

Phase 2 Site Investigation

Manchester Enterprise Academy

Prosperre Learning Trust

civil

structural

earth sciences

strategic land

special projects

COMPLEX CHALLENGES ...
MADE SIMPLE

27 June 2022



COMPLEX CHALLENGES ...
MADE SIMPLE

Phase 2 Site Investigation

Manchester Enterprise Academy

DESCRIPTION	DATE	AUTHOR	REVIEWED BY	APPROVED BY
Phase 2 Site Investigation Report	27/06/2022	Reece McGuinness 	Linden Richardson 	Linden Richardson 
REVISION	DESCRIPTION	DATE	AUTHOR	APPROVED BY
Report Reference	4111-ROC-ZZ-XX-RP-ES-PH2SI			
Report Status	FINAL			



CONTENTS

1.0	INTRODUCTION	3
1.1	BACKGROUND	3
1.2	TERMS OF REFERENCE	3
1.3	OBJECTIVES.....	3
2.0	LIMITATIONS OF STUDY ASSESSMENT.....	4
3.0	BACKGROUND INFORMATION	5
3.1	SITE DESCRIPTION	5
3.2	GEOLOGICAL CHARACTERISTICS.....	5
3.3	SITE HISTORY AND ENVIRONMENTAL CHARACTERISTICS	5
3.4	SUMMARY OF HISTORIC SITE INVESTIGATIONS	6
4.0	SITE INVESTIGATION DESIGN	7
5.0	SITE INVESTIGATION FIELDWORKS	8
6.0	ENCOUNTERED GROUND CONDITIONS	9
6.1	GROUND CONDITIONS OVERVIEW	9
6.2	GROUNDWATER & CONTAMINATION OBSERVATIONS.....	9
6.3	BELOW GROUND OBSTRUCTIONS	9
7.0	LABORATORY AND IN-SITU TESTING.....	10
8.0	GEO-ENVIRONMENTAL ASSESSMENT	13
8.1	ASSESSMENT OF SOIL CONTAMINATION.....	17
8.2	CONTROLLED WATERS	19
8.3	BELOW GROUND CONCRETE CONSTRUCTION.....	19
8.4	WASTE ACCEPTANCE CRITERIA TESTING.....	19
9.0	REFINED CONCEPTUAL SITE MODEL	20
10.0	GEOTECHNICAL & FOUNDATION DESIGN ASSESSMENT	24
10.1	CARPARK FOUNDATION DESIGN	24
10.2	GENERAL COMMENTS	24
11.0	CONCLUSIONS & RECOMMENDATIONS	25
	APPENDIX A – SITE DRAWINGS.....	26
	APPENDIX B – EXPLORATORY HOLE LOGSHEETS.....	27
	APPENDIX C – CHEMICAL TESTING RESULTS	28
	APPENDIX D – GEOTECHNICAL TESTING RESULTS	29



**COMPLEX CHALLENGES ...
MADE SIMPLE**

1.0 Introduction

1.1 Background

- 1.1.1 RoC Consulting has been appointed by Chris Hindle of AA Projects on behalf of Prospere Learning Trust to conduct a Phase 2 Site Investigation across a vacant plot of land at Manchester Enterprise Academy (the site). It is understood that the site is to be redeveloped for use as a car park in accordance with drawing (ref: 22-04-21MEAaltCarpark) provided within Appendix A.
- 1.1.2 The following assessment has been completed to support design and planning requirements for the site's redevelopment.
- 1.1.3 The scope of the report and its assessment has been based around the site's redevelopment proposals as outlined in the aforementioned plans. It should be noted that any subsequent revision of the proposed redevelopment or site boundary away from the above-mentioned drawing may result in the full or partial re-interpretation of this report and assessment.

1.2 Terms of Reference

- 1.2.1 The Phase 2 Site Investigation was carried out following receipt of an instruction from Chris Hindle of AA Projects on behalf of Prospere Learning Trust.

1.3 Objectives

- 1.3.1 The scope of works has been tailored to meet both planning and design requirements to assist with the site's redevelopment. These considerations include:
 - 1) Design a programme of site investigation works to establish ground conditions beneath the site and target known or suspected sources of contamination.
 - 2) Completion of site investigation field works including the formation of 5 hand dug trial pits to establish the site's geology and recover soil samples.
 - 3) Completion of geo-environmental and geotechnical laboratory analysis of soil samples to determine physical and chemical characteristics.
 - 4) Completion of a detailed geotechnical assessment of site conditions to inform carpark foundation design. The scope of this assessment will also include reference to the findings and result of previous site investigation works.
 - 5) Completion of a geo-environmental assessment utilising information provided by both the current and previous phases of site investigation works sufficient in its scope to assist with the discharge of contaminated land related planning conditions / for submission to the relevant statutory authorities.

2.0 Limitations of Study Assessment

- 2.0.1 The report has been produced by RoC Consulting for the client solely for the purposes of a review of information for the above-mentioned site. It may not be used by any person for any other purpose other than that specified without the express written permission of RoC Consulting. Any liability arising out of its use by a third party for purposes not wholly connected with the above shall be the responsibility of that party who shall indemnify RoC Consulting against all claims, costs, damages and losses arising out of such use.
- 2.0.2 This report is written in the context of an agreed scope of work and should not be used in a different context. The report should be read in its entirety. Furthermore, new information, improved practices and changes in legislation may require re-interpretation of this report in whole or in part after its original issue. RoC Consulting reserve the right to alter their conclusions and recommendations in the light of further information that may become available.
- 2.0.3 Ground conditions can change rapidly, especially in areas of made ground. However, it is assumed that the ground conditions observed are typical and representative of the site as a whole. The ground conditions have been determined from a limited number of exploratory holes formed across the property, therefore, only a small percentage of the total area of the property has been investigated. Interpolation between exploratory holes has enabled a general picture of the subsurface conditions to be produced.
- 2.0.4 Conclusions drawn from the ground investigation should be read in this context. RoC Consulting cannot accept responsibility for any situations resulting from locally unforeseen ground conditions occurring between exploratory holes.
- 2.0.5 RoC Consulting has exercised all reasonable due skill, care and diligence when collating the design and subsequent execution of ground investigation works. It should be noted we cannot anticipate the requirements and actions of the regulatory authorities when designing and implementing ground investigation works and, whilst thorough consideration has been given to all geo-environmental and geotechnical concerns; further additional fieldworks or assessment may be required at their request.
- 2.0.6 RoC Consulting cannot confirm that all ground conditions which may be uncovered during the works have been identified, rather this report is intended as an informative for use by experienced professionals and contractors.
- 2.0.7 Whilst the investigation and report has been scoped in accordance with our understanding of typical regulatory authority requirements, we cannot confirm that on submission regulators may require additional in situ testing or investigation.

3.0 Background Information

3.0.1 The overview below outlines the most salient points / considerations.

3.1 Site Description

- 3.1.1 The Manchester Enterprise Academy campus site is located off Simonsway, Wythenshawe approximately 10km south of Manchester City Centre. The area of investigation is located to the north of the main school building and is bordered by car parking to the south, residential housing to the west artificial grass pitches to the east and residential housing to the north. The area of investigation is occupied by a grassed field.
- 3.1.2 No topographical survey of the site is available. However, the topography of the site is currently generally flat.

3.2 Geological Characteristics

- 3.2.1 Review of publicly available BGS geological map records indicate the site is underlain by the following:
- Drift Geology:** Till, Devensian – Diamicton
- Solid Geology:** Bollin Mudstone Member – Mudstone
- 3.2.2 The Coal Authority Interactive Map Viewer indicates that the site is located in an area which is not affected by historic Coal Mining or Brine extraction and a Coal Authority report is not required.

3.3 Site History and Environmental Characteristics

- 3.3.1 Site history and Environmental Characteristics have been assessed using publicly available records and those acquired as part of previous site investigations as summarised in Section 3.4.
- 3.3.2 Earliest historical records dated 1897-1899 indicate the site to have been used as an agricultural field, in 1960 the Poundwick Grammar School is indicated immediately to the south of the site. The current academy is thought to have been constructed circa 2008/2009 and the previous school buildings demolished during this period.
- 3.3.3 BGS records indicates the drift geology is classified secondary undifferentiated with the underlying mudstone bedrock classed as a Secondary B Aquifer. The site is not located within any Environment Agency Source Protection Zones. According to the TerraConsult Phase 1 Report there are no surface or groundwater abstraction points within 1000m of the site.
- 3.3.4 The nearest surface water feature is indicated circa 210m to the southwest in the form of Baguley Brook. There is no water quality or flow rate data available for the watercourse. There are no surface or groundwater abstraction points within 500m of the site; one discharge consent is located 480m from the site into the River Medlock.

COMPLEX CHALLENGES ... MADE SIMPLE

- 3.3.5 There are no registered Integrated Pollution Control (IPC) Sites, Registered Radioactive Substances sites, Control of Major Accident sites (COMAH), Explosives Sites or Notification of Installations Handling Hazardous Substances (NIHHS) within 250m of the site.
- 3.3.6 The site is not said to be located in an area deemed to be at risk from flooding or extreme flooding events from either land or sea.

3.4 Summary of Historic Site Investigations

TerraConsult Phase 1 Site Investigation Report (ref: No2589/01 Issue 1 06/06/2016)

- 3.4.1 TerraConsult completed a Phase 1 Site Investigation Report in 2016 covering the wider MEA Campus. The report comprised a desk-based review of historic records, environmental databases and historic site investigations.
- 3.4.2 The report concluded that based on the review of information there was potential for contamination on site due to the presence of made ground and mounds of possible construction waste although based on the findings of previous investigations this was considered unlikely. None of the features identified were located in the area of the current site.

TerraConsult Phase 2 Site Investigation Report (ref: No2589/02 Issue 1 25/07/2016)

- 3.4.3 TerraConsult completed a Phase 2 Site Investigation Report in 2016 covering the wider MEA Campus. A number of exploratory holes were formed during the site investigation to assess geotechnical conditions on site and investigate the presence of any potential contaminants on site. One investigation location, TP124 was located within the current site boundary. Soils in this location were described as Made Ground to a depth of 0.95m, with small quantities of coal and brick noted.
- 3.4.4 The report concluded that there were no significant sources of contamination present on the wider campus and therefore there was a negligible risk to all receptors including humans, controlled waters and ecological receptors.

4.0 Site Investigation Design

General

- 4.0.1 The RoC intrusive investigation was designed and completed to investigate potential geo-environmental issues as well as provide geotechnical information to facilitate new building design.
- 4.0.2 The site investigation works comprised the formation of 5 hand dug trial pits as well as TRL DCP testing in each location.
- 4.0.3 Hand dug trial pits were located within the footprint of the proposed new development to establish ground conditions and support carpark foundation design.
- 4.0.4 Samples of soil collected during the investigation works are to be analysed for a variety of determinants associated with the pattern of current / historic activity across the site.
- 4.0.5 Table 4.0 provided below provides location justification for each exploratory hole formed during the site investigation fieldworks. The purposes of this table are to illustrate the targeting of potential sources of contamination during the Phase 2 site investigation works.

Table 4.0: Borehole Locations & Justification

BH/WS ID.	Reason for selection
HP201	General site coverage
HP202	General site coverage
HP203	General site coverage
HP204	General site coverage
HP205	General site coverage

- 4.0.6 Exploratory hole locations are shown on RoC Consulting drawing ESK101 (Current Site) and ESK102 (Prop Development) provided within Appendix A.

5.0 Site Investigation Fieldworks

- 5.0.1 Site investigation fieldworks were completed on the 25th May 2022 by drilling contractors Earth Engineering. Boreholes were formed using hand digging equipment.
- 5.0.2 Information with respect to buried services was obtained from relevant providers prior to commencement of the investigation works. However, as a precautionary measure all exploratory hole locations were scanned with a Cable Avoidance Tool prior to the commencement of works.
- 5.0.3 Soil and samples were collected for subsequent chemical and geotechnical laboratory analysis. Soil samples used for geotechnical analysis were collected in 500g plastic sample tubs. Samples collected for chemical testing were collected in 60g glass jars, 258g glass jars and 500g plastic sample tubs. Samples were obtained from natural strata to assess the overall quality of underlying soils. In situ soil strength was investigated using a hand vane.
- 5.0.4 The shallow soils encountered during construction of the boreholes were described and logged by a suitably qualified engineer in accordance with BS 5930: Code of Practice for Site Investigations (the log sheets for which have been provided within Appendix B).

6.0 Encountered Ground Conditions

- 6.0.1 The following ground conditions are summarised from the exploratory holes formed during the RoC Consulting site investigation. The following represents an overview of encountered ground conditions, and it is recommended reference be made to the borehole and trial pit log sheets provided within Appendix B for a detailed strata description; all depths shown are given in metres below ground level (mbgl) unless otherwise stated).

6.1 Ground Conditions Overview

Topsoil

- 6.1.1 Surface soils at the site have been described as Topsoil (or Made Ground – Topsoil where these contain man-made material or overly man-made material). Typically, this material has a depth of 0.15 to 0.20mbgl. These depths and classifications are based on visual descriptions only and do not in-themselves indicate that the material is suitable for reuse in soft landscaping areas and should be verified by a landscape architect. We have not undertaken assessment to *BS 3882: 2015 – Specification for topsoil*. However, we consider that this material is likely unsuitable for engineering purposes.

