mg/kg	0.0000296 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.49 mg/kg		0.382 mg/kg	0.0000382 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.2 mg/kg		0.156 mg/kg	0.0000156 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.41 mg/kg		0.32 mg/kg	0.000032 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.19 mg/kg		0.148 mg/kg	0.0000148 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.23 mg/kg		0.179 mg/kg	0.0000179 %	✓	
Total:								0.0243 %		

Key

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



Classification of sample: TP103

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

Sample details

Sample name:	LoW Code:
TP103	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.00-0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	pH		PH		6.1 pH		6.1 pH		6.1 pH		
2	arsenic { arsenic trioxide }				16 mg/kg	1.32	17.534 mg/kg		0.00175 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg		<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308 mg/kg		<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				16 mg/kg	1.462	19.409 mg/kg		0.00194 %	✓	
		215-160-9	1308-38-9								
6	copper { dicopper oxide; copper (I) oxide }				56 mg/kg	1.126	52.331 mg/kg		0.00523 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	100 mg/kg		83 mg/kg		0.0083 %	✓	
	082-001-00-6										
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg		<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
9	nickel { nickel dihydroxide }				16 mg/kg	1.579	20.976 mg/kg		0.0021 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg		<0.000141 %		<LOD
	034-002-00-8										
11	zinc { zinc oxide }				110 mg/kg	1.245	113.642 mg/kg		0.0114 %	✓	
	030-013-00-7	215-222-5	1314-13-2								
12	naphthalene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg		<0.000005 %		<LOD
		205-917-1	208-96-8								
14	acenaphthene				0.07 mg/kg		0.0581 mg/kg		0.00000581 %	✓	
		201-469-6	83-32-9								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		0.05 mg/kg		0.0415 mg/kg	0.00000415 %	✓	
16	phenanthrene	201-581-5	85-01-8		0.5 mg/kg		0.415 mg/kg	0.0000415 %	✓	
17	anthracene	204-371-1	120-12-7		0.1 mg/kg		0.083 mg/kg	0.0000083 %	✓	
18	fluoranthene	205-912-4	206-44-0		0.97 mg/kg		0.805 mg/kg	0.0000805 %	✓	
19	pyrene	204-927-3	129-00-0		0.92 mg/kg		0.764 mg/kg	0.0000764 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.46 mg/kg		0.382 mg/kg	0.0000382 %	✓	
21	chrysene	601-048-00-0	205-923-4		0.59 mg/kg		0.49 mg/kg	0.000049 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.68 mg/kg		0.564 mg/kg	0.0000564 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.3 mg/kg		0.249 mg/kg	0.0000249 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.52 mg/kg		0.432 mg/kg	0.0000432 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.27 mg/kg		0.224 mg/kg	0.0000224 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.32 mg/kg		0.266 mg/kg	0.0000266 %	✓	
Total:								0.0316 %		

Key

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



Classification of sample: TP106

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

Sample details

Sample name:	LoW Code:
TP106	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
040-1.25 m	
Moisture content:	
11%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.7 pH		7.7 pH	7.7 pH		
2	arsenic { arsenic trioxide }				27 mg/kg	1.32	31.727 mg/kg	0.00317 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				35 mg/kg	1.462	45.527 mg/kg	0.00455 %	✓	
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				190 mg/kg	1.126	190.388 mg/kg	0.019 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	120 mg/kg		106.8 mg/kg	0.0107 %	✓	
	082-001-00-6									
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				38 mg/kg	1.579	53.419 mg/kg	0.00534 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	zinc { zinc oxide }				83 mg/kg	1.245	91.947 mg/kg	0.00919 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
12	naphthalene				1 mg/kg		0.89 mg/kg	0.000089 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				0.08 mg/kg		0.0712 mg/kg	0.00000712 %	✓	
		205-917-1	208-96-8							
14	acenaphthene				1.6 mg/kg		1.424 mg/kg	0.000142 %	✓	
		201-469-6	83-32-9							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		1.4 mg/kg		1.246 mg/kg	0.000125 %	✓	
16	phenanthrene	201-581-5	85-01-8		11 mg/kg		9.79 mg/kg	0.000979 %	✓	
17	anthracene	204-371-1	120-12-7		3 mg/kg		2.67 mg/kg	0.000267 %	✓	
18	fluoranthene	205-912-4	206-44-0		13 mg/kg		11.57 mg/kg	0.00116 %	✓	
19	pyrene	204-927-3	129-00-0		12 mg/kg		10.68 mg/kg	0.00107 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		6.1 mg/kg		5.429 mg/kg	0.000543 %	✓	
21	chrysene	601-048-00-0	205-923-4		5.7 mg/kg		5.073 mg/kg	0.000507 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		6.9 mg/kg		6.141 mg/kg	0.000614 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		2.4 mg/kg		2.136 mg/kg	0.000214 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		5.7 mg/kg		5.073 mg/kg	0.000507 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		2.5 mg/kg		2.225 mg/kg	0.000223 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.65 mg/kg		0.579 mg/kg	0.0000579 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		2.8 mg/kg		2.492 mg/kg	0.000249 %	✓	
28	TPH (C6 to C40) petroleum group		TPH		109.6 mg/kg		97.544 mg/kg	0.00975 %	✓	
29	benzene	601-020-00-8	200-753-7		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
30	toluene	601-021-00-3	203-625-9		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
31	ethylbenzene	601-023-00-4	202-849-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
32	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
Total:								0.0689 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00975%)



