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Ref: 19-493-LR1-RevC
Date: 15th September 2022

HM Property

Office 3,
Enterprise Centre,
Bellfield Road,
Rochdale
OL16 2UP

BY Email to Talat Mahmood (talat_ert@hotmail.com)

Land South of Manchester Road, Rochdale

Dear Talat,

INTRODUCTION

Background

ERGO have been commissioned by HM Property to undertake a Phase II Geo-Environmental Site Investigation for a parcel of land located to the south of Manchester Road in Rochdale. ERGO have based the site investigation works on a brief specification provided by the engineers for the project – Krypton Structure Ltd.

The location of the site is shown within ERGO Drawing 19-493-001.

Objectives

The objectives of the Geo-Environmental Investigation are to:

- Undertake a stage of sampling and analysis within the footprint of the demolished structure to provide an overview of environmental issues present;
- Assess the implications of potential environmental risks, liabilities and development constraints associated with the above-mentioned structural footprints in relation to the future use of the site and off-site receptors; and,
- Assess the geotechnical information and provide preliminary recommendations in relation to foundations and floor slabs.

Site Works included:

- Sampling of Made Ground and natural deposits on the site to determine the nature of possible contamination (if present); and,
- Supervision of works by suitably qualified ERGO Engineer/Consultant.

Ergo have not been provided with any previous reports for the site and a desk based site assessment was outside the scope of this investigation.

Limitations

The limitations of this report are enclosed.



Confidentiality

ERGO has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from ERGO; a charge may be levied against such approval.

SITE INVESTIGATION

The site works were undertaken between the 16th September 2019 and 8th October 2019 using a cable percussive drilling rig. 3No. cable percussive boreholes were completed within the footprint of the demolished structure down to maximum depths of 12.00m bgl. ERGO Drawing 19-493-003 shows the approximate locations of the cable percussive boreholes.

The works were undertaken following consultation with the client to determine the specifics of the required scope of works. It was agreed that 3no. boreholes to depths of 12.00m bgl would be undertaken with no requirement for environmental monitoring installations or investigation of the underlying solid geology.

The presence of stockpiled demolition arisings on the site restricted access to some areas and therefore prevented access for investigation in parts of the site.

The ground conditions encountered within the boreholes are summarised in the table below:

Table 1 *Summary of Strata*

STRATA	GENERAL DESCRIPTION	TYPICAL DEPTH (mbgl):				LOCATION
		TOP:		BASE:		
		MIN	MAX	MIN	MAX	
MADE GROUND	MADE GROUND: Black sandy gravel.	0.00	-	-	1.00	BH101
MADE GROUND	MADE GROUND: Yellowish brown sandy gravel.	0.00	-	-	0.20	BH102, BH102A, BH103
MADE GROUND	MADE GROUND: Reddish brown sandy gravel.	0.20	-	0.50	2.10	BH102, BH102A, BH103
MADE GROUND	MADE GROUND: Concrete.	0.50	-	-	0.55	BH102
MADE GROUND	MADE GROUND: Brown clayey gravelly sand .	1.00			1.70	BH101
MADE GROUND	MADE GROUND: Soft grey sandy gravelly clay.	1.80	2.10	3.10	3.30	BH102A, BH103
CLAY	Firm greyish brown sandy gravelly CLAY.	1.70			3.80	BH101
CLAY	Stiff sandy gravelly CLAY	3.90			5.80	BH101
SAND	Very dense grey gravelly SAND	3.10	3.80	3.90	4.00	BH101, BH102A, BH103
SAND	Loose light greyish brown fine to coarse SAND.	3.10	3.10	4.00	4.00	BH102A
SAND	Medium dense yellowish brown gravelly SAND	4.00	5.80	6.00	8.50	BH101, BH102A
SAND	Very dense yellowish brown SAND	4.00	8.50	12.45	12.95	BH101, BH102A, BH103

Exploratory borehole logs are enclosed for reference in Appendix IV.

Made Ground

Made Ground deposits were encountered within all exploratory hole locations to depths of between 1.70m and 3.30m bgl.



Made Ground deposits within the footprint of the former structure predominantly comprised a yellowish brown sandy gravel of sandstone overlying a reddish brown slightly sandy gravel of concrete and brick and a soft very sandy reworked clay with occasional brick fragments noted. Immediately adjacent to the footprint of the former structure ground conditions were noted to predominantly comprise black sandy angular to sub-angular fine to coarse gravel of mudstone, ash, sandstone, brick and concrete overlying a brown clayey gravelly fine to coarse sand.

Visual evidence of asbestos contamination was noted at the surface within the demolition arisings. No further visual or olfactory evidence of contamination was noted within any of the exploratory hole locations.

Drift Deposits

Drift deposits were encountered within all exploratory locations with the exception of BH102 where the full depth of Made Ground could not be proven owing to a buried concrete obstruction preventing the borehole from being progressed beyond a depth of 0.55m bgl. The drift deposits generally comprised firm to stiff light greyish brown sandy slightly gravelly CLAY overlying medium dense to very dense yellowish brown occasionally gravelly SANDs proven to depths of at least 12.00m bgl.

Solid Geology

The solid bedrock geology was not encountered within any of the exploratory borehole locations.

Groundwater

Groundwater was encountered within BH102A and BH103 at depths between 1.80 and 2.00m bgl.

GEOENVIRONMENTAL RISK ASSESSMENT

Human Health Risk Assessment

A preliminary Tier 1 human health risk assessment has been undertaken using selected samples retrieved from the from the exploratory borehole locations. A Phase I Desk Study has not been commissioned as part of these works however, in lieu of this, a suite of commonly associated contaminants has been scheduled to assess the site. At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic compounds with reference values published in LQM / CIEH S4UL (S4UL3747) compared to residential without plant uptake threshold values, given the absence of landscaping and the presence of proposed hardstanding cover.

The results of this comparison have been summarised within the table 2 (overleaf).



Table 2 Summary of Inorganic and Hydrocarbon Toxicity Assessment for a Residential End Use