Devensian Till

- 6.1.2 Made ground was reported at all five exploratory hole locations the details of which is provided in table 6.1 below:

Table 6.1: Devensian Till Strata Description

Strata description	Devensian Till was encountered as both cohesive and granular deposits. The cohesive deposits were generally reported as a firm to very stiff light brown / brown / orangish brown slightly gravelly sandy clay. Granular Devensian Till deposits were reported as a brown slightly gravelly clayey medium sand and were found to overlay cohesive deposits at HP203 and HP204. Hand shear vane tests were undertaken within cohesive Devensian Till deposits. Shear vane tests indicated soils strength to be low to high with most tests reporting a medium strength (40 – 75 kPa) No groundwater strikes were encountered within Devensian Till deposits.
---------------------------	--

6.2 Groundwater & Contamination Observations

- 6.2.1 No visual or olfactory evidence of contamination was encountered during the completion of the works.
- 6.2.2 No groundwater strikes were encountered during the completion of the works.

6.3 Below ground obstructions

- 6.3.1 No below ground obstructions were encountered during the completion of the works.

7.0 Laboratory and In-Situ Testing

- 7.0.1 To establish the physical and chemical properties of underlying soils, a programme of laboratory analysis was completed utilising samples obtained during site investigation works. This analysis comprised the testing of soil samples to assist with the estimation of risks posed by contaminated land related concerns.

Chemical Testing

- 7.0.2 RoC Consulting submitted a total of 5 soil samples to a UKAS accredited testing facility for analysis against a range of determinands synonymous with the site's former industrial activity.

Table 7.1: Scheduled Chemical Testing

Determinands	No. of Tests
Toxic and phytotoxic metals and metalloids	5
Total & Speciated Polycyclic Aromatic Hydrocarbons (PAH),	5
Other inorganic substances (e.g. Sulphate, Cyanide etc)	5
Asbestos ID	5
Water Soluble Sulfate & pH	5
Waste Acceptance Criteria	1

- 7.0.3 Copies of chemical testing results have been provided within Appendix C.

Geotechnical Testing

- 7.0.4 A programme of geotechnical laboratory analysis was also completed on disturbed soil samples obtained during site investigation works.

Plasticity Index

- 7.0.5 A total of 2 soil samples were tested for the determination of the glacial clay's plasticity index. Both samples were taken from 0.80mbgl. The plasticity index range varied between 13 and 24% with a mean value of 18.5%. These results indicate clays to be of a too low, to medium plastic nature.

Undrained Shear Strength

- 7.0.6 A total of 5 hand shear vanes tests were undertaken within cohesive Devensian Till deposits. Tests were undertaken from depths ranging between 0.40 and 0.70mbgl. Shear strength results vary between 36 and 100kPa with a mean value of 63kPa. These results indicate shallow clay strengths vary between low to high.

CBR Testing

- 7.0.7 DCP testing was conducted through the dropping of an 8kg hammer from a height of 575mm and recording the resulting penetration of a 20mm cone through the ground. CBR values have been

COMPLEX CHALLENGES ... MADE SIMPLE

calculated from the number of blows per millimetre. The reported CBR values are banded based on the number of blows recorded for each increment.

- 7.0.8 The tests, which were completed in accordance with the method detailed in the Design Manual for Roads and Bridges Volume 7 Section 3 Part 2 HD29/08 and were extended to depths between 0.93m and 0.95m through the ground.
- 7.0.9 Table 7.2 below summarises calculated CBR values for ranges of depths recorded at each location within proposed areas of redevelopment. Graphs showing DCP penetration in cm and the variation of CBR values with depth are available in Appendix D.

Table 7.2: Dynamic Cone Penetrometer Analysis and Calculated CBR%

Location ID	Start Depth (mm)	End Depth (mm)	Calculated CBR%
HP201	62	394	5.3
	394	944	9.5
HP202	67	515	7.3
	515	952	3.4
HP203	47	948	6.0
HP204	60	934	6.4
HP205	65	442	7.3
	442	732	4.3
	732	948	10.0

- 7.0.10 The calculated CBR values from the DCP analysis indicated an average CBR value of 6% across site soils.
- 7.0.11 Equilibrium CBR (California Bearing Ratio) values can also be estimated from knowledge of soil classification data (plasticity index for soils exhibiting cohesion (clay type) and particle size distribution for granular soils), the location of the water table, pavement thickness, and weather conditions at the time of construction, according to the method outlined in the document Transport and Road Research Laboratory (TRRL) Report LR1132 'Structural design of Bituminous Roads.' The method is summarised in Table 7.3 below.

Table 7.3: Equilibrium Suction Index CBR Values

Equilibrium suction-index CBR values

TYPE OF SOIL	PLASTICITY INDEX	HIGH WATER TABLE						LOW WATER TABLE					
		CONSTRUCTION CONDITIONS:						CONSTRUCTION CONDITIONS:					
		POOR		AVERAGE		GOOD		POOR		AVERAGE		GOOD	
		THIN	THICK	THIN	THICK	THIN	THICK	THIN	THICK	THIN	THICK	THIN	THICK
HEAVY CLAY	70	1.5	2	2	2	2	2	1.5	2	2	2	2	2.5
	60	1.5	2	2	2	2	2.5	1.5	2	2	2	2	2.5
	50	1.5	2	2	2.5	2	2.5	2	2	2	2.5	2	2.5
	40	2	2.5	2.5	3	2.5	3	2.5	2.5	3	3	3	3.5
SILTY CLAY SANDY CLAY	30	2.5	3.5	3	4	3.5	5	3	3.5	4	4	4	6
	20	2.5	4	4	5	4.5	7	3	4	5	6	6	8
	10	1.5	3.5	3	6	3.5	7	2.5	4	4.5	7	6	>8
SILT *	—	1	1	1	1	2	2	1	1	2	2	2	2
SAND (POORLY GRADED)	—	← 20 →											
SAND (WELL GRADED)	—	← 40 →											
SANDY GRAVEL (WELL GRADED)	—	← 60 →											

* estimated assuming some probability of material saturating

**COMPLEX CHALLENGES ...
MADE SIMPLE**

- 7.0.12 It is anticipated that excavations to formation levels will encounter cohesive soils. Assuming an average plasticity index of 18.5% for cohesive soils, a low water table, a 'thin' pavement, an equivalent CBR value of 6% could be anticipated.
- 7.0.13 Generally we consider that, following the removal of topsoil at the site, near surface soils will provide an equivalent CBR value of 6% without ground improvement.
- 7.0.14 Results from geotechnical laboratory testing and in-situ CBR testing have been provided within Appendix D.

8.0 Geo-Environmental Assessment

- 8.0.1 The results from the intrusive Phase 2 ground investigation have been used to complete a refined assessment of risks posed by ground contamination and ground stability issues beneath the site. The assessment considers these risks both in terms of the site's current arrangement and usage, as well as any potential future development (and associated construction process).
- 8.0.2 The assessment has been collated with reference to various statutory and non-statutory guidance documents relating to land contamination and ground stability. Specifically, the assessment has been conducted in accordance with the Environment Agency Land Contamination Risk Management (LCRM) guidance relating to the "Tier 2 Generic Quantitative Risk assessment" process (revised April 2021).
- 8.0.3 In accordance with this method, a Refined Conceptual Model has been collated for the site based on the results of the desktop review. This model is based around the Source / Pathway / Receptor methodology as outlined in Fig 8.0.

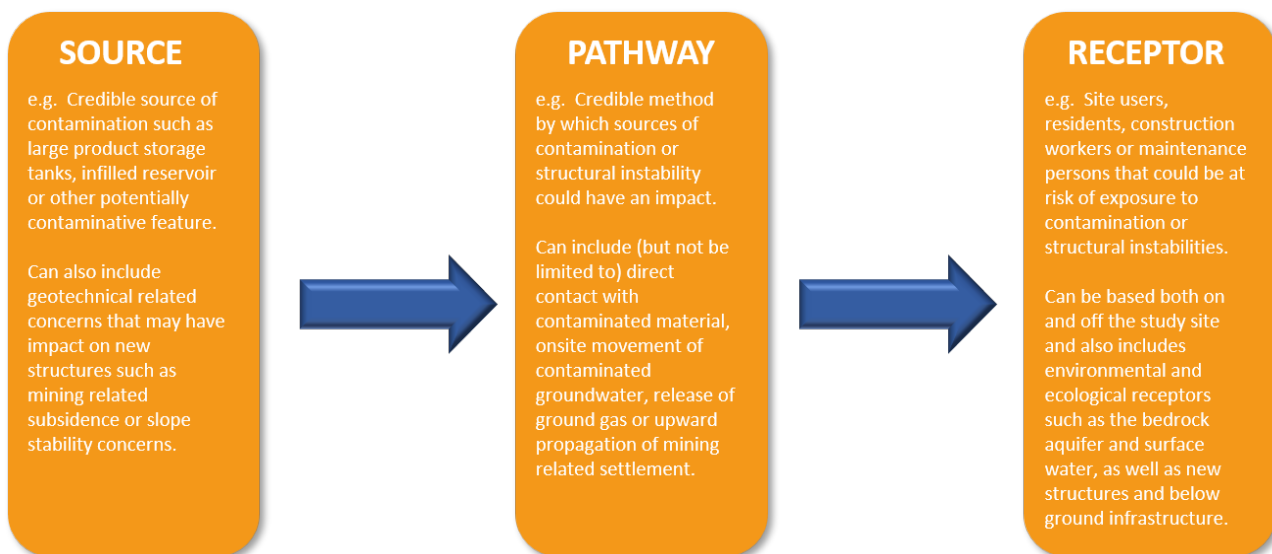


Figure 8.0 Source Pathway Receptor Diagram

- 8.0.4 Risk assessment is the process of collating known information on a hazard or set hazards in order to establish actual or potential risks to receptors. The receptor may be human health, controlled waters, a sensitive local ecosystem or even construction materials. Receptors can be connected with the hazard under consideration via one or several exposure pathways (e.g., the pathway of direct skin contact and oral exposure).
- 8.0.5 Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there is deemed to be no risk. In other words, the mere presence of a hazard at a site does not mean that there will necessarily be risks.

COMPLEX CHALLENGES ... MADE SIMPLE

- 8.0.6 Potential sources of contamination have been identified across the site, where applicable, based on observations and information obtained during the desktop review. These sources are defined based on the results from site investigation fieldworks and subsequent laboratory analysis of samples / monitoring works.
- 8.0.7 The risk assessment has been completed with reference to the guidance outlined within CIRIA 552 “Contaminated land risk assessment. A good practice guide”. This risk assessment methodology considers the potential consequence / severity of risks that may be present within soils in comparison with the likelihood of exposure to or and occurrence of said risk. A range of risk classifications are provided within CIRIA 552 further details of which are provided in Table 8.0 below.

Table 8.0: Definition of risk class and consequence

Risk Class	Definition	Example
Minor	Potential for harm, although not significant, which may result in financial loss to resolve. Ground conditions where the use of PPE would readily mitigate risks posed to human health.	Low level contamination hotspots within made ground / demolition fill materials. Stunted or impeded plant growth due to poor soil quality.
Mild	Pollution of non-sensitive water resources or damage to crops, plant growth, below ground utilities or structures.	Perched groundwater contamination overlying low permeability aquifer or aggressive sulphate concentrations in soils.
Medium	Sources of contamination identified on site have the potential to cause both long and short-term health effects on site residents / users. Alternatively (or in conjunction with) sources of contamination may have the potential to impact surface or groundwater quality or impede vegetation growth.	Elevated concentrations of hydrocarbon contamination reported within topsoil tested within residential gardens as a result of inadequate or incomplete previous remediation works. Movement of contaminated groundwater from leaking below ground storage tank into adjacent surface water course.
Severe	Sources of contamination pose a credible and acute risk to human health with potential for “Significant Harm” occurring as defined by the Part IIA of the Environmental Protection Act (1990). Alternatively (or in conjunction with risks posed to human health) sources of contamination may pose an immediate risk to controlled water resources or ecosystems.	Grossly contaminated soils are encountered or disturbed during excavation works, causing an immediate release of toxic soil vapour and leachate / contaminated groundwater flow across adjacent land.

- 8.0.8 As previously discussed the contaminated land risk assessment model evaluates the severity of risks that may be present within soils / groundwaters in the context of threats posed to identified receptors before deriving the actual risk rating based on the probability of occurrence. Table 8.1 (provided overleaf) outlines the range likelihood of risk.

COMPLEX CHALLENGES ... MADE SIMPLE

Table 8.1: Probability Assessment

Classification	Definition
High likelihood	A credible pollutant linkage has been identified and it is very likely contaminants will impact identified receptors in both the short or long term (or is already actively doing so). The potential for harm to be caused is thus highly likely.
Likely	Pollutant linkages between the sources of contamination and identified receptors are present and it is considered likely they will become active given the right set of circumstances (e.g. contaminants currently buried below ground that are likely to be exposed or disturbed during construction / excavation works. The circumstances are such that an event is not inevitable, however it is possible in the short term and likely over the longer term.
Low likelihood	A theoretical pollutant linkage has been identified that has the potential to exposure receptors to contaminants under the correct circumstances. However, the likelihood of such an event occurring is not a certainty, even in the long term
Unlikely	There is no / minimal likelihood a pollutant linkage would occur, even over the long term.