Classification of sample: TP108

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

Sample details

Sample name:	LoW Code:
TP108	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.10-1.00 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.1 pH		7.1 pH	7.1 pH		
2	arsenic { arsenic trioxide }				43 mg/kg	1.32	48.258 mg/kg	0.00483 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				18 mg/kg	1.462	22.362 mg/kg	0.00224 %	✓	
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				380 mg/kg	1.126	363.662 mg/kg	0.0364 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	140 mg/kg		119 mg/kg	0.0119 %	✓	
	082-001-00-6									
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				67 mg/kg	1.579	89.953 mg/kg	0.009 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	zinc { zinc oxide }				140 mg/kg	1.245	148.121 mg/kg	0.0148 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
12	naphthalene				0.32 mg/kg		0.272 mg/kg	0.0000272 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				0.21 mg/kg		0.179 mg/kg	0.0000179 %	✓	
		201-469-6	83-32-9							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		0.17 mg/kg		0.145 mg/kg	0.0000145 %	✓	
16	phenanthrene	201-581-5	85-01-8		2 mg/kg		1.7 mg/kg	0.00017 %	✓	
17	anthracene	204-371-1	120-12-7		0.37 mg/kg		0.315 mg/kg	0.0000314 %	✓	
18	fluoranthene	205-912-4	206-44-0		3 mg/kg		2.55 mg/kg	0.000255 %	✓	
19	pyrene	204-927-3	129-00-0		2.7 mg/kg		2.295 mg/kg	0.00023 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		1.4 mg/kg		1.19 mg/kg	0.000119 %	✓	
21	chrysene	601-048-00-0	205-923-4		1.4 mg/kg		1.19 mg/kg	0.000119 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		1.6 mg/kg		1.36 mg/kg	0.000136 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.78 mg/kg		0.663 mg/kg	0.0000663 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		1.5 mg/kg		1.275 mg/kg	0.000127 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.64 mg/kg		0.544 mg/kg	0.0000544 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.21 mg/kg		0.179 mg/kg	0.0000179 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		0.76 mg/kg		0.646 mg/kg	0.0000646 %	✓	
28	TPH (C6 to C40) petroleum group		TPH		43 mg/kg		36.55 mg/kg	0.00366 %	✓	
29	benzene	601-020-00-8	200-753-7		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
30	toluene	601-021-00-3	203-625-9		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
31	ethylbenzene	601-023-00-4	202-849-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
32	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
Total:								0.0847 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00366%)