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATHWAY	ASSESSMENT
Asbestos Identification	-	Present	4	Fibres	BH102 0.20 BH103 0.40	4	Further Action
Arsenic	mg/kg	40	3	14	N/A	1	No Further Action
Cadmium	mg/kg	85	3	0.7	N/A	1	No Further Action
Chromium (VI)	mg/kg	6	3	<1	N/A	1	No Further Action
Lead	mg/kg	330	3	324	N/A	1	No Further Action
Mercury	mg/kg	1.2	3	<0.5	N/A	2	No Further Action
Nickel	mg/kg	180	3	27	N/A	1	No Further Action
Selenium	mg/kg	430	3	0.8	N/A	1	No Further Action
Copper	mg/kg	7100	3	244	N/A	1	No Further Action
Zinc	mg/kg	40000	3	326	N/A	1	No Further Action
Naphthalene	mg/kg	2.3	3	0.54	N/A	2	No Further Action
Acenaphthylene	mg/kg	500	3	0.05	N/A	3	No Further Action
Acenaphthene	mg/kg	500	3	0.85	N/A	1	No Further Action
Fluorene	mg/kg	500	3	0.44	N/A	1	No Further Action
Phenanthrene	mg/kg	500	3	10.52	N/A	3	No Further Action
Anthracene	mg/kg	500	3	2.39	N/A	3	No Further Action
Fluoranthene	mg/kg	500	3	12.67	N/A	3	No Further Action
Pyrene	mg/kg	500	3	11.17	N/A	3	No Further Action
Benzo(a)Anthracene	mg/kg	11	3	4.99	N/A	3	No Further Action
Chrysene	mg/kg	30	3	5.61	N/A	3	No Further Action
Benzo(b)Fluoranthene	mg/kg	3.9	3	7.16	BH103 0.40	3	Further Action
Benzo(k)Fluoranthene	mg/kg	110	3	2.89	N/A	3	No Further Action
Benzo(a)Pyrene**	mg/kg	3.2	3	6.42	BH103 0.40	3	Further Action
Indeno(123-cd)Pyrene	mg/kg	45	3	3.98	N/A	3	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.31	3	0.95	BH103 0.40	3	Further Action
Benzo(ghi)Perylene	mg/kg	360	3	4.67	N/A	3	No Further Action
TPH C5-C6 (aliphatic)*	mg/kg	42	1	<0.1	N/A	3	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	1	<0.1	N/A	3	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	1	<0.1	N/A	3	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	250	1	<1	N/A	3	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	1800	1	9	N/A	3	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	1900	1	649	N/A	3	No Further Action
TPH C21-C35 (aromatic)*	mg/kg	1900	1	935.33	N/A	1	No Further Action

Notes

Main Exposure Pathways: 1 = Soil Ingestion, 2 = Vapour Inhalation (indoor), 3 = Dermal Contact & Ingestion, 4 = Dust Inhalation.

Abbreviations: GAC = General Assessment Criteria, n = number of samples, MC = Maximum Concentration; Loc of Ex = Location of Exceedance; NFD = No Fibres Detected

* The Tier 1 GAC for the hydrocarbon fraction is derived from the CIEH assessment for petroleum hydrocarbons Criteria Working Group (CWG) for both aliphatic and aromatic compounds. ERGO has utilised the Tier 1 values for aliphatic compounds for the volatile and semi volatile fractions (C₅-C₁₂) and the Tier 1 values for aromatic compound for the non-volatile fractions (C₁₂-C₃₅). The comparison of a total (aliphatic/aromatic) compounds to an individual fraction is considered to be a conservative approach and satisfactory for the protection of human health.

Referring to Table 2, the results of this direct comparison indicates that the data exceeds the screening criteria for a residential end use for the following contaminants:

-  Asbestos
-  Benzo(b)fluoranthene
-  Benzo(a)pyrene
-  Dibenzo(a,h)anthracene



Risk Assessment and Mitigation

Asbestos in the form of Chrysotile bitumen and Amosite, Chrysotile Insulating board has been identified within shallow Made Ground deposits within the footprint of the demolished building. It is considered likely that the identified asbestos is associated with the former building which has been demolished and may be present elsewhere on the site.

Quantification has not been undertaken given the visible nature of the encountered material. Further asbestos testing was undertaken within the vicinity of BH103 within shallow Made Ground deposits in December 2019 and no asbestos fibres were recorded.

All Asbestos Containing Material (ACM) identified during the site enabling works must be dealt with in strict accordance with the Control of Asbestos Regulations (CAR) 2012, UK Waste Management Legislation and the Environmental Protection Act 1994.

Should off-site disposal be required, then additional asbestos quantification and waste classification testing should be undertaken to ensure that it is classified correctly and disposed at a suitably licenced facility.

All ACM impacted soils must be managed so as to ensure no airborne fibre release during construction or placement of impacted material in such a manner to ensure no future exposure risk.

Elevated concentrations of PAH compounds have also been identified within the Made Ground.

However, given the absence of proposed landscaping and given that the proposals involve the placement of either buildings and/or hardstanding across the site there will be no viable pollutant linkage between the source of contamination and the future site users. The

Should design proposals change to include landscaping and should Made Ground soils remain on the site, this report will need to be revised and soils will need to be placed below a suitable clean cover layer to ensure they pose no unacceptable risk to the future site users.



GEOTECHNICAL SITE ASSESSMENT

Soil Consistency

Undrained shear strength values were measured using both field hand shear vane tests and laboratory undrained triaxial testing. Results of the in-situ tests indicate the localised clay soils to predominantly vary between firm and stiff and are shown within the exploratory hole logs, enclosed. Laboratory results are presented in Table 3 below, testing certificates are enclosed for reference. Strength test data is generally consistent with the field descriptions of the soils given above.

Table 3 *Summary of Undrained Triaxial Shear Strength Test Results*

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m ²)	CONSISTENCY
BH101	3.00	Brown slightly gravelly very sandy CLAY	52	Firm

Results of the Standard Penetration Tests are included on the exploratory boreholes logs which are enclosed with this letter.

Foundation Recommendations

Significant thicknesses of Made Ground and locally loose sands have been recorded throughout the site during this investigation to depths of between 3.30 to 4.00m bgl.

These materials are not considered suitable for traditional shallow foundations and a piled foundation solution is therefore considered appropriate for proposed structures.

The nature and thickness of these deposits is such that skin friction should be generated within the underlying stiff clays and medium dense/very dense granular soils. However, the ground conditions at the site include an element of compressible soils which may give rise to negative skin friction and a competent piling contractor should take this into account during the design; this may result in increased pile length.

It is also noted that significant obstructions are present at the site and these should be taken into account by the piling contractor.

Adjacent existing properties should also be considered as piling may have an adverse effect on the stability of these structures.

Ground Bearing Floor Slabs

Current building control regulations require that where infilled ground is present to depths in excess of 600mm or where the sub-stratum is variable in terms of the structure and settlement potential or where clay soils are present within the influence of existing or proposed trees, a suspended floor slab is required.

In this instance it is considered that the underlying stratum would have in-excess of 600mm of infill and as such suspended floor slabs will be required.

Heave Precautions

Selected samples were sent for analysis to determine Liquid and Plastic Limits of natural in situ clay. The results are shown below in table 4 (overleaf).



Table 4 Summary of Plasticity testing

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
BH101	2.00	14	14	30	16	96	15	Low

Atterberg testing identified the site to be underlain by low plasticity clay soils which are susceptible to volumetric instability due to fluctuations in moisture content, particularly within influencing distance of trees as per the NHBC / LABC conjectured zones of influence.

Clay soils have been proven to be of low volume change potential.

The results of these tests are enclosed for reference.

Concrete Classification

Based upon the results of the chemical analyses summarised in it is considered that subsurface concrete should be designed in accordance with Design Sulphate Class DS-2, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE Special Digest 1 (2005) due to the presence of elevated concentrations of sulphate.

Civil Engineering Excavation Risk Matrix

Table 5 Civil Engineering Risk Matrix

Risk Item	Present	Comment
Running Sands	No	None encountered in the exploratory locations undertaken.
Minor Water ingress	No	None encountered in the exploratory locations undertaken.
Shallow Bedrock	No	None encountered to depths of at least 12.00m bgl.