8.0.9 The risk assessment process is a combination of probability and consequence, recognising that it may be possible to have a significant source of contamination beneath a site (such as a large below ground chemical storage tank) that may only present a relatively moderate to low risk (owing to the fact it may be contained within a secure concrete bund). Table 8.2 indicates how the actual nature of risk is established with Table 8.3 illustrating how the risk is interpreted in the context of contaminated land risk assessment.

Table 8.2: Risk Definition

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	

COMPLEX CHALLENGES ... MADE SIMPLE

Table 8.3: Description of risks posed

Risk Definition	Description
Very High	Active pollutant linkages between a significant source of contamination and identified receptors have been established and there is a high likelihood of severe harm occurring to said receptors unless immediate investigation and remediation action is not taken.
High Risk	Harm is likely to arise to receptors from an identified hazard in the short and long term. Urgent investigation of the contaminant issue will be required, and remedial treatment is likely.
Moderate Risk	The possibility of harm has been identified toward receptors under the right circumstances, although the severity of harm would be relatively mild. Further investigation of identified issues would be prudent and possible need for remedial measures in the long term.
Low Risk	It is possible harm could arise to a designated receptor from identified hazard, but it is likely (if realised) any harm would be (at worst) mild.
Very Low Risk	No significant pollutant linkages have been identified and the possibility of harm occurring to receptors is low.

8.0.10 The Tier 2 risk assessment process can be divided based on the receptor group in question between:

- 1) Risks posed to human health by soil contamination (both construction persons and future site users).
- 2) Risks posed to human health by hazardous ground gas ingress (both construction persons and future site users).
- 3) Risks posed to controlled waters by soil or groundwater contamination (both surface water features and bedrock aquifers).
- 4) Risks posed to new building construction by aggressive ground conditions (namely elevated sulphate concentrations).

8.0.11 It is noted the site is being developed for use as a car park. It is understood that the site will be developed as a hardstanding carpark with minimal soft landscaping and therefore pathways relating to human health will be significantly inhibited.

8.0.12 Appropriate assessment have been completed for each of the above utilising the latest statutory and non-statutory guidance documents; for details of risks posed to human health refer to Section 8.1 (soils) and Section 8.2 (ground gas), for details of risks posed to controlled waters refer to Section 8.3 and risks posed to new structures refer to Section 8.4.

8.1 Assessment of Soil Contamination

- 8.1.1 In order to estimate the risks posed to human health from soil contamination, a quantitative risk assessment has been completed utilising the latest Environment Agency CLEA methodology. The assessment utilises the chemical testing results obtained during the site investigation fieldworks to characterise site conditions and facilitate the completion of the risk assessment process.
- 8.1.2 The assessment is based on the comparison of soil chemical testing results with published Environment Agency Category Four Screening Levels (C4SL's) under the proposed end use scenario to determine the sites suitability for use. C4SL values represent the highest acceptable values for contaminants within site soils under the proposed end use and are derived using the Environment Agency CLEA risk assessment methodology. A result in exceedance of a C4SL level may indicate the presence of contaminants within site soils and require further assessment.
- 8.1.3 It is noted only a limited number of C4SL values have been derived by the Environment Agency for use and reference has been made to LQM/CIEH Suitable For Use Values (S4UL's) for a wider range of other contaminants (Heavy Metals, Poly Aromatic Hydrocarbons, TPH, SVOC and VOC's) to increase the depth and robustness of our assessment.
- 8.1.4 Chemical testing results are compared against C4SL and S4UL values for each determinant with any results reported in exceedance of screening criteria identified and their significance reviewed. When determining the significance of any exceedances within the dataset the magnitude and frequency of the exceedance need to be taken into account, for example, a single exceedance of a screening value may be considered a localised hotspot whereas consistently elevated levels of a substance at multiple locations across the site may indicate a more prevalent contamination issue.
- 8.1.5 In addition to this assessment, an Asbestos Identification test (via the visual inspection method) has been completed on all samples of made ground obtained during the investigation to determine risks posed. Any positive occurrences of Asbestos will be subject to quantification analysis to further assess the extent and significance of risks posed.
- 8.1.6 As required, for each exceedance reference will be made to the Conceptual Site Model to establish the most likely source of contaminants and initial commentary given as to the likely scope of remedial measures. In addition, reference will also be made to the assumptions used to derive generic assessment criteria (C4SL and S4UL values) to determine their comparability with the proposed end use.
- 8.1.7 For the purposes of this assessment we have assumed a "Commercial" end use scenario when reviewing chemical testing data against C4SL / S4UL values; a "worst case" Soil Organic Matter content value of 1% has been assumed for the initial assessment.



COMPLEX CHALLENGES ... MADE SIMPLE

Summary and Assessment of Risks Posed by Soil Contamination

- 8.1.8 Results from chemical testing analysis indicate that no sources of contamination were encountered within site soils. Similarly, there was no positive identification of the presence of asbestos.
- 8.1.9 The findings of the above have been used to update the Refined Conceptual Site Model (provided within Section 9.0) as well as inform the scope of any further investigation or remedial works deemed necessary to support the sites development.

8.2 Controlled Waters

- 8.2.1 The superficial deposits and bedrock beneath the site comprise a Secondary Undifferentiated and Secondary B Aquifer respectively, and the site is not located within any Environment Agency Zone source protection zones or in close proximity to sensitive groundwater abstraction boreholes. The nearest surface water feature is indicated 210m to the south west in the form of Baguley Brook and is not considered to be at risk of contaminant migration from the study site.
- 8.2.2 Given the lack of any sources of contaminants encountered in site soils it is deemed controlled waters are not at risk of contamination from site soils.

8.3 Below Ground Concrete Construction

- 8.3.1 Peak potential sulphate concentrations range between 28 and 33 with soil pH values ranging between 6.82 and 7.41. Based on these results, it is considered that well compacted buried concrete should be designed in accordance with Class DS-1 AC1s requirements as specified in BRE Digest Special Digest 1:2005 *Concrete in aggressive ground: Version 3*.

8.4 Waste Acceptance Criteria Testing

- 8.4.1 WAC testing was undertaken on a single sample taken from 1.00mbgl. The sample exceeded the Landfill Waste Acceptance Criteria Limit for Total Organic Carbon (%) for an inert waste landfill indicating site soils may need to be disposed of at a Non-Hazardous Landfill.

9.0 Refined Conceptual Site Model

9.0.1 The Environmental Protection Act Part IIA: 1990, defines contamination as land containing levels of contamination which form a risk to human health, controlled waters or other ecosystems. Therefore, contamination in exceedance of the relevant screening values is considered a source. Table 9.0 assesses and summarises the sources, pathways and receptors that may exist at the site;

Table 9.0: Refined Conceptual Site Model

Table 9.0		Refined Conceptual Site Model					
Source		Pathway	Receptor	Severity	Probability	Risk definition	Comments
On Site	Current Ground Conditions, including Made Ground	Dermal contact and / or ingestion; inhalation of vapours / dusts	Current Site Users	Minor	Unlikely	Very Low	Chemical testing has revealed an absence of any elevated contaminant concentrations within samples taken from the site and therefore it is deemed there is a very low risk to current site users.
			Construction workers	Minor	Low Likelihood	Very Low	The greatest risk of exposure to contamination lies with construction workers as they will be exposed to soils within excavations. However, given the absence of any elevated concentrations of contaminants within samples from site soils it is deemed that there is a very low risk to construction workers. It is considered the risks posed to construction personnel, by sources of contamination, can be adequately mitigated against via the use of full PPE and the adoption of good hygiene and site practices.* Appropriate personal ground gas detection equipment should be deployed by all site operatives when working in below ground or confined spaces.

COMPLEX CHALLENGES ... MADE SIMPLE

Table 9.0		Refined Conceptual Site Model					
Source	Pathway	Receptor	Severity	Probability	Risk definition	Comments	
		Future Site Users	Minor	Low Likelihood	Very Low	The site is to be developed to comprise a car park covered almost entirely in hardstanding material with only limited areas of soft landscaping around the peripheries of the car park. Coupled with the absence of any elevated contaminant concentrations within site soils it is considered the risk to future site users is very low.	
		Ecological [Plant Uptake]	Minor	Low Likelihood	Very Low	No evidence of elevated concentrations of phytotoxic contaminants has been reported in samples from site soils. Therefore there is judged to be very low risk to any existing and future ecological receptors.	
	Leaching of contaminated soil & impact beneath site	Controlled Waters: Aquifer	Minor	Unlikely	Very Low	There is no evidence of historic industrial land use. The site is underlain by a Secondary Undifferentiated and Secondary B Aquifer and is not said to be located within any Environment Agency source protection zones or in close proximity to sensitive groundwater abstraction boreholes.	
		Adjacent Sites	Minor	Unlikely	Very Low	There is no evidence of historic industrial land use. Given the absence of any elevated concentration of contaminants reported within samples from site soils it is deemed there is a very low risk to adjacent sites.	
	Below ground service runs	Below ground infrastructure & construction	Minor	Unlikely	Very Low	There is no evidence of historic industrial land use. Given the absence of any elevated concentration of contaminants reported within samples from site soils it is deemed there is a very low risk to below ground service infrastructure.	
						All below ground concrete structures to be designed in accordance with a Class DS-1 AC-1s requirements as specified in BRE Digest Special	

COMPLEX CHALLENGES ... MADE SIMPLE

Table 9.0		Refined Conceptual Site Model					
Source	Pathway	Receptor	Severity	Probability	Risk definition	Comments	
	Ground gas Migration / Accumulation					Digest 1:2005 Concrete in aggressive ground: Version.	
		Current Site Users	Minor	Unlikely	Very Low	No sources of ground gas generation have been identified and the site is currently open air so there is very low risk to current site users.	
		Construction Workers	Minor	Unlikely	Very Low	No sources of ground gas generation have been identified.	
		Future Site Users	Minor	Unlikely	Very Low	No sources of ground gas generation have been identified. The future site will be a car park without buildings for gas to accumulate in. Manholes and ducts may be present which may allow ground gas accumulation however it is unlikely any significant sources of ground gas are present on the site.	
Off site	Potentially Contaminative Sources; Controlled waters and ground gas generation	Leaching of contaminated soil onto site	Controlled Waters: Aquifer	Minor	Unlikely	Very Low	There is little evidence of significant nearby industrial land use. Given the absence of any identified contamination within site soils it is deemed there is a very low risk to controlled waters.
			Controlled Waters: Surface Water	Minor	Unlikely	Very Low	There is little evidence of significant nearby industrial land use. Given the absence of any identified contamination within site soils and the distance from surface water receptors, it is deemed there is a very low risk to surface waters
	Ground gas Migration / Accumulation	Current Site Users	Severe	Unlikely	Very Low	No significant off-site sources of ground gas have been identified.	
		Construction Workers	Severe	Unlikely	Very Low	No significant off-site sources of ground gas have been identified.	
		Future Site Users	Severe	Unlikely	Very Low	No significant off-site sources of ground gas have been identified.	

*Any sources of contamination uncovered during site development works should be brought to the immediate attention of RoC Consulting for consideration and comment.

Soil Contamination Remedial Requirements

- 9.0.2 Re-appraisal and reassessment of the conceptual site model (following completion of investigation works) has failed to reveal any specific sources of contamination that could require specific remedial measures.
- 9.0.3 It is recommended all construction contractors take reasonable precautions to control environmental impacts that may occur as a result of redevelopment works with respect of soil and groundwater quality. These measures should include (and not be limited to):
- 1) Any sources of contamination uncovered during site development works should be brought to the immediate attention of RoC Consulting for consideration and comment. As required, the findings and recommendations of the current assessment may require amendment to reflect changes in site condition.
 - 2) The operation of plant, refuelling facilities and general basement excavation works should include appropriate provision to reduce the risk of leakage / spillage, particularly into the site's groundwater table or exposed natural soils.
 - 3) Appropriate dust mitigation measures should be deployed during basement excavation works, particularly when handling and excavating made ground deposits.
 - 4) All excavated materials stockpiled should be periodically dampened down to control dust release. Similarly, the disposal of any material from site should be completed using covered wagons.

Ground Water Remedial Requirements

- 9.0.4 No sources of soil contamination have been revealed during ground investigation works. Given the sites locality and proximity to sensitive water / ground water receptors it is not considered any risks are posed to controlled water resources.

10.0 Geotechnical & Foundation Design Assessment

Background Information

10.0.1 It is understood the site is to be redeveloped to comprise a car park.

10.1 Carpark Foundation Design

- 10.1.1 We consider that the subgrade soils at the site will achieve equivalent CBR values in the region of 6%. Consequently, ground improvement is unlikely to be required for this purpose.
- 10.1.2 While minimal below ground structures are anticipated, we have undertaken assessment of aggressive ground conditions as part of our assessment. Peak potential sulphate concentrations range between 28 and 33 with soil pH values ranging between 6.82 and 7.41. Based on these results, it is considered that well compacted buried concrete should be designed in accordance with Class DS-1 AC1s requirements as specified in BRE Digest Special Digest 1:2005 *Concrete in aggressive ground: Version 3*.

10.2 General Comments

- 10.2.1 No entry should be permitted into excavations exceeding 1.2m depth without appropriate risk assessments, shoring and support. Whilst groundwater was not encountered in significant volumes during site investigation works the presence of a perched water table cannot be precluded. Appropriate provisions should be made to dewater excavations as and when required.
- 10.2.2 The geotechnical assessment has been collated based on the proposed development type, layout and likely loadings at the time of report publication. It should be noted that future alterations to these proposals or loadings (including alterations in the site layout) will require the re-interpretation of the current assessment. In such an instance updated design information should be provided to RoC Consulting and the current assessment updated accordingly.