Classification of sample: HP101

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

Sample details

Sample name:	LoW Code:
HP101	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30-1.10 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.2 pH		7.2 pH	7.2 pH		
2	arsenic { arsenic trioxide }				43 mg/kg	1.32	47.122 mg/kg	0.00471 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				17 mg/kg	1.462	20.623 mg/kg	0.00206 %	✓	
		215-160-9	1308-38-9							
6	copper { dicopper oxide; copper (I) oxide }				530 mg/kg	1.126	495.278 mg/kg	0.0495 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	130 mg/kg		107.9 mg/kg	0.0108 %	✓	
	082-001-00-6									
8	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
9	nickel { nickel dihydroxide }				64 mg/kg	1.579	83.903 mg/kg	0.00839 %	✓	
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
11	zinc { zinc oxide }				270 mg/kg	1.245	278.94 mg/kg	0.0279 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
12	naphthalene				2.6 mg/kg		2.158 mg/kg	0.000216 %	✓	
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				0.57 mg/kg		0.473 mg/kg	0.0000473 %	✓	
		201-469-6	83-32-9							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	fluorene	201-695-5	86-73-7		0.53 mg/kg		0.44 mg/kg	0.000044 %	✓	
16	phenanthrene	201-581-5	85-01-8		6 mg/kg		4.98 mg/kg	0.000498 %	✓	
17	anthracene	204-371-1	120-12-7		1.1 mg/kg		0.913 mg/kg	0.0000913 %	✓	
18	fluoranthene	205-912-4	206-44-0		7.3 mg/kg		6.059 mg/kg	0.000606 %	✓	
19	pyrene	204-927-3	129-00-0		6.6 mg/kg		5.478 mg/kg	0.000548 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6		3.1 mg/kg		2.573 mg/kg	0.000257 %	✓	
21	chrysene	601-048-00-0	205-923-4		3.1 mg/kg		2.573 mg/kg	0.000257 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		3.8 mg/kg		3.154 mg/kg	0.000315 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		1 mg/kg		0.83 mg/kg	0.000083 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		3.1 mg/kg		2.573 mg/kg	0.000257 %	✓	
25	indeno[123-cd]pyrene	205-893-2	193-39-5		1.3 mg/kg		1.079 mg/kg	0.000108 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.33 mg/kg		0.274 mg/kg	0.0000274 %	✓	
27	benzo[ghi]perylene	205-883-8	191-24-2		1.6 mg/kg		1.328 mg/kg	0.000133 %	✓	
Total:								0.107 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

• pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

• chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• lead compounds with the exception of those specified elsewhere in this Annex

GB MCL index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers many simple lead compounds to be Carcinogenic category 2
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium
www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

• acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

• fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410



▪ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

▪ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

▪ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

▪ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Absence of hexavalent chromium indicates it unlikely that lead chromate is present within the site soils. Given the presence of groundwater underlying the site at shallow depths an insoluble form has been selected.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc oxide}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils. Given the presence of groundwater underlying the site at shallow depths an insoluble form has been selected (zinc oxide).

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021

HazWasteOnline Classification Engine Version: 2023.237.5731.10565 (25 Aug 2023)

HazWasteOnline Database: 2023.237.5731.10565 (25 Aug 2023)



This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

APPENDIX G

BGS Radon Report

STEPHANIE DIXON
BROWNFIELD SOLUTIONS LTD
173-183
WITTON STREET
NORTHWICH
CW9 5LP

Radon Report

Advisory report on the requirement for radon protective measures in new buildings, conversions and extensions to existing buildings. The report also indicates whether a site is located within a radon Affected Area

Report Id: *BGS_335200/49095*

Client reference: C5394/SD

Search location



Contains OS data © Crown Copyright and database right 2023. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)

Search location indicated in red

Site Address:

SPRING LANE SCHOOL
SPRING LANE
RADCLIFFE
MANCHESTER
M26 2SZ

Point centred at: grid reference obtained from Ordnance Survey OS Places API

Radon Report: UK

When extensions are made to existing buildings in high radon areas, or new buildings are constructed in these areas, the Building Regulations for England, Wales, Scotland and Northern Ireland require that protective measures are taken against radon entering the building.

This report provides information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

This is an advisory report on the requirement for radon protective measures in new buildings, conversions and extensions. The report also indicates whether a site is located within a radon Affected Area

Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2023 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2023 edition) Radon: Guidance on protective measures for new buildings?