Drainage

It is recommended that a suitable drainage system for surface water is installed by the contractor in order to prevent surface water ponding or collecting during and post construction, which may in turn lead to deterioration of the founding stratum.

Minor water ingress will require localised dewatering / sump pumping during the construction of site drainage infrastructure.

Construction Activity and Inspection

The following activities and inspections should be incorporated into the site works:

- Due to the variability of the soils at the site it is recommended that sufficient allowance is made for the inspection of formation and sub formations to foundations and pavement construction;
- Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 utilised;
- It is considered that de-watering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant



regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond;

-  The presence of potential contamination and in particular asbestos should be taken in to account and mitigation measures should be addressed as part of the Construction Stage Health and Safety Plan and should include measures to design out the risks, reduce their impact and finally the use of Personnel Protective Equipment (PPE).

I trust this information is satisfactory to your requirements, and should I be able to be of any further assistance, please do not hesitate to contact me.

Yours sincerely,

For and on behalf of ERGO Ltd



Alicia Becker
Senior Geo-environmental Consultant



APPENDIX I LIMITATIONS



1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between ERGO and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. ERGO cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by ERGO is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by ERGO in this connection without their explicit written agreement there to by ERGO.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II GLOSSARY



TERMS

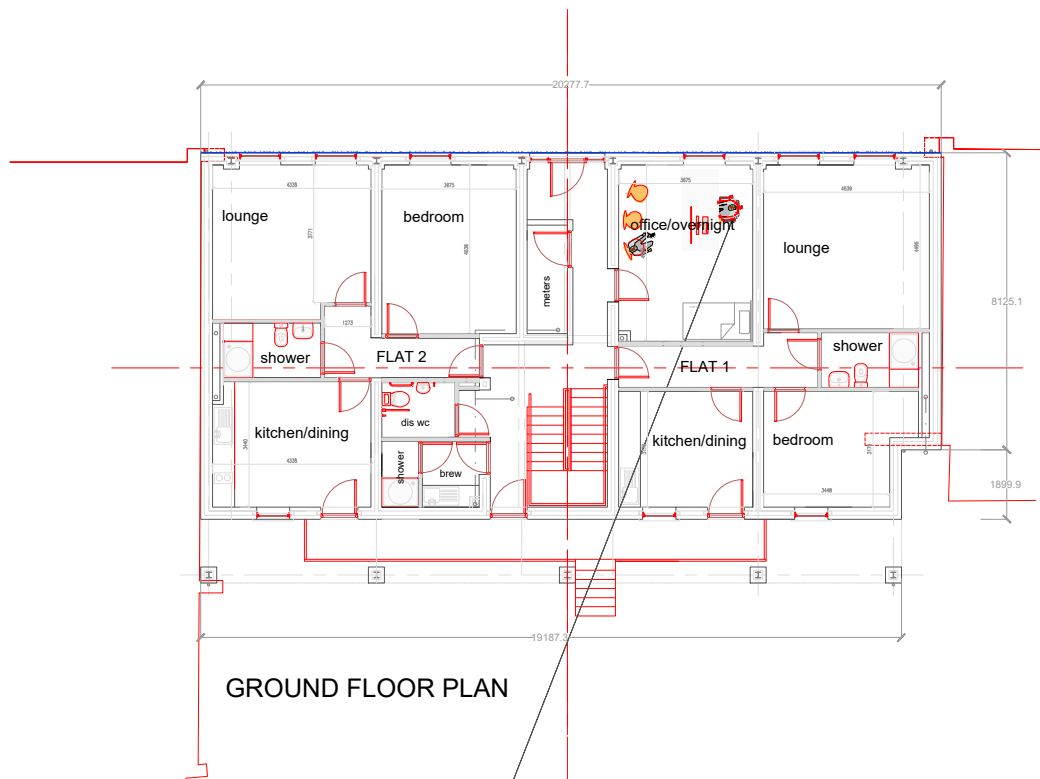
AST	Above Ground Storage Tank	SGV	Soil Guideline Value
BGS	British Geological Survey	SPH	Separate Phase Hydrocarbon
BSI	British Standards Institute	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes	SPT	Standard Penetration Test
CIEH	Chartered Institute of Environmental Health	SVOC	Semi Volatile Organic Compound
CIRIA	Construction Industry Research Association	UST	Underground Storage Tank
CLEA	Contaminated Land Exposure Assessment	VCCs	Vibro Concrete Columns
CSM	Conceptual Site Model	VOC	Volatile Organic Compound
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)	WTE	Water Table Elevation
DWS	Drinking Water Standard	m	Metres
EA	Environment Agency	km	Kilometres
EQS	Environmental Quality Standard	%	Percent
GAC	General Assessment Criteria	%v/v	Percent volume in air
GL	Ground Level	mb	Milli Bars (atmospheric pressure)
GSV	Gas Screening Value	l/hr	Litres per hour
HCV	Health Criteria Value	µg/l	Micrograms per Litre (parts per billion)
ICSM	Initial Conceptual Site Model	ppb	Parts Per Billion
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)	mg/kg	Milligrams per kilogram (parts per million)
ND	Not Detected	ppm	Parts Per Million
LMRL	Lower Method Reporting Limit	mg/m³	Milligram per metre cubed
NR	Not Recorded	m bgl	Metres Below Ground Level
PAH	Polycyclic Aromatic Hydrocarbon	m bcl	Metre Below Cover Level
PCB	Poly-Chlorinated Biphenyl	mAOD	Metres Above Ordnance Datum (sea level)
PID	Photo Ionisation Detector	kN/m²	Kilo Newtons per metre squared
QA	Quality Assurance	µm	Micro metre
SGV	Soil Guideline Value		