11.0 Conclusions & Recommendations

- 11.0.1 The site is to be redeveloped for use as a car park. Site investigations have revealed the site to be underlain by a covering of topsoil (containing man made materials in some locations) 0.15 to 0.20m thick and underlain by predominantly cohesive Devensian Till deposits generally described as a firm to very stiff slightly gravelly sandy clay.
- 11.0.2 Chemical assessment of site soils has failed to reveal any sources of soil contamination when compared against a “*Commercial*” end use scenario. Due care and attention should be taken at all times when excavating site soils and any suspected sources of contamination identified brought to the immediate attention of RoC Consulting.
- 11.0.3 We consider that the subgrade soils at the site will achieve equivalent CBR values in the region of 6%. Consequently, ground improvement is unlikely to be required for this purpose.
- 11.0.4 As required, any suspected sources of contamination discovered during the site development (outside those discussed in this report) should be brought to the attention of RoC Consulting and their implications assessed. Depending on the extent and severity, the findings and assessment of the current study may require re-interpretation and a remediation strategy proposed to support the sites development.
- 11.0.5 Copies of the current report should be submitted to the local planning authority for consideration and comment. As required, any feedback received from the local authority should be passed back to RoC Consulting for review.



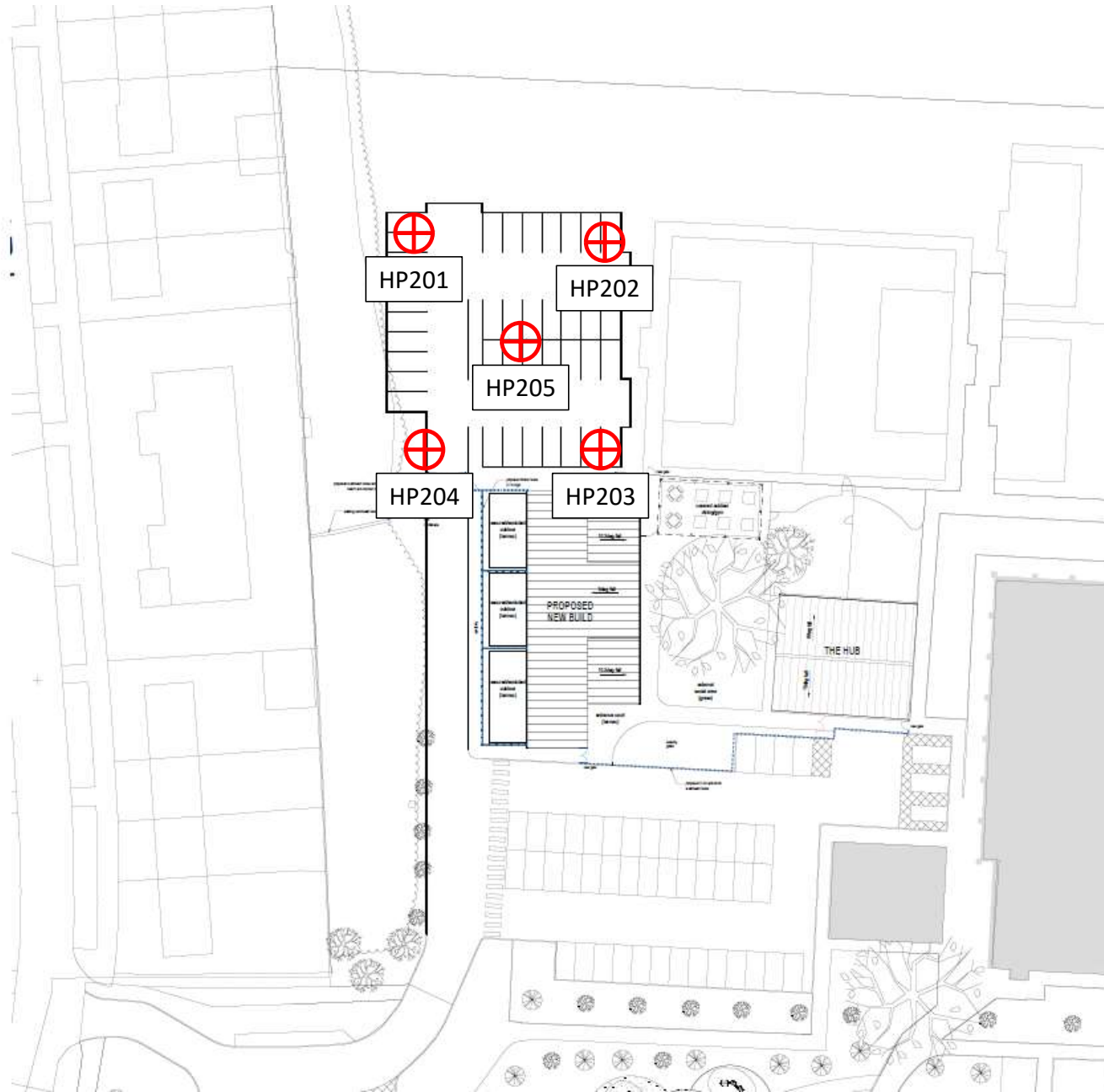
COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX A – Site Drawings





	JOB NO	4111	SKETCH NO	4111-ROC-ZZ-XX-SK-ES-ESK101	DRAWN BY : RM 10 06 2022
	PROJECT TITLE	Manchester Enterprise Academy	SKETCH TITLE	Exploratory Hole Location Plan (Existing Site)	



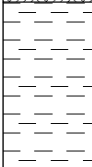


COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX B – Exploratory Hole Logsheets

Trial Pit Log

Project Name: Manchester Enterprise Academy		Client: Manchester Enterprise Academy	Date: 25/05/2022
Location: Wythenshawe		Contractor:	
Project No. : 4111		Crew Name:	Equipment: Hand Excavated
Location Number HP201	Location Type TP	Level	Logged By LR
		Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15			Grass onto light brown very sandy CLAY with frequent rootlets (TOPSOIL)	1
		0.40 0.40	ES	HVP=36.0				Firm light brown slightly gravelly sandy CLAY. Gravel is fine to medium rounded of sandstone (DEVENSIA TILL)	
		0.80	D					...at 0.70mbgl becoming stiff	
					1.00			End of Borehole at 1.000m	2
									3
									4
									5

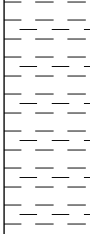
Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

1. Location scanned for services prior to excavation. 2. Groundwater was not observed. 3. Upon completion exploratory hole backfilled with arisings.

Trial Pit Log

Project Name: Manchester Enterprise Academy		Client: Manchester Enterprise Academy	Date: 25/02/2022	
Location: Wythenshawe		Contractor:		
Project No. : 4111		Crew Name:		Equipment: Hand Excavated
Location Number HP202	Location Type TP	Level	Logged By LR	Scale 1:25
				Page Number Sheet 1 of 1

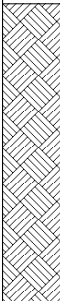
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.40 0.40	ES	HVP=100.0	0.20			Grass onto light brown very sandy CLAY with frequent rootlets and plastic fragments (MADE GROUND - TOPSOIL)	1		
								Stiff light brown slightly gravelly sandy slightly organic CLAY. Gravel is fine to medium rounded of sandstone (DEVENSIAN TILL) <u>...at 0.70mbgl becoming very stiff</u>			
1.00					End of Borehole at 1.000m			2			
									3		
										4	
											5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Location scanned for services prior to excavation. 2. Groundwater was not observed. 3. Upon completion exploratory hole backfilled with arisings.

Trial Pit Log

Project Name: Manchester Enterprise Academy		Client: Manchester Enterprise Academy		Date: 25/02/2022	
Location: Wythenshawe		Contractor:			
Project No. : 4111		Crew Name:		Equipment: Hand Excavated	
Location Number HP203	Location Type TP	Level	Logged By LR	Scale 1:25	Page Number Sheet 1 of 1

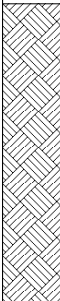
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES	HVP=54.0	0.20			Grass onto light brown very sandy CLAY with frequent rootlets and brick gravel (MADE GROUND - TOPSOIL)	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks
 1. Location scanned for services prior to excavation. 2. Groundwater was not observed. 3. Upon completion exploratory hole backfilled with arisings.

Trial Pit Log

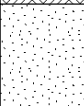
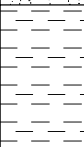
Project Name: Manchester Enterprise Academy		Client: Manchester Enterprise Academy	Date: 25/02/2022	
Location: Wythenshawe		Contractor:		
Project No. : 4111		Crew Name:		Equipment: Hand Excavated
Location Number HP204	Location Type TP	Level	Logged By LR	Scale 1:25
				Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40 0.40	ES	HVP=55.0	0.20 				

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

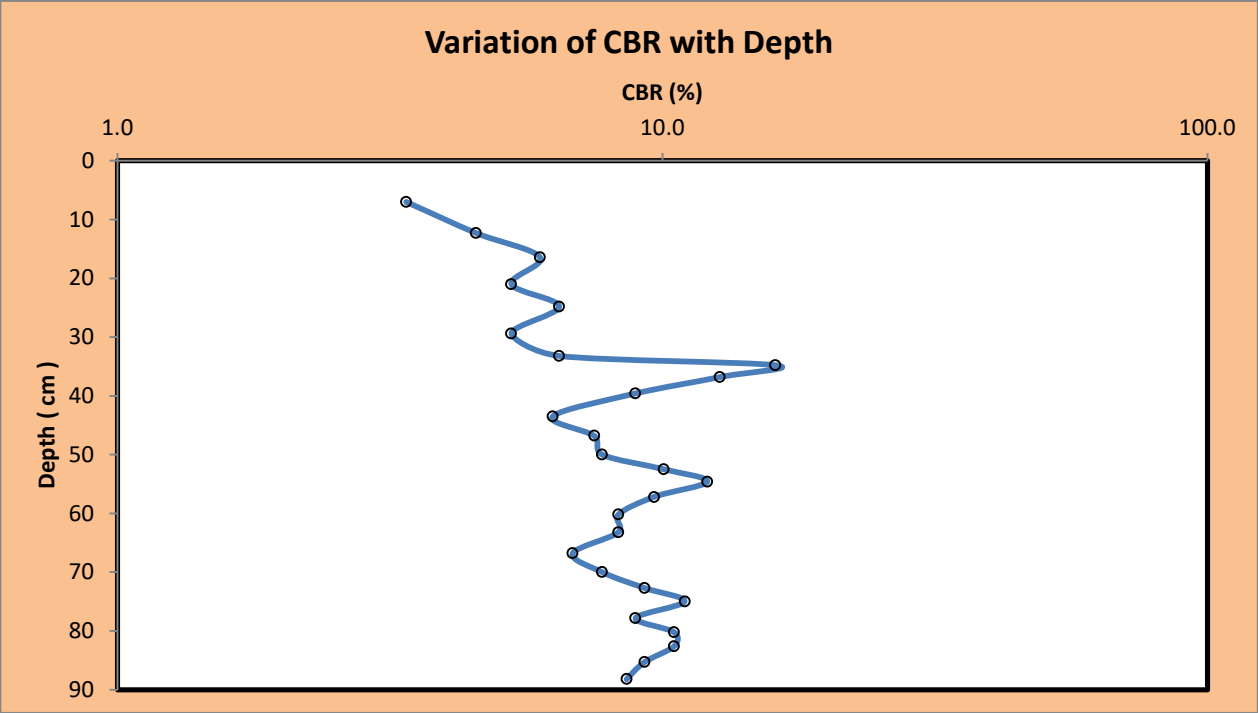
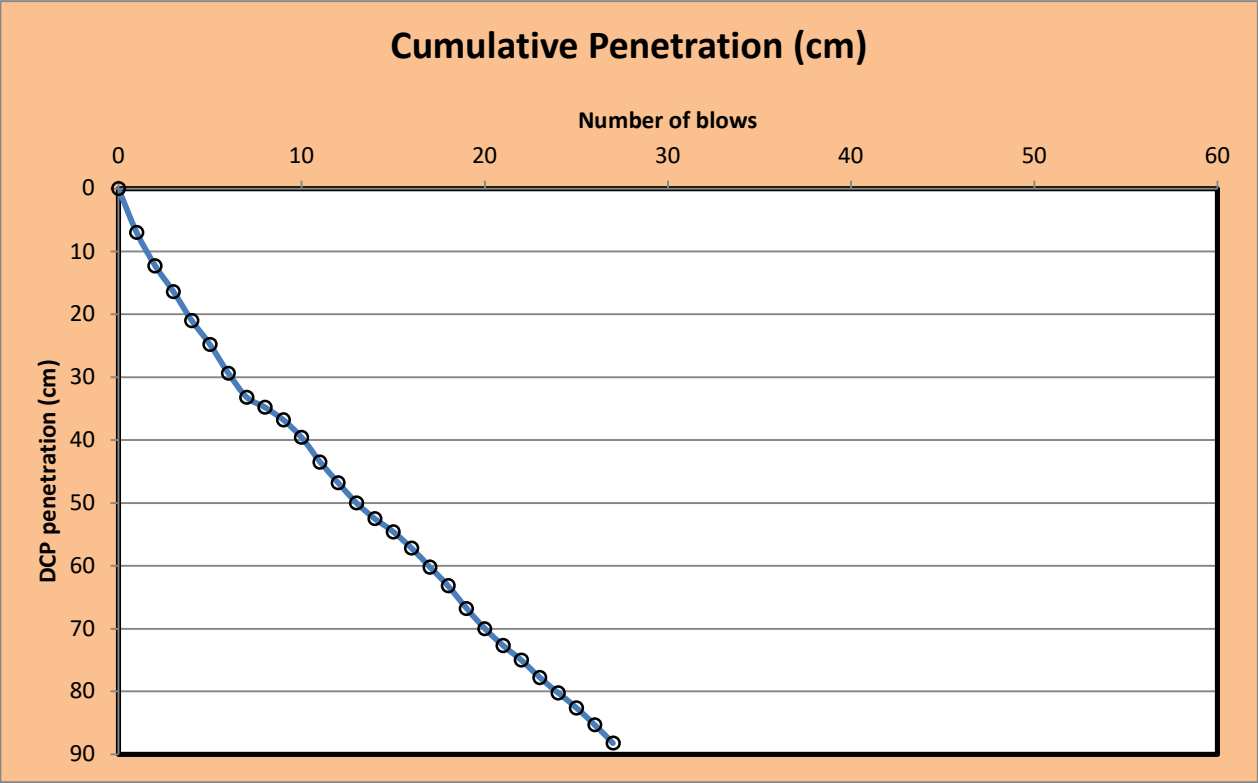
Remarks
 1. Location scanned for services prior to excavation. 2. Groundwater was not observed. 3. Upon completion exploratory hole backfilled with arisings.