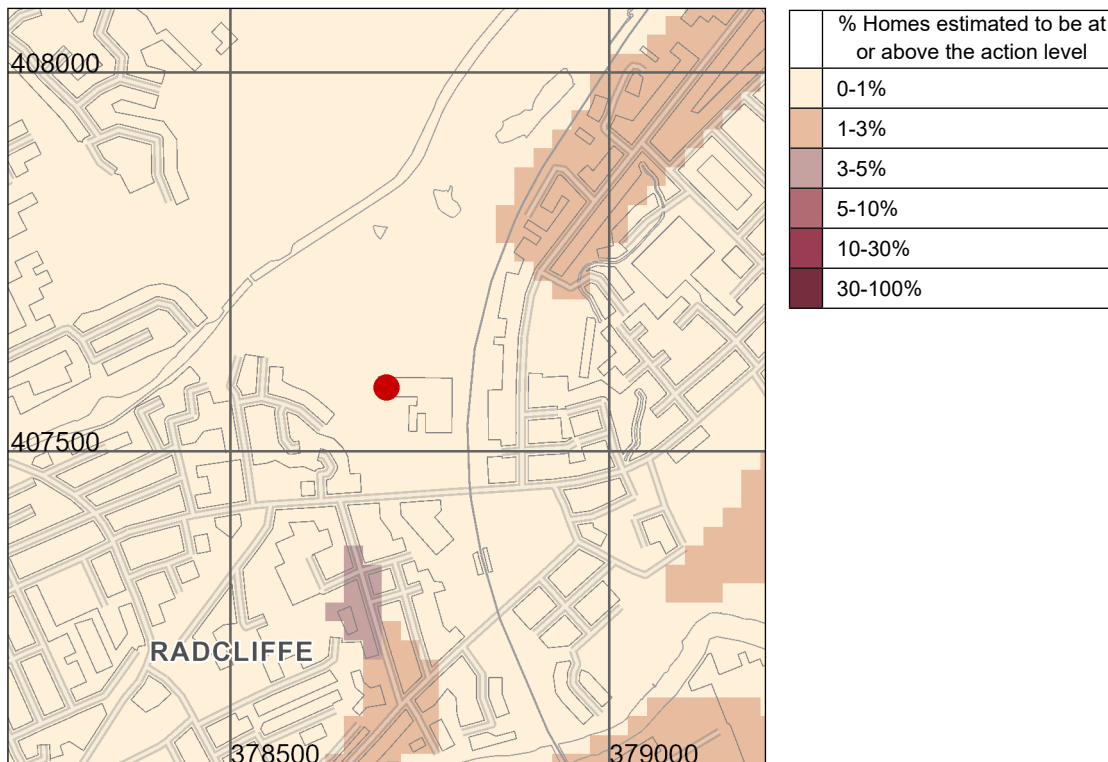
NO RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

More details of the protective measures required are available in *BR211 Radon: Guidance on protective measures for new buildings (2023 Edition)*. Additional information and guidance is available from the Building Research Establishment website (<http://www.bre.co.uk/radon/>).

Whether or not the radon level in a building is above or below the radon Action Level can only be established by having the building tested. The UKHSA provides a radon testing service which can be accessed at www.ukradon.org or by telephone (01235 822622).

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Radon Affected Area



Contains OS data © Crown Copyright and database right 2023

Scale: 1:10 000 (1cm = 100 m)

Search area indicated in red

Is the property in a radon Affected Area as defined by the UK Health Security Agency (UKHSA) and if so what percentage of homes are estimated to be at or above the Action Level? NO

Additional Information

THE PROPERTY IS IN AN AREA WHERE LESS THAN 1% OF HOMES ARE ESTIMATED TO BE AT OR ABOVE THE ACTION LEVEL. THE PROPERTY IS NOT IN A RADON AFFECTED AREA.

The UKHSA recommends a radon 'Action Level' of 200 Becquerels per cubic metre of air (Bq m^{-3}) for the annual average of the radon gas concentration in a home. Where 1% or more of homes are estimated to be at or above the Action Level the area should be regarded as a radon Affected Area.

This report informs you whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a high radon level within the property; the only way to determine the radon level is to carry out a radon measurement.

The UKHSA advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels at or above the Action Level (200 Bq m⁻³) should be remediated. Householders with levels between the Target Level (100 Bq m⁻³) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested. The UKHSA provides a validated radon testing service which can be accessed at www.ukradon.org.

The information in this report provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as Law Society CON29 Enquiries of the Local Authority (2016); 3.14 Radon Gas: Do records indicate that the property is in a “Radon Affected Area” as identified by the UKHSA. The data can also be used to advise house buyers and sellers in Scotland and Northern Ireland.

If you are buying a new build property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

If you are buying a currently occupied property in a radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were at or above the radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and if the results of re-testing confirmed the effectiveness of the measures.

Further information on radon is available from the UKHSA at www.ukradon.org.

What is radon?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level is at or above the Action Level, measures should be taken to reduce the concentration.

Radon in workplaces

The Ionising Radiation Regulations 2017 require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293): **Radon in the workplace**. BRE publications may be obtained from the BRE Bookshop, Tel: 01923 664262, email: bookshop@bre.co.uk website: www.brebookshop.com

Contact Details

Keyworth Office

British Geological Survey
Environmental Science Centre
Nicker Hill
Keyworth
Nottingham
NG12 5GG
Tel: 0115 9363100
Email: enquiries@bgs.ac.uk

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British Geological Survey
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Email: enquiry@bgs.ac.uk

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- The data, information and related records supplied in this Report by BGS can only be indicative and should not be taken as a substitute for specialist interpretations, professional advice and/or detailed site investigations. You must seek professional advice before making technical interpretations on the basis of the materials provided.
- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
- Raw data may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected to quality control to ensure reliability where possible, some raw data may have been processed without human intervention and may in consequence contain undetected errors.
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