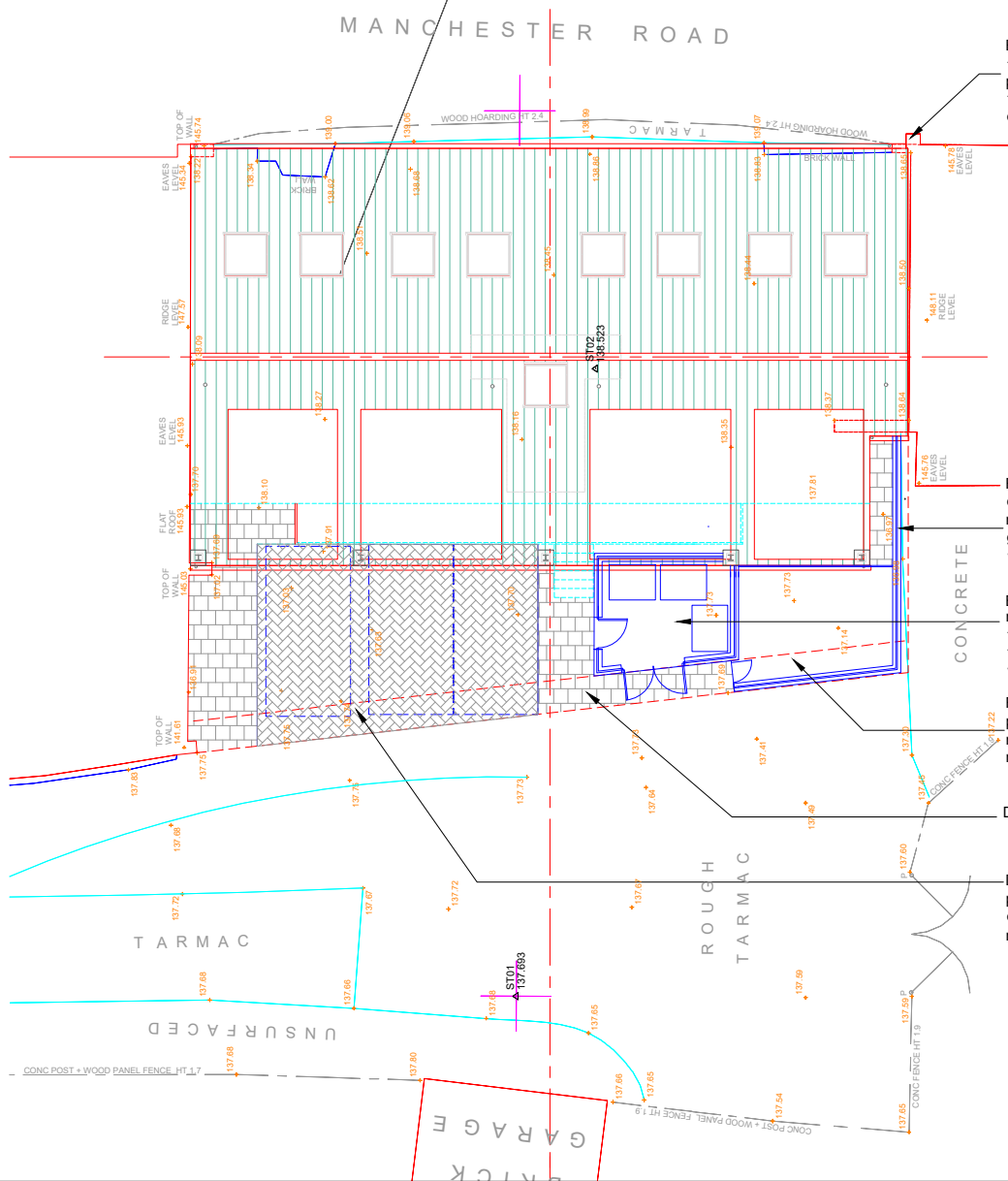
APPENDIX III DRAWINGS







GROUND FLOOR PLAN



Existing projecting brickwork to adjoining properties to be cut back - stabilized and rebuilt to suit proposed building in brickwork to match existing-all to the advice and details provided by the structural engineer

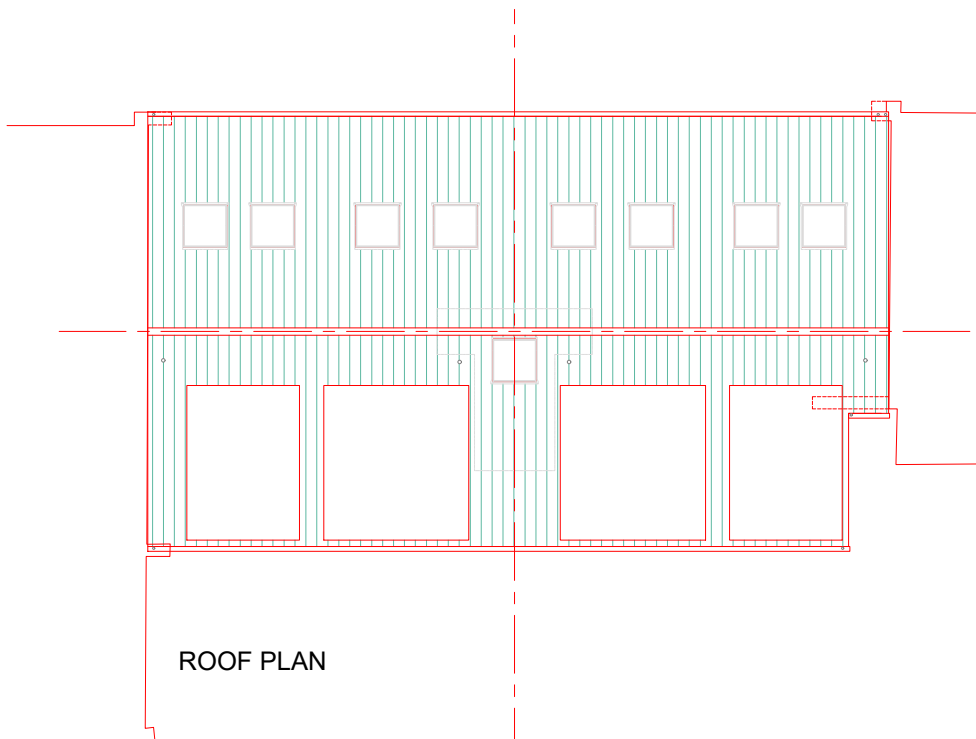
Retaining wall to structural engineers design and details faced in brickwork to match proposed building max 600mm above higher GL and topped off with galv steel black painted railings 600mm high to top of wall.

Bin store constructed with dwarf brickwork walls to match main building with timber panel fencing above to provide overall maximum height of 1.8m - provide timber pedestrian and access gates as shown in vertical timber work to match fencing

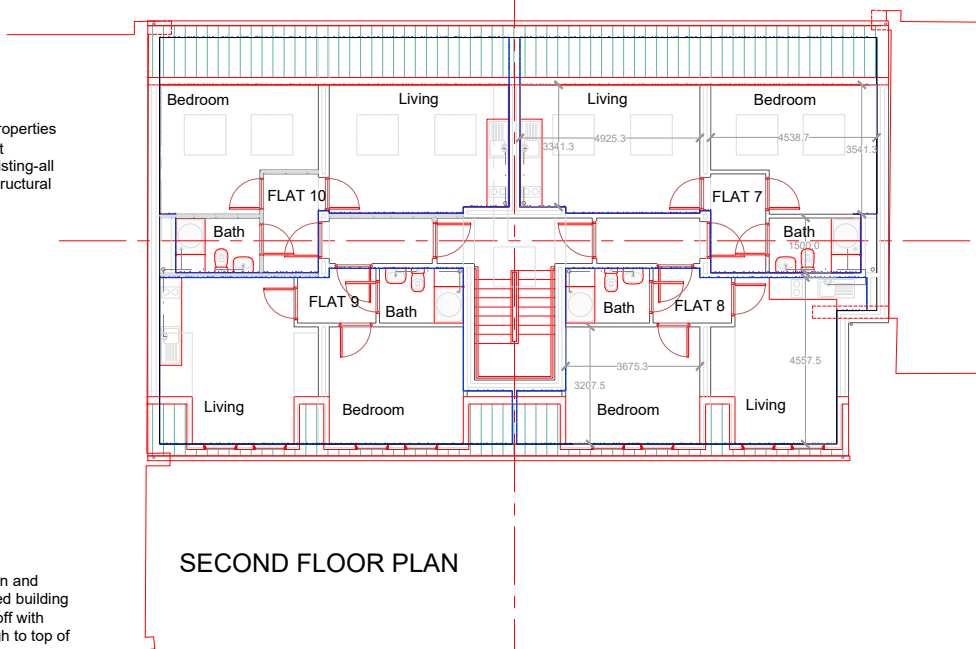
Form amenity space for residents with p.c.conc paving and vertically boarded timber fence enclosure max 1.8m in height - fencing cont. with bin store and masonry pier

Denotes p.c.conc paving laid to falls.