Trial Pit Log

Project Name: Manchester Enterprise Academy				Client: Manchester Enterprise Academy				Date: 25/02/2022			
Location: Wythenshawe				Contractor:							
Project No. : 4111				Crew Name:				Equipment: Hand Excavated			
Location Number HP205		Location Type TP		Level		Logged By LR		Scale 1:25		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.10	ES	HVP=68.0	0.15			Grass onto light brown very sandy CLAY with frequent rootlets(TOPSOIL)		1	
		0.60					Brown slightly gravelly clayey medium SAND. Gravel is sub-rounded to rounded fine to medium of sandstone and mudstone (DEVENSIAN TILL)				
							Stiff orange slightly gravelly sandy CLAY. Gravel is fine to medium sub-rounded to rounded of sandstone and limestone (DEVENSIAN TILL) ...at 0.70mbgl becoming very stiff				
							End of Borehole at 1.000m				
					1.00					5	
Dimensions			Trench Support and Comment				Pumping Data				
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks			Date	Rate	Remarks		
Remarks											
1. Location scanned for services prior to excavation. 2. Groundwater was not observed. 3. Upon completion exploratory hole backfilled with arisings.											

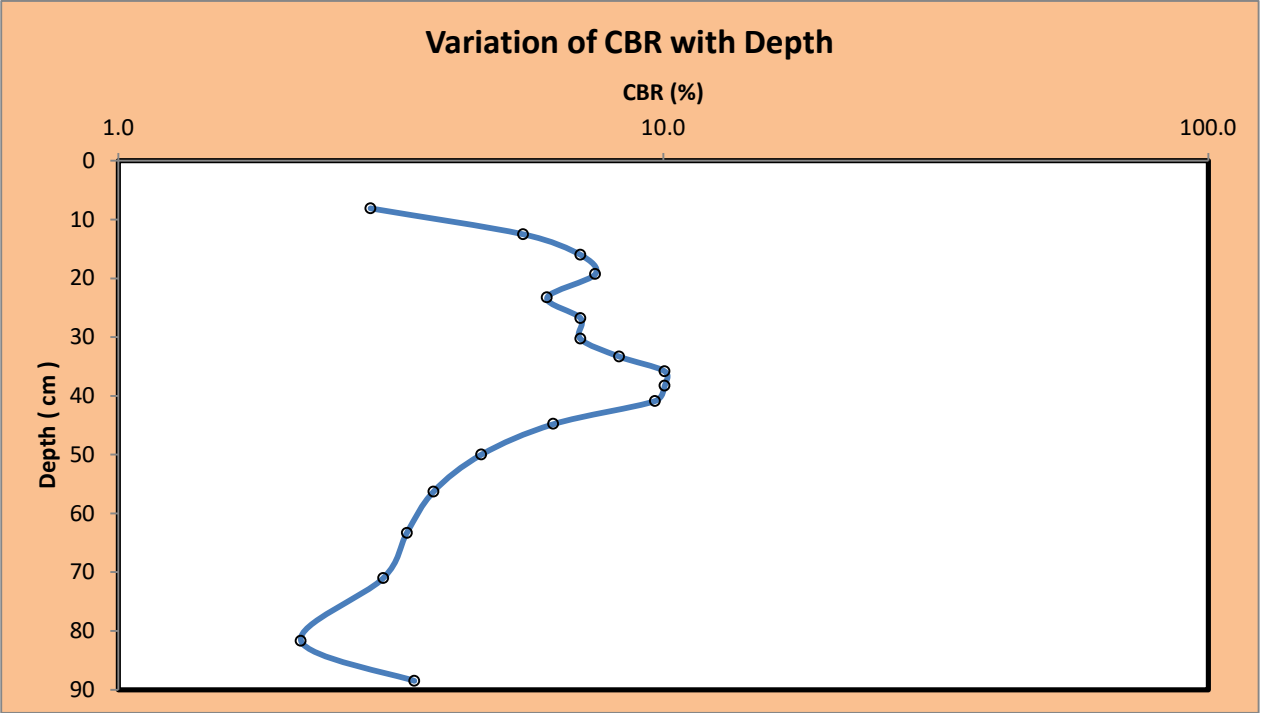
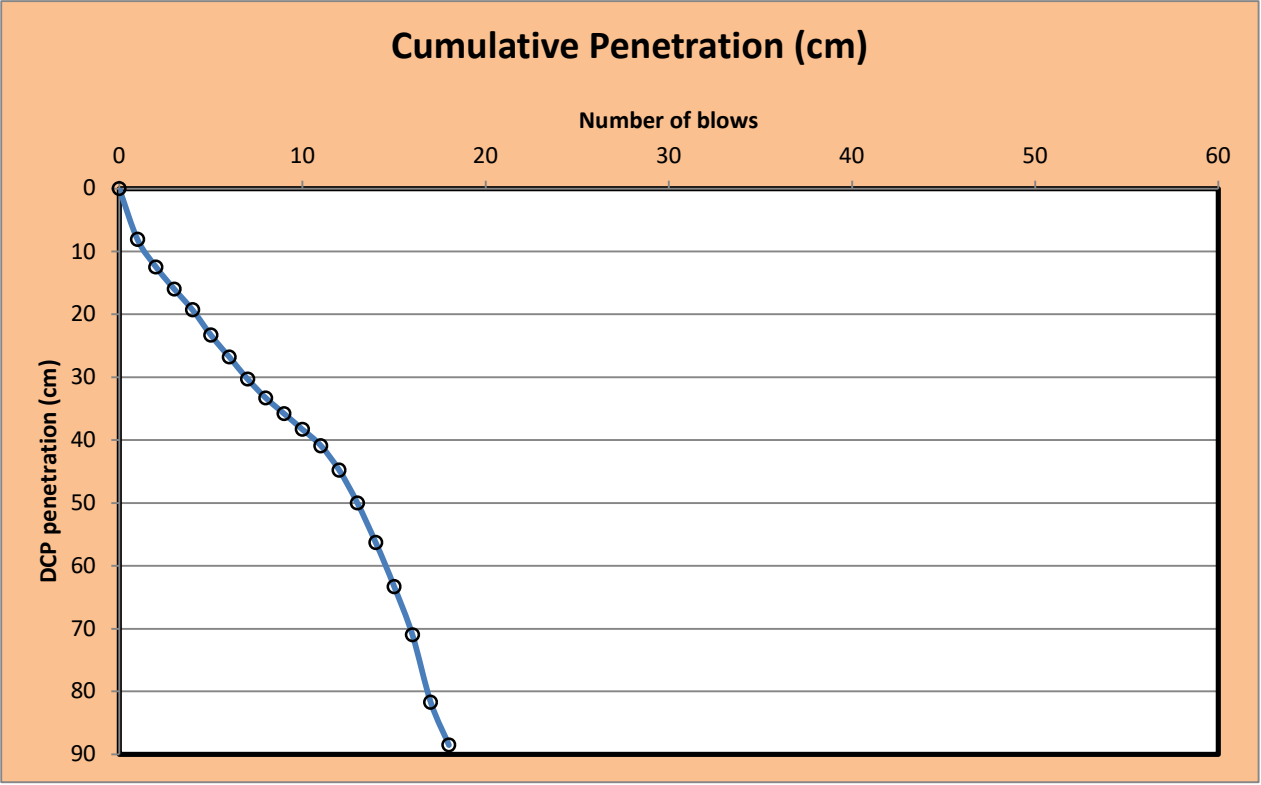
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT (HP201)

No. of Blows	DCP Scale Reading (cm)	Penetration /Blow (mm)	Cumulative Penetration (mm)	CBR Value (%)	Cumulative Penetration (cm)	Layer Thickness (mm)	Avg. CBR (%)
0	6.2	0	0		0	332	5.3
1	13.2	70	70	3.4	7		
2	18.5	53	123	4.5	12.3		
3	22.6	41	164	6.0	16.4		
4	27.2	46	210	5.3	21		
5	31	38	248	6.5	24.8		
6	35.6	46	294	5.3	29.4		
7	39.4	38	332	6.5	33.2		
8	41	16	348	16.1	34.8	550	9.5
9	43	20	368	12.7	36.8		
10	45.8	28	396	8.9	39.6		
11	49.7	39	435	6.3	43.5		
12	53	33	468	7.5	46.8		
13	56.2	32	500	7.7	50		
14	58.7	25	525	10.1	52.5		
15	60.8	21	546	12.1	54.6		
16	63.4	26	572	9.6	57.2		
17	66.4	30	602	8.3	60.2		
18	69.4	30	632	8.3	63.2		
19	73	36	668	6.8	66.8		
20	76.2	32	700	7.7	70		
21	78.9	27	727	9.3	72.7		
22	81.2	23	750	11.0	75		
23	84	28	778	8.9	77.8		
24	86.4	24	802	10.5	80.2		
25	88.8	24	826	10.5	82.6		
26	91.5	27	853	9.3	85.3		
27	94.4	29	882	8.6	88.2		



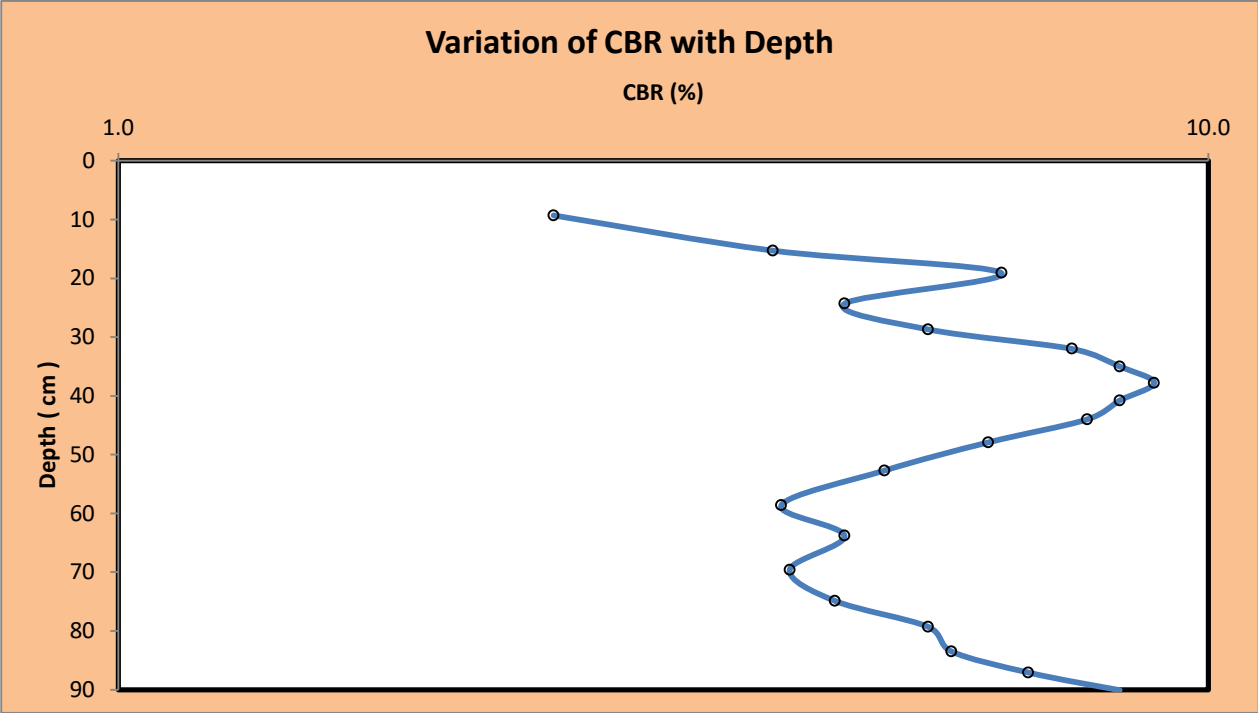
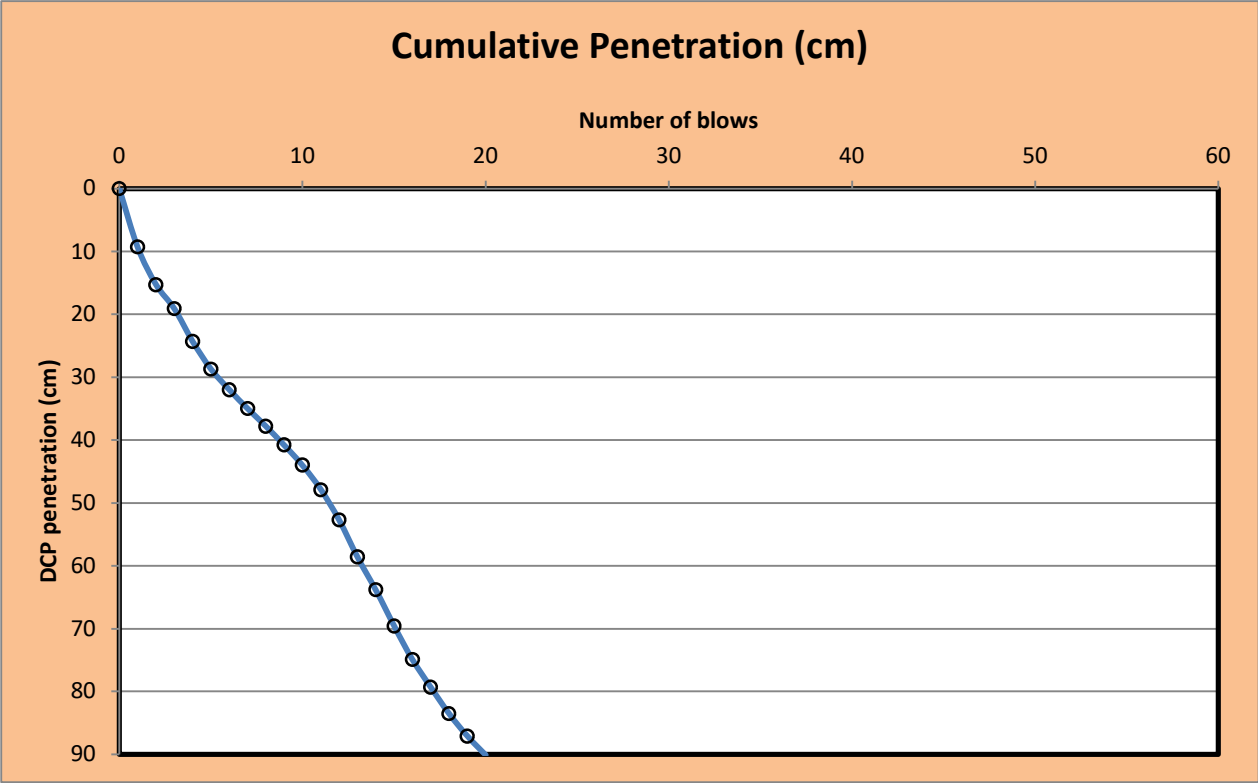
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT (HP202)

No. of Blows	DCP Scale Reading (cm)	Penetration /Blow (mm)	Cumulative Penetration (mm)	CBR Value (%)	Cumulative Penetration (cm)	Layer Thickness (mm)	Avg. CBR (%)
0	6.7	0	0		0	448	7.3
1	14.8	81	81	2.9	8.1		
2	19.2	44	125	5.5	12.5		
3	22.7	35	160	7.0	16		
4	26	33	193	7.5	19.3		
5	30	40	233	6.1	23.3		
6	33.5	35	268	7.0	26.8		
7	37	35	303	7.0	30.3		
8	40	30	333	8.3	33.3		
9	42.5	25	358	10.1	35.8		
10	45	25	383	10.1	38.3		
11	47.6	26	409	9.6	40.9		
12	51.5	39	448	6.3	44.8	437	3.4
13	56.7	52	500	4.6	50		
14	63	63	563	3.8	56.3		
15	70	70	633	3.4	63.3		
16	77.7	77	710	3.1	71		
17	88.4	107	817	2.2	81.7		
18	95.2	68	885	3.5	88.5		



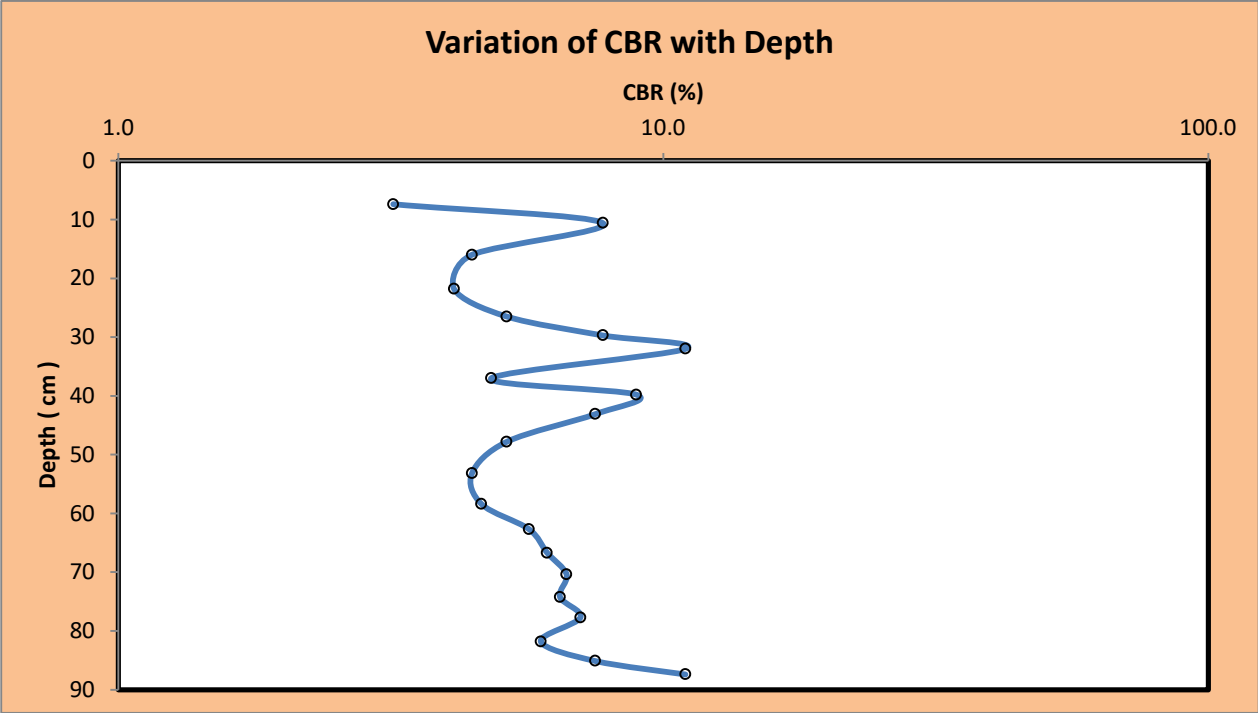
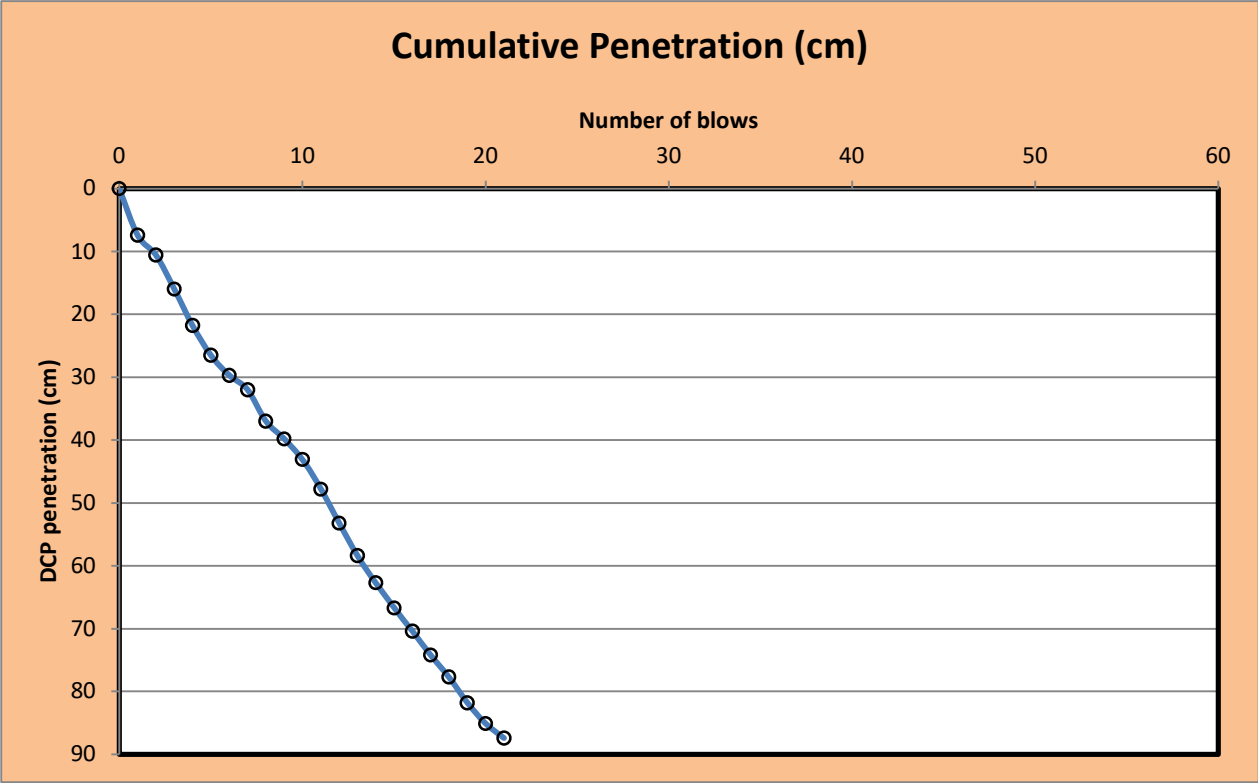
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT (HP203)

No. of Blows	DCP Scale Reading (cm)	Penetration /Blow (mm)	Cumulative Penetration (mm)	CBR Value (%)	Cumulative Penetration (cm)	Layer Thickness (mm)	Avg. CBR (%)
0	4.7	0	0		0	901	6.0
1	14	93	93	2.5	9.3		
2	20	60	153	4.0	15.3		
3	23.8	38	191	6.5	19.1		
4	29	52	243	4.6	24.3		
5	33.4	44	287	5.5	28.7		
6	36.7	33	320	7.5	32		
7	39.7	30	350	8.3	35		
8	42.5	28	378	8.9	37.8		
9	45.5	30	408	8.3	40.8		
10	48.7	32	440	7.7	44		
11	52.6	39	479	6.3	47.9		
12	57.4	48	527	5.0	52.7		
13	63.3	59	586	4.1	58.6		
14	68.5	52	638	4.6	63.8		
15	74.3	58	696	4.1	69.6		
16	79.6	53	749	4.5	74.9		
17	84	44	793	5.5	79.3		
18	88.2	42	835	5.8	83.5		
19	91.8	36	871	6.8	87.1		
20	94.8	30	901	8.3	90.1		