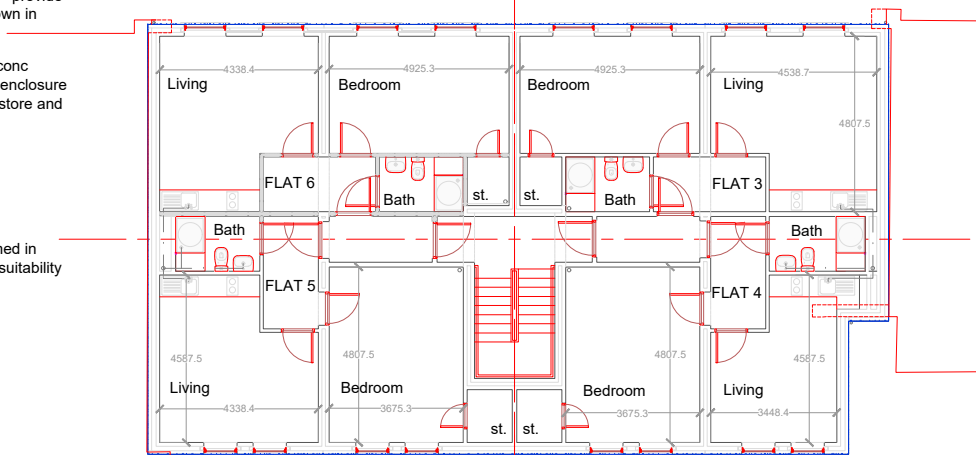
Denotes area for three parking spaces formed in permeable block paving surface subject to suitability of ground conditions and engineers recommendations.



ROOF PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

Key:

Notes:

updated layout	B	13.09.2022	DRAFT	AB	JN
P1	-	24.09.2019	DRAFT	AB	JN
Phase	Revision	Date	Issue	Drawn	Authorised
Client:			Job No:	19-493	Date: 24.09.2019
HM Properties			Drawing No:	002	Scale: NTS
Job Title:			Drawing Title:		
Manchester Road, Rochdale			Proposed Development Plan		

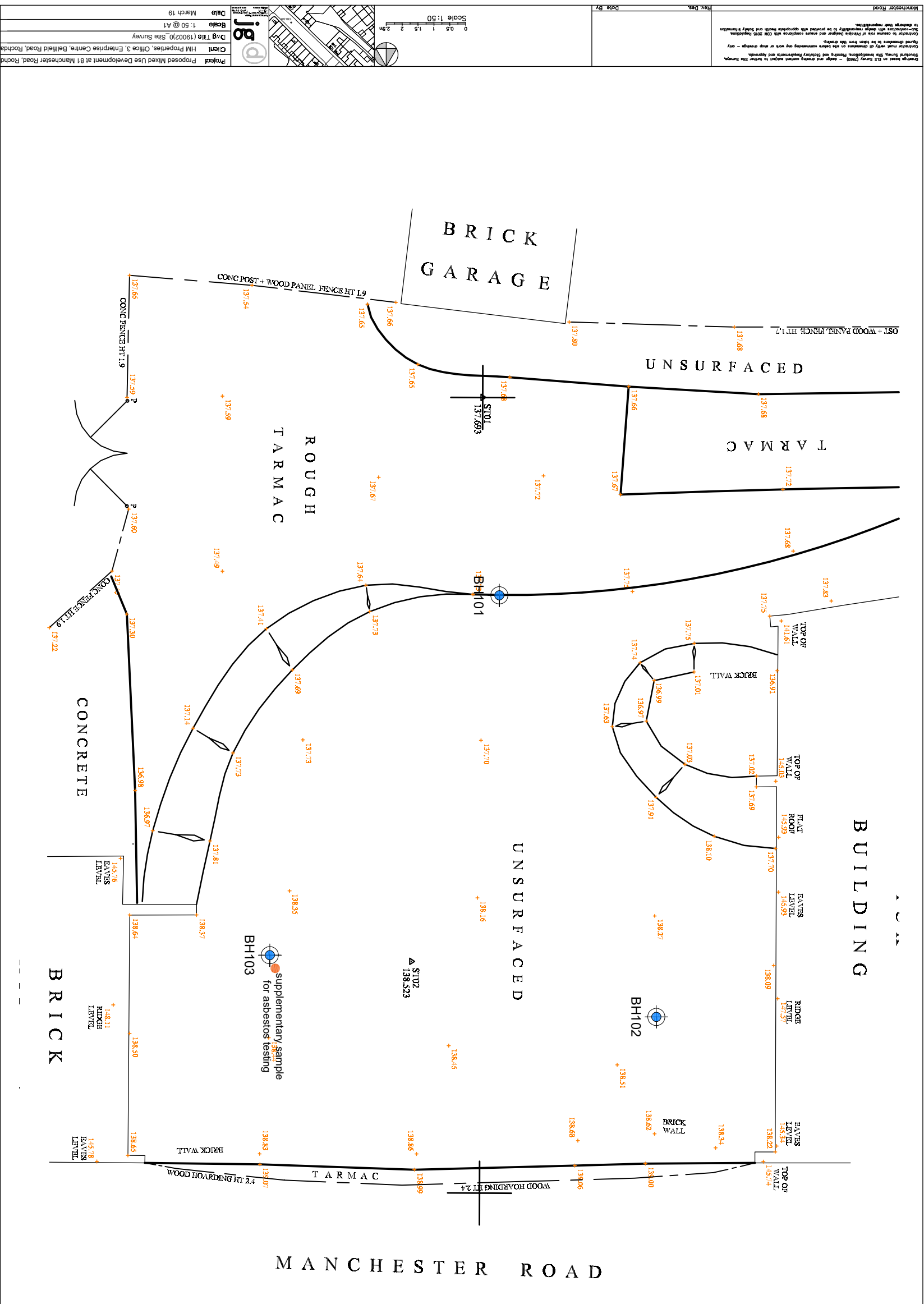


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Location Symbols

 BH101



P1	1	06.01.2019	DRAFT	AB	JN
P1	-	04.10.2019	DRAFT	AB	JN
Phase	Revision	Date	Issue	Drawn	Authorised

Client:	Talat Mahmood	
	Job No:	Date:
	19-493	06.01.2019
	Drawing No:	Scale:
	003	NTS