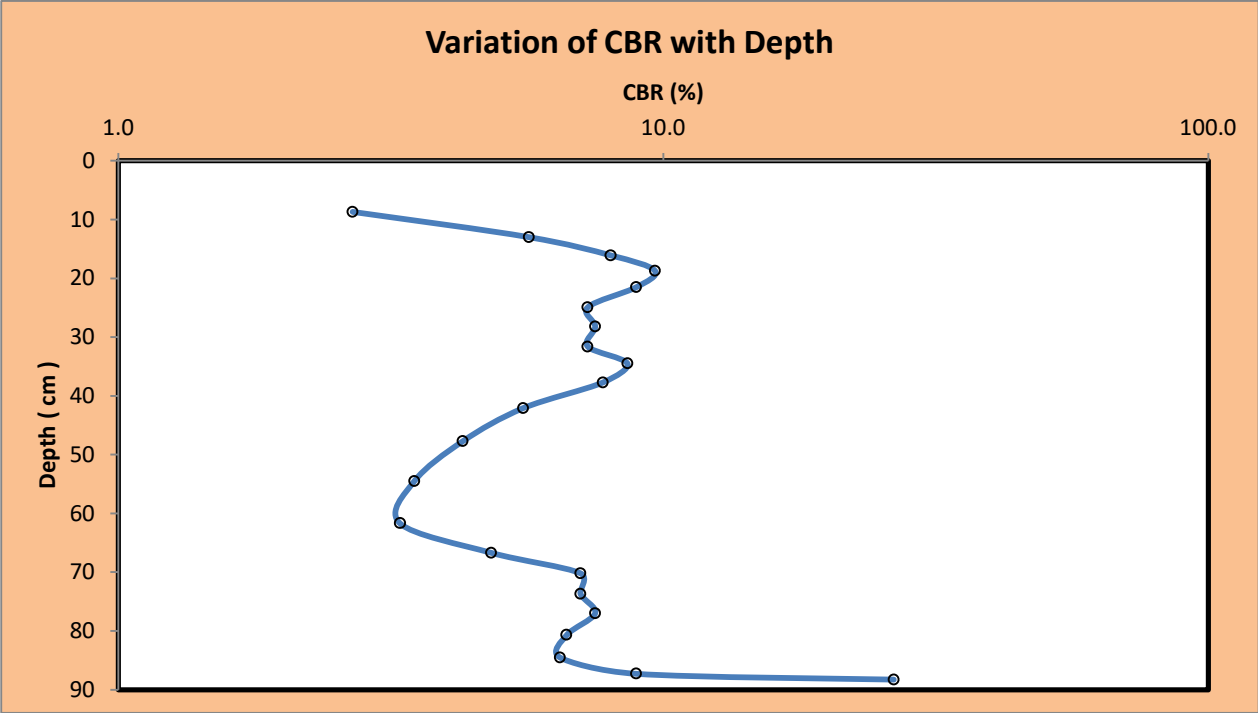
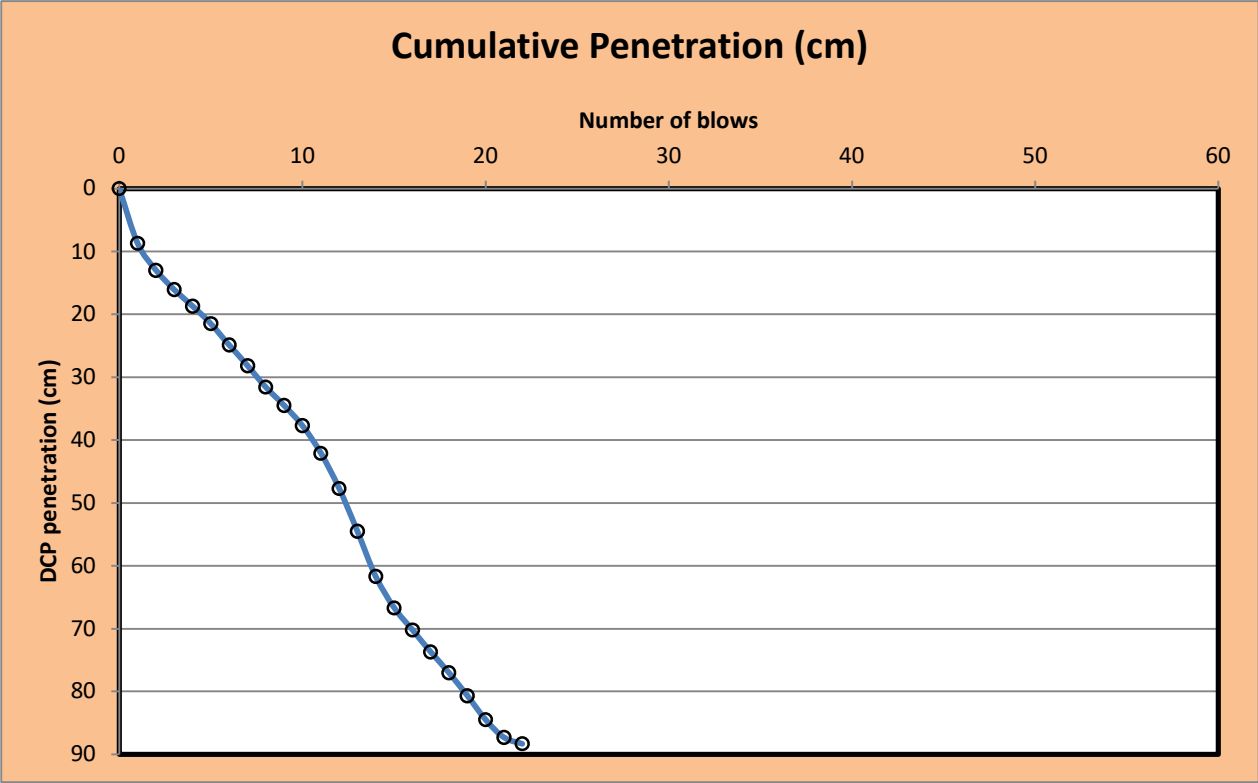
ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT (HP204)

No. of Blows	DCP Scale Reading (cm)	Penetration /Blow (mm)	Cumulative Penetration (mm)	CBR Value (%)	Cumulative Penetration (cm)	Layer Thickness (mm)	Avg. CBR (%)
0	6	0	0		0	874	6.4
1	13.4	74	74	3.2	7.4		
2	16.6	32	106	7.7	10.6		
3	22	54	160	4.5	16		
4	27.8	58	218	4.1	21.8		
5	32.5	47	265	5.2	26.5		
6	35.7	32	297	7.7	29.7		
7	38	23	320	11.0	32		
8	43	50	370	4.8	37		
9	45.8	28	398	8.9	39.8		
10	49.1	33	431	7.5	43.1		
11	53.8	47	478	5.2	47.8		
12	59.2	54	532	4.5	53.2		
13	64.4	52	584	4.6	58.4		
14	68.7	43	627	5.7	62.7		
15	72.7	40	667	6.1	66.7		
16	76.4	37	704	6.6	70.4		
17	80.2	38	742	6.5	74.2		
18	83.7	35	777	7.0	77.7		
19	87.8	41	818	6.0	81.8		
20	91.1	33	851	7.5	85.1		
21	93.4	23	874	11.0	87.4		



ANALYSIS OF DYNAMIC CONE PENETRATION TEST RESULT (HP205)

No. of Blows	DCP Scale Reading (cm)	Penetration /Blow (mm)	Cumulative Penetration (mm)	CBR Value (%)	Cumulative Penetration (cm)	Layer Thickness (mm)	Avg. CBR (%)
0	6.5	0	0		0	377	7.3
1	15.2	87	87	2.7	8.7		
2	19.5	43	130	5.7	13		
3	22.6	31	161	8.0	16.1		
4	25.2	26	187	9.6	18.7		
5	28	28	215	8.9	21.5		
6	31.4	34	249	7.3	24.9		
7	34.7	33	282	7.5	28.2		
8	38.1	34	316	7.3	31.6		
9	41	29	345	8.6	34.5		
10	44.2	32	377	7.7	37.7	667	4.3
11	48.6	44	421	5.5	42.1		
12	54.2	56	477	4.3	47.7		
13	61	68	545	3.5	54.5		
14	68.2	72	617	3.3	61.7		
15	73.2	50	667	4.8	66.7		
16	76.7	35	702	7.0	70.2		
17	80.2	35	737	7.0	73.7		
18	83.5	33	770	7.5	77		
19	87.2	37	807	6.6	80.7	883	10.0
20	91	38	845	6.5	84.5		
21	93.8	28	873	8.9	87.3		
22	94.8	10	883	26.5	88.3		





COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX C – Chemical Testing Results

Final Test Report

Envirolab Job Number: 22/05226
Issue Number: 1 Date: 14-Jun-22

Client: ROCP LIMITED
Commercial Wharf 6 Commercial Street
Castlefield
Manchester
M15 4PZ

Project Manager: Linden Richardson
Project Name: Manchester Enterprise Academy
Project Ref: Not specified
Order No: 1757

Date Samples Received: 27-May-22
Date Instructions Received: 27-May-22
Date Analysis Completed: 13-Jun-22

Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

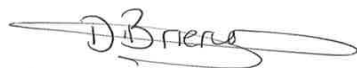
IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

HWOL TPH Code: EH_CU_1D_AL: Extractable hydrocarbons - i.e. everything extracted by the solvent(s), Clean-up - e.g. by florisil, silica gel, GC - Single coil gas chromatography, Aliphatics only

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	22/05226/6						
Client Sample Number							Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				WAC01						
Depth to Top				0						
Depth to Bottom				1.00						
Date Sampled				25/05/2022						
Sample Type				Soil - ES						
Sample Matrix Code				6AE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	7.33				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.09				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	7.4				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	3.25				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	3.88				100	-	-
Mineral Oil (mg/kg) _{A EH_CU_1D_AL}	A-T-007	N	N	<10				500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	0.002	0.005	0.004	0.050	0.5	2	25
Barium	A-T-025	N	N	0.033	0.139	0.072	1.300	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	0.005	0.002	0.011	0.020	0.5	10	70
Copper	A-T-025	N	N	0.008	0.019	0.018	0.180	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	30
Nickel	A-T-025	N	N	<0.001	0.003	<0.002	<0.01	0.4	10	40
Lead	A-T-025	N	N	0.007	0.049	0.015	0.450	0.5	10	50
Antimony	A-T-025	N	N	0.002	0.002	0.004	0.020	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.014	0.032	0.031	0.310	4	50	200
Chloride	A-T-026	N	N	1	4	3	35	800	15000	25000
Fluoride	A-T-026	N	N	0.5	0.5	1.1	5.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	2	22	5	205	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	41	63	90	617	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	30.50	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	6.7	7.5					
Conductivity (µS/cm)	A-T-037	N	N	81	126					
Mass Sample (kg)				0.208						
Dry Matter (%)	A-T-044	N	N	84.1						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.200						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

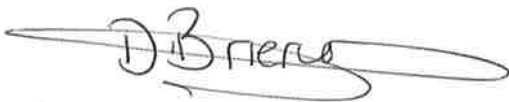
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/05226
Issue Number: 1
Date: 13 June, 2022

Client: ROCP LIMITED
Commercial Wharf 6 Commercial Street
Castlefield
Manchester
M15 4PZ

Project Manager: Linden Richardson
Project Name: Manchester Enterprise Academy
Project Ref: Not specified
Order No: 1757
Date Samples Received: 27/05/22
Date Instructions Received: 27/05/22
Date Analysis Completed: 13/06/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/05226

Client Project Name: Manchester Enterprise Academy

Client Project Ref: Not specified

Lab Sample ID	22/05226/1	22/05226/2	22/05226/3	22/05226/4	22/05226/5	22/05226/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	HP201	HP202	HP203	HP204	HP205	WAC01				
Depth to Top	0.4	0.4	0.4	0.1	0.1	0				
Depth To Bottom						1				
Date Sampled	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	5E	5AE	6A	6AE	6AE				
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	0.1	A-T-044
pH _D ^{M#}	6.82	7.09	7.18	7.41	6.83	7.33		pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	33	28	<10	<10	<10	-		mg/l	10	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	-		mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	-		mg/kg	0.2	A-T-050s
Fraction of organic carbon _D [#]	0.0031	0.0052	0.0303	0.0471	0.0422	-		N/A	0.0003	A-T-032 FOC
Antimony _D	<5	<5	<5	<5	<5	-		mg/kg	5	A-T-024s
Arsenic _D ^{M#}	3	2	9	12	18	-		mg/kg	1	A-T-024s
Barium _D	79	106	100	226	132	-		mg/kg	1	A-T-024s
Beryllium _D	0.8	1.1	0.7	0.9	1.2	-		mg/kg	0.5	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	<1.0	<1.0	<1.0	-		mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.0	0.9	0.7	0.9	0.9	-		mg/kg	0.5	A-T-024s
Copper _D ^{M#}	9	13	29	37	48	-		mg/kg	1	A-T-024s
Chromium _D ^{M#}	29	31	22	24	26	-		mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	-		mg/kg	1	A-T-040s
Chromium (trivalent)	29	31	22	24	26	-		mg/kg	1	Calc
Lead _D ^{M#}	9	16	68	133	101	-		mg/kg	1	A-T-024s
Mercury _D	<0.17	<0.17	0.48	0.63	0.71	-		mg/kg	0.17	A-T-024s
Molybdenum _D ^{M#}	<1	<1	<1	<1	1	-		mg/kg	1	A-T-024s
Nickel _D ^{M#}	20	33	18	21	22	-		mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	-		mg/kg	1	A-T-024s
Vanadium _D ^{M#}	32	33	28	30	35	-		mg/kg	1	A-T-024s
Zinc _D ^{M#}	32	54	77	82	98	-		mg/kg	5	A-T-024s

Envirolab Job Number: 22/05226

Client Project Name: Manchester Enterprise Academy

Client Project Ref: Not specified

Lab Sample ID	22/05226/1	22/05226/2	22/05226/3	22/05226/4	22/05226/5	22/05226/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	HP201	HP202	HP203	HP204	HP205	WAC01				
Depth to Top	0.4	0.4	0.4	0.1	0.1	0				
Depth To Bottom						1				
Date Sampled	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	5E	5AE	6A	6AE	6AE				
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil [#]	NAD	NAD	NAD	NAD	NAD	-				A-T-045
Asbestos Matrix (visual) ₀	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope) ₀	-	-	-	-	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ₀	N/A	N/A	N/A	N/A	N/A	-				A-T-045