Job Title: Manchester Road, Rochdale	Drawing Title: Exploratory Hole Location Plan
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**APPENDIX IV
EXPLORATORY HOLE
LOGS**





Percussion Drilling Log- BH101

Project Name: Manchester Road, Rochdale		Client: HM Properties		Date: 16/09/2019	
Location: Rochdale		Contractor: TDS			
Project No. : 19-493		Crew Name: NT		Drilling Equipment: Dando 150	
Borehole Number BH101	Hole Type CP		Logged By JM	Scale 1:50	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES					MADE GROUND: Black sandy angular to sub-angular fine to coarse gravel of mudstone, ash, sandstone, brick and concrete. Sand is fine to coarse.	
		1.20	ES		1.00				1
		1.20 - 1.65	D					MADE GROUND: Brown clayey gravel fine to coarse sand. Gravel is angular to sub-rounded fine to coarse of sandstone, mudstone, coal and brick. Occasional reddish brown sandy lenses noted.	
		1.20	SPT	N=9 (1,1/2,2,2,3)					
		1.80		HVP=62	1.70				
		2.00 - 2.45	D					Firm light greyish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	2
		2.00	SPT	N=9 (2,2/2,2,2,3)					
		2.60		HVP=50					
		3.00 - 3.45	U						3
		4.00 - 4.45	D		3.80			Grey slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	4
		4.00	SPT	N=21 (4,4/4,5,5,7)	3.90			Stiff grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and coal.	
		5.00 - 5.45	U						5
		6.00 - 6.45	D		5.80			Very dense yellow slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.	6
		6.00	SPT	50 (5,9/50 for 200mm)					7
		7.50 - 7.95	D						
		7.50	SPT	N=50 (5,10/50 for 275mm)					8
		9.00 - 9.45	D		8.50			Very dense yellow fine to coarse SAND.	9
		9.00	SPT	50 (4,12/50 for 190mm)					10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks											
1. Complete at 12.95mbgl. 2. No groundwater encountered.											



Percussion Drilling Log- BH101

Project Name: Manchester Road, Rochdale		Client: HM Properties		Date: 16/09/2019	
Location: Rochdale		Contractor: TDS			
Project No. : 19-493		Crew Name: NT		Drilling Equipment: Dando 150	
Borehole Number BH101	Hole Type CP		Logged By JM	Scale 1:50	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 - 10.95 10.50	D SPT	N=47 (2,8/10,11,11,15)	12.95			Very dense yellow fine to coarse SAND.	11
		12.50 - 12.95 12.50	D SPT	50 (25 for 125mm/50 for 105mm)					12
								End of Borehole at 12.95m	13
									14
									15
									16
									17
									18
									19
									20

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

1. Complete at 12.95mbgl. 2. No groundwater encountered.



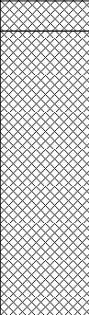
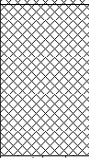
Remarks

1. Borehole terminated on concrete obstruction at 0.55m bgl. 2. No groundwater encountered.



Percussion Drilling Log- BH102A

Project Name: Manchester Road, Rochdale		Client: HM Properties		Date: 08/10/2019	
Location: Rochdale		Contractor: TDS			
Project No. : 19-493		Crew Name: NT		Drilling Equipment: Dando 150	
Borehole Number BH102A	Hole Type CP		Logged By JM	Scale 1:50	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.50	B		0.20			MADE GROUND: Yellowish brown sandy sub-angular to sub-rounded fine to coarse gravel of sandstone. Sand is fine to coarse. MADE GROUND: Reddish brown slightly sandy angular to sub-angular fine to coarse gravel of sandstone, brick, concrete, wood, metal and ceramic. Sand is fine to coarse. Cobbles of brick noted.	1
		1.20 - 1.65 1.20	D SPT	N=22 (5,5/7,7,4,4)					
		2.00 - 2.45 2.00	D SPT	N=8 (2,1/2,2,2,2)	2.10			MADE GROUND: Soft grey sandy slightly gravelly clay. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone, coal and brick.	2
		2.50		HVP=32					
		3.00 - 3.45 3.00	D SPT	N=6 (1,1/1,1,2,2)	3.10			Loose light greyish brown fine to coarse SAND.	3
		4.00 - 4.45 4.00	D SPT	N=24 (3,5/5,6,6,7)	4.00			Medium dense light brown silty slightly gravelly fine to coarse SAND. Gravel is fine sub-rounded to sub-angular of coal.	4
		5.00 - 5.45 5.00	D SPT	N=26 (5,5/6,7,6,7)					5
		6.00 - 6.45 6.00	D SPT	N=50 (4,5/50 for 295mm)	6.00			Very dense yellowish brown fine to coarse SAND.	6
		7.50 - 7.95 7.50	D SPT	N=50 (5,9/50 for 235mm)					7
		9.00 - 9.45 9.00	D SPT	N=50 (5,12/50 for 225mm)					9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

1. Borehole completed at 12.45m bgl. 2. Groundwater encountered at 2.00m bgl.



Percussion Drilling Log- BH102A

Project Name: Manchester Road, Rochdale		Client: HM Properties		Date: 08/10/2019	
Location: Rochdale		Contractor: TDS			
Project No. : 19-493		Crew Name: NT		Drilling Equipment: Dando 150	
Borehole Number BH102A	Hole Type CP		Logged By JM	Scale 1:50	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 - 10.95 10.50	D SPT	N=50 (10,10/50 for 230mm)	12.45			Very dense yellowish brown fine to coarse SAND.	11
		12.00 - 12.45 12.00	D SPT	50 (9,12/50 for 225mm)					12
								End of Borehole at 12.45m	13
									14
									15
									16
									17
									18
									19
									20

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks											
1. Borehole completed at 12.45m bgl. 2. Groundwater encountered at 2.00m bgl.											



Remarks

1. Borehole completed at 12.45m bgl. 2. Groundwater encountered at 1.80m bgl.



Remarks

1. Borehole completed at 12.45m bgl. 2. Groundwater encountered at 1.80m bgl.

APPENDIX V
CHEMICAL TESTING RESULTS





ANALYTICAL TEST REPORT

Contract no: 81378
Contract name: Manchester Road, Rochdale
Client reference: 19-492
Clients name: Ergo Environmental
Clients address: Maling Exchange
Hoults Yard, Walker Road
Newcastle
NE6 2HL

Samples received: 24 September 2019

Analysis started: 24 September 2019

Analysis completed: 30 September 2019

Report issued: 30 September 2019

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Support Hero

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
81378-1	BH101	0.50	Sand with Gravel	-	-	15.1
81378-2	BH102	0.20	Clayey Sand with Gravel	-	-	14.8
81378-3	BH103	0.40	Clayey Sand with Gravel	-	-	15.5