Envirolab Job Number: 22/05226

Client Project Name: Manchester Enterprise Academy

Client Project Ref: Not specified

Lab Sample ID	22/05226/1	22/05226/2	22/05226/3	22/05226/4	22/05226/5	22/05226/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	HP201	HP202	HP203	HP204	HP205	WAC01				
Depth to Top	0.4	0.4	0.4	0.1	0.1	0				
Depth To Bottom						1				
Date Sampled	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22	25-May-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	5E	5AE	6A	6AE	6AE				
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	<0.01	0.25	<0.01	-		mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	0.08	<0.01	-		mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	<0.02	0.49	<0.02	-		mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	0.12	0.72	0.11	-		mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	0.10	0.46	0.11	-		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	0.13	0.59	0.15	-		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	<0.05	0.23	<0.05	-		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	0.21	<0.07	-		mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	0.15	0.83	0.15	-		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	-		mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	0.25	1.94	0.24	-		mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	<0.01	0.39	<0.01	-		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	<0.03	0.07	0.25	0.08	-		mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	0.93	<0.03	-		mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	<0.03	0.12	2.50	0.12	-		mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	<0.07	0.25	1.78	0.23	-		mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	<0.08	1.19	11.7	1.19	-		mg/kg	0.01	A-T-019s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: ROCP LIMITED, Commercial Wharf 6 Commercial Street, Castlefield,
Manchester, M15 4PZ

Project: Manchester Enterprise Academy

Clients Project No:

Project No: 22/05226

Date Received: 27/05/2022 (am)

Cool Box Temperatures (°C): 14.1

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	22/05226/1	22/05226/2	22/05226/3	22/05226/4	22/05226/5	22/05226/6
Client Sample No						
Client Sample ID/Depth	HP201 0.4m	HP202 0.4m	HP203 0.4m	HP204 0.1m	HP205 0.1m	WAC01 0-1m
Date Sampled	25/05/22	25/05/22	25/05/22	25/05/22	25/05/22	25/05/22
A-T-004s						06/06/2022
A-T-007s						31/05/2022
A-T-019s	07/06/2022	07/06/2022	07/06/2022	07/06/2022	07/06/2022	31/05/2022
A-T-022s						07/06/2022
A-T-024s	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	
A-T-025w						13/06/2022
A-T-026s	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	
A-T-026w						13/06/2022
A-T-027s	09/06/2022	09/06/2022	09/06/2022	09/06/2022	09/06/2022	
A-T-030s						08/06/2022
A-T-031s	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
A-T-031w						13/06/2022
A-T-032 FOC	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022	
A-T-032s						08/06/2022
A-T-032w						13/06/2022
A-T-037w						13/06/2022
A-T-040s	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	
A-T-042sTCN	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022	
A-T-044	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022	08/06/2022
A-T-045	30/05/2022	30/05/2022	30/05/2022	30/05/2022	30/05/2022	
A-T-050s	01/06/2022	01/06/2022	01/06/2022	01/06/2022	01/06/2022	
A-T-050w						13/06/2022
A-T-ANCs						08/06/2022
Calc	10/06/2022	10/06/2022	10/06/2022	10/06/2022	10/06/2022	06/06/2022
Calc-no stones						13/06/2022
Probe (w)						13/06/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report



COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX D – Geotechnical Testing Results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: ROC Consulting Ltd
Client Address: Commercial Wharf, 6 Commercial Street,
Castlefield, Manchester,
M15 4PZ
Contact: Linden Richardson
Site Address: Manchester Enterprise Academy

Client Reference: 4111
Job Number: 22-61119
Date Sampled: Not Given
Date Received: 26/05/2022
Date Tested: 07/06/2022
Sampled By: Client - LR

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

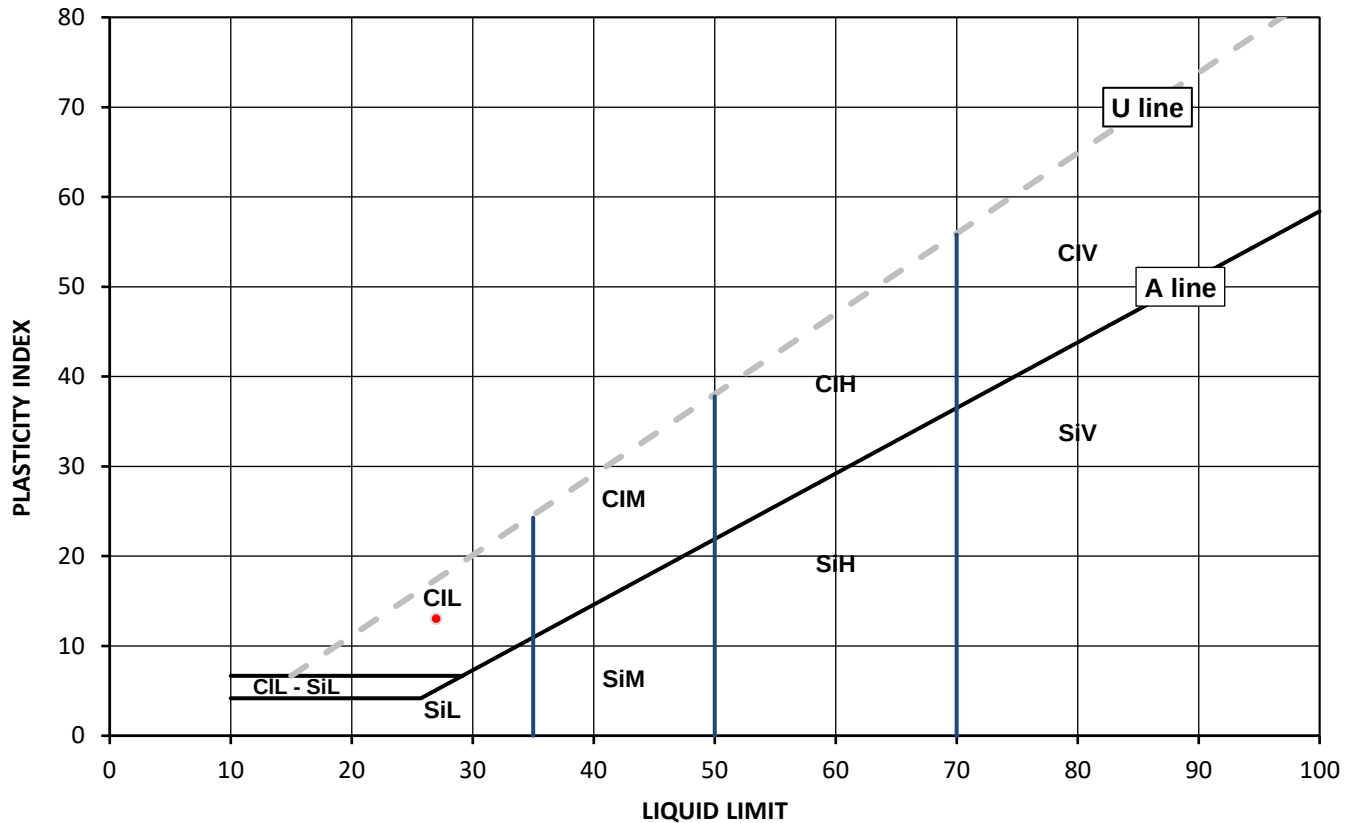
Test Results:

Laboratory Reference: 2291778
Hole No.: HP201
Sample Reference: 1
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 0.80
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	27	14	13	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	append to classification for organic material (eg CIHO)
	V Very high	
	O Organic	

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

4041

Client: ROC Consulting Ltd
Client Address: Commercial Wharf, 6 Commercial Street,
Castlefield, Manchester,
M15 4PZ

Contact: Linden Richardson
Site Address: Manchester Enterprise Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 4111
Job Number: 22-61119
Date Sampled: Not Given
Date Received: 26/05/2022
Date Tested: 07/06/2022
Sampled By: Client - LR

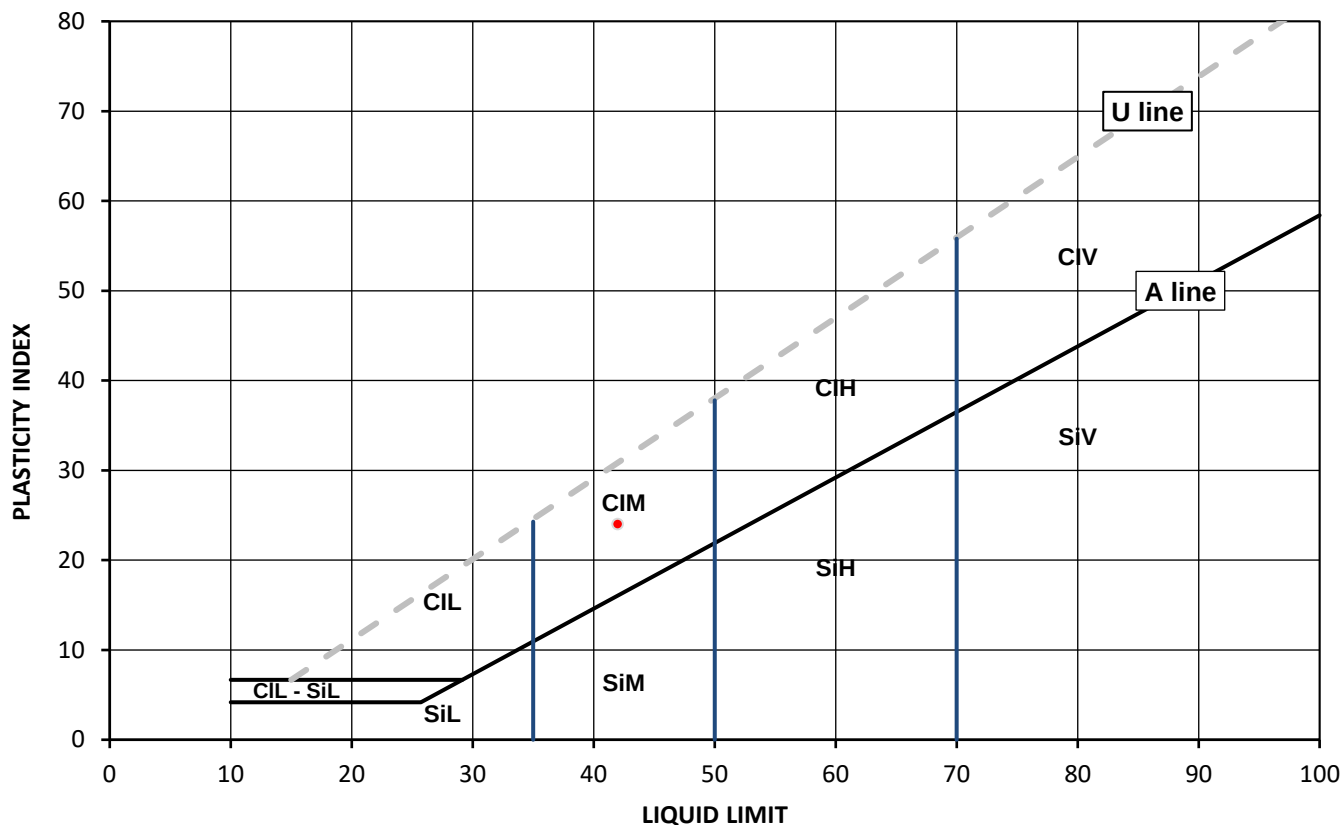
Test Results:

Laboratory Reference: 2291779
Hole No.: HP203
Sample Reference: 2
Sample Description: Brown sandy CLAY

Depth Top [m]: 0.80
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	42	18	24	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.



4041

Client: ROC Consulting Ltd
 Client Address: Commercial Wharf, 6 Commercial Street,
 Castlefield, Manchester,
 M15 4PZ
 Contact: Linden Richardson
 Site Address: Manchester Enterprise Academy

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990:
 Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2:
 1990: Clause 8.2

i2 Analytical Ltd
 Unit 8 Harrowden Road
 Brackmills Industrial Estate
 Northampton NN4 7EB



Environmental Science

Client Reference: 4111
 Job Number: 22-61119
 Date Sampled: Not Given
 Date Received: 26/05/2022
 Date Tested: 07/06/2022
 Sampled By: Client - LR

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-1 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL	Wp	Ip	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
2291778	HP201	1	0.80	Not Given	D	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	21		98	27	14	13						
2291779	HP203	2	0.80	Not Given	D	Brown sandy CLAY	Atterberg 1 Point	22		100	42	18	24						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
 Technical Reviewer
 for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.



4041

Client: ROC Consulting Ltd
Client Address: Commercial Wharf, 6 Commercial Street,
Castlefield, Manchester,
M15 4PZ
Contact: Linden Richardson
Site Address: Manchester Enterprise Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

Client Reference: 4111
Job Number: 22-61119
Date Sampled: Not Given
Date Received: 26/05/2022
Date Tested: 07/06/2022
Sampled By: Client - LR

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2291778	HP201	1	0.80	Not Given	D	Brown slightly gravelly very sandy CLAY		21	Sample was quartered, oven dried at 107 °C			
2291779	HP203	2	0.80	Not Given	D	Brown sandy CLAY		22	Sample was quartered, oven dried at 109 °C			

Comments:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

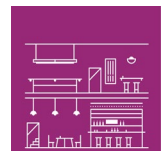
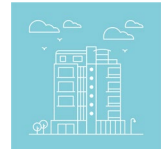
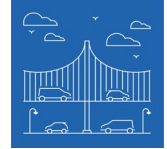
Signed:

Katarzyna Koziel

Katarzyna Koziel
Technical Reviewer
for and on behalf of i2 Analytical Ltd



An award-winning practice
serving the property and
construction industry for
more than 25 years



RoCP Ltd
(Trading as RoC Consulting)
Commercial Wharf
6 Commercial Street
MANCHESTER
M15 4PZ

T | 0161 214 5390
W | www.rocconsulting.com