Chemtech Environmental Limited

SOILS

Lab number			81378-1	81378-2	81378-3
Sample id			BH101	BH102	BH103
Depth (m)			0.50	0.20	0.40
Date sampled			23/09/2019	23/09/2019	23/09/2019
Test	Method	Units			
Arsenic (total)	CE127 ^M	mg/kg As	12	14	9.1
Cadmium (total)	CE127 ^M	mg/kg Cd	0.7	0.3	0.4
Chromium (total)	CE127 ^M	mg/kg Cr	43	36	44
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	102	244	61
Lead (total)	CE127 ^M	mg/kg Pb	324	165	216
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	27	19	20
Selenium (total)	CE127 ^M	mg/kg Se	0.7	0.6	0.8
Zinc (total)	CE127 ^M	mg/kg Zn	326	139	140
pH	CE004 ^M	units	8.1	8.0	7.7
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	194	355	808
Total Organic Carbon (TOC)	CE072 ^M	% w/w C	3.2	2.0	2.2
Estimate of OMC (calculated from TOC)	CE072 ^M	% w/w	5.5	3.5	3.9
PAH					
Naphthalene	CE087 ^M	mg/kg	0.19	0.54	0.18
Acenaphthylene	CE087 ^M	mg/kg	0.05	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	0.16	0.54	0.85
Fluorene	CE087 ^U	mg/kg	0.12	0.30	0.44
Phenanthrene	CE087 ^M	mg/kg	1.51	2.83	10.52
Anthracene	CE087 ^U	mg/kg	0.31	0.67	2.39
Fluoranthene	CE087 ^M	mg/kg	2.85	6.23	12.67
Pyrene	CE087 ^M	mg/kg	2.71	6.24	11.17
Benzo(a)anthracene	CE087 ^U	mg/kg	1.46	2.91	4.99
Chrysene	CE087 ^M	mg/kg	1.83	3.51	5.61
Benzo(b)fluoranthene	CE087 ^M	mg/kg	2.22	5.02	7.16
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.86	1.94	2.89
Benzo(a)pyrene	CE087 ^U	mg/kg	1.55	4.32	6.42
Indeno(123cd)pyrene	CE087 ^M	mg/kg	1.39	3.98	1.05
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.14	0.67	0.95
Benzo(ghi)perylene	CE087 ^M	mg/kg	1.28	3.48	4.67
PAH (total of USEPA 16)	CE087	mg/kg	18.6	43.2	72.0
TPH					
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	<1	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	1	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	17	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	25	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	6	-

Chemtech Environmental Limited

SOILS

Lab number			81378-1	81378-2	81378-3
Sample id			BH101	BH102	BH103
Depth (m)			0.50	0.20	0.40
Date sampled			23/09/2019	23/09/2019	23/09/2019
Test	Method	Units			
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	<4	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	9	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	649	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	223	-
Subcontracted analysis					
Asbestos (qualitative)	\$	-	NAD	Amosite, Chrysotile	Chrysotile
Form of Asbestos	\$	-	-	Insulating board	Bitumen

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO ₄
CE072	Total Organic Carbon (TOC)	Removal of IC by acidification, Carbon Analyser	Dry	M	0.1	% w/w C
CE072	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry	M	0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
81378-1	BH101	0.50	N	
81378-2	BH102	0.20	N	
81378-3	BH103	0.40	N	

ANALYTICAL TEST REPORT

Contract no: 83290
Contract name: Manchester Road, Rochdale
Client reference: 19-492
Clients name: Ergo Environmental
Clients address: Maling Exchange
Hoults Yard, Walker Road
Newcastle
NE6 2HL

Samples received: 18 December 2019

Analysis started: 18 December 2019

Analysis completed: 02 January 2020

Report issued: 02 January 2020

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:



Dave Bowerbank
Customer Support Hero

Chemtech Environmental Limited

SOILS

Lab number			83290-1
Sample id			BH103
Depth (m)			0.40
Date sampled			17/12/2019
Test	Method	Units	
Subcontracted analysis			
Asbestos (qualitative)	\$	-	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
83290-1	BH103	0.40	N	

**APPENDIX VI
ORIGIN OF TIER I GENERIC
ASSESSMENT CRITERIA**



Constituent	Origin of Risk Assessment Value
Arsenic	2014 LQM/CIEH S4ULs
Cadmium	2014 LQM/CIEH S4ULs
Chromium	2014 LQM/CIEH S4ULs
Lead	2014 LQM/CIEH S4ULs
Mercury	2014 LQM/CIEH S4ULs - methylmercury
Nickel	2014 LQM/CIEH S4ULs
Selenium	2014 LQM/CIEH S4ULs
Copper	2014 LQM/CIEH S4ULs
Zinc	2014 LQM/CIEH S4ULs
Cyanide - Total	2014 LQM/CIEH S4ULs
Phenols - Total.	2014 LQM/CIEH S4ULs
Naphthalene	General Assessment Criteria (GAC) developed by CIEH / LQM Suitable 4 Use Levels with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene ⁽ⁱ⁾	
Chrysene	
Benzo(b/k)Fluoranthene ⁽ⁱⁱⁱ⁾	
Benzo(a)Pyrene	
Indeno(123-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(ghi)Perylene	
TPH C ₅ -C ₆ (aliphatic)	
TPH C ₆ -C ₈ (aliphatic)	
TPH C ₈ -C ₁₀ (aliphatic)	
TPH C ₁₀ -C ₁₂ (aliphatic)	
TPH C ₁₂ -C ₁₆ (aromatic)	
TPH C ₁₆ -C ₂₁ (aromatic)	
TPH C ₂₁ -C ₃₅ (aromatic)	

**APPENDIX VII
GEOTECHNICAL TESTING
RESULTS**



LABORATORY REPORT



4043

Contract Number: PSL19/5919

Report Date: 16 October 2019
Client's Reference: 19-493
Client Name: Ergo Ltd
Maling Exchange
Hoults Yard
Walker Road
Newcastle upon Tyne
NE6 2HL

For the attention of: Alicia Becker

Contract Title: Land at Manchester Road, Rochdale
Date Received: 3/10/2019
Date Commenced: 3/10/2019
Date Completed: 16/10/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

L Knight
(Senior Technician)

A Watkins
(Director)

S Eyre
(Senior Technician)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
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e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043



PSL
Professional Soils Laboratory

Land at Manchester Road, Rochdale

Contract No:

PSL19/5919

Client Ref:

19-493

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

PSL

Professional Soils Laboratory

Land at Manchester Road, Rochdale

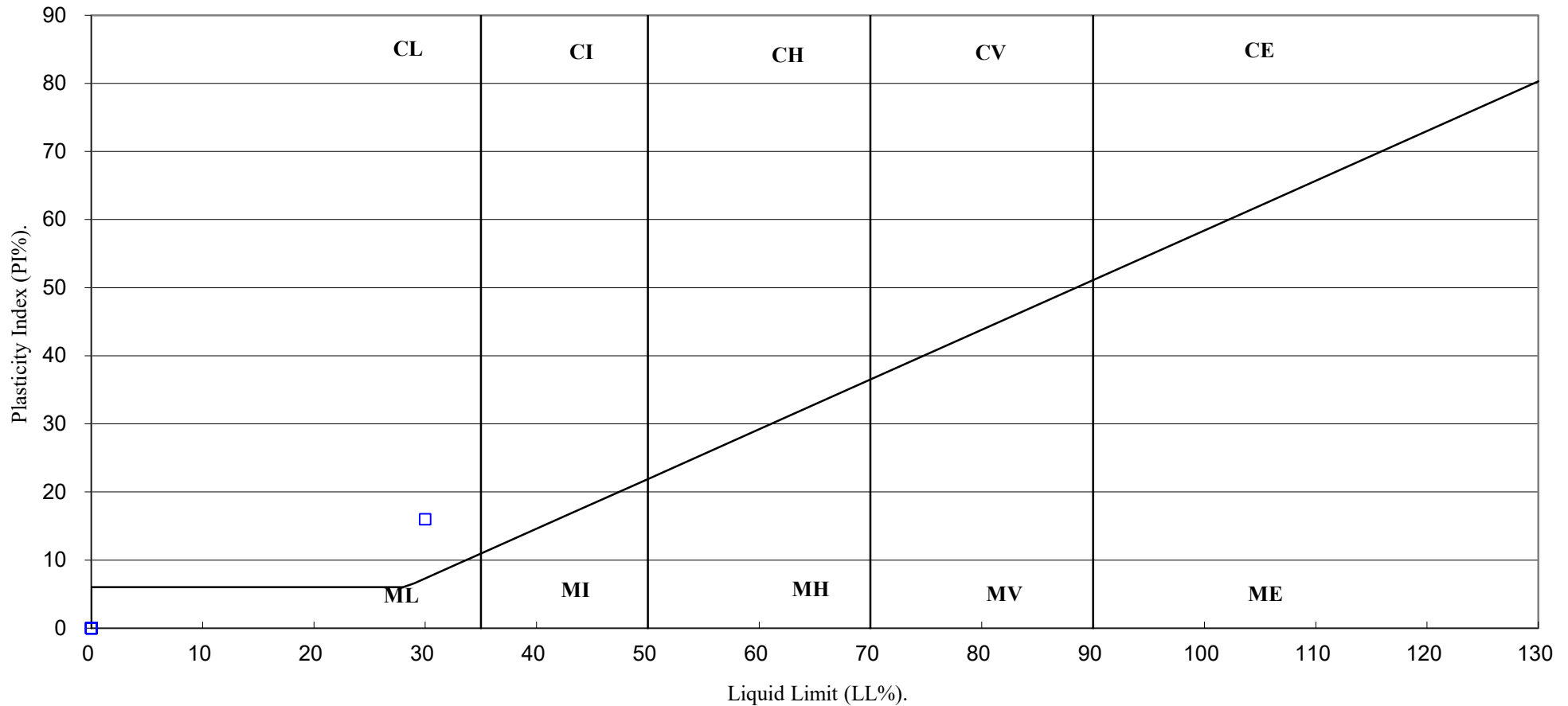
Contract No:

PSL19/5919

Client Ref:

19-493

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Land at Manchester Road, Rochdale

Contract No:

PSL19/5919

Client Ref:

19-493

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:

BH101

Top Depth (m):

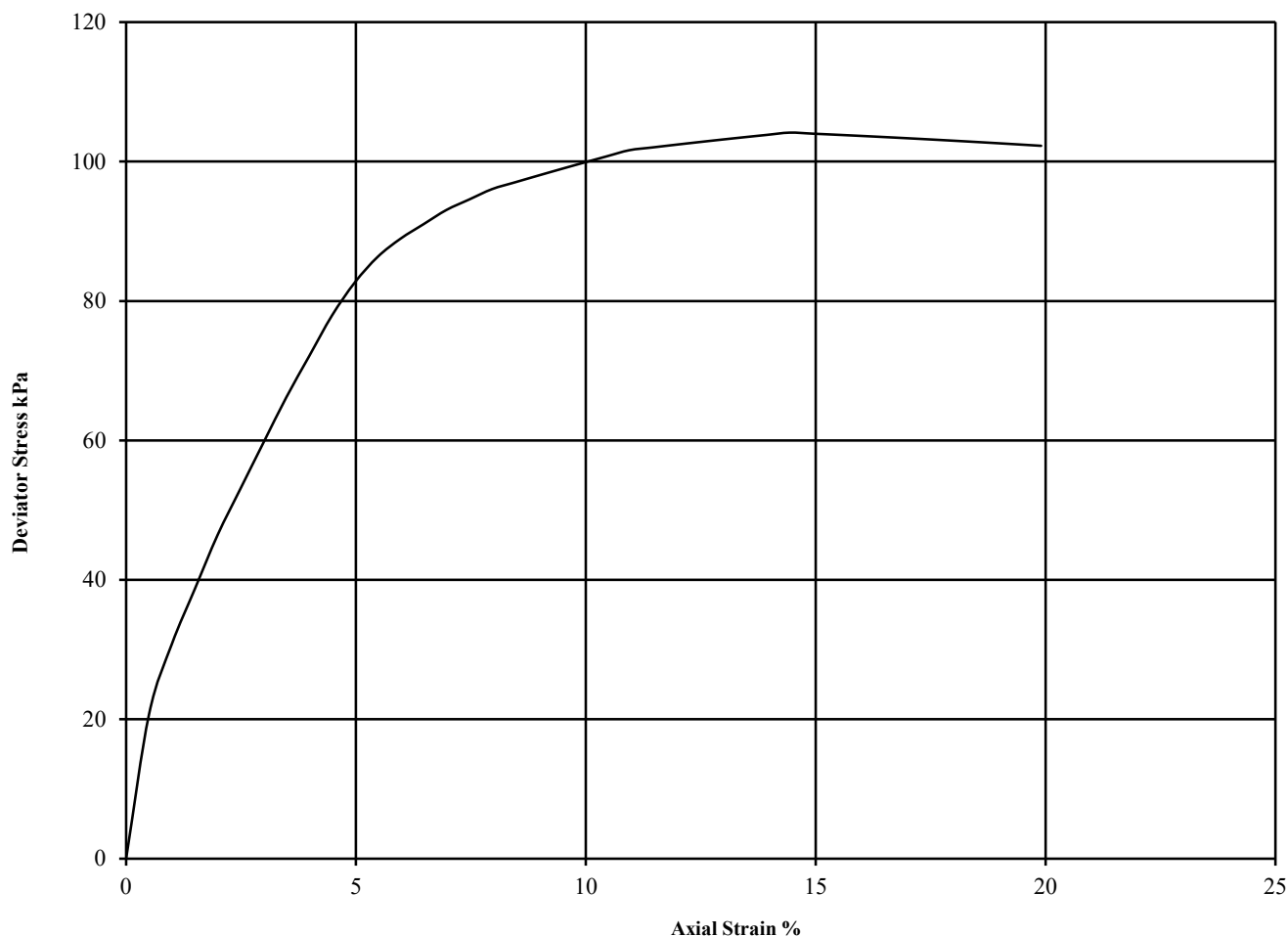
3.00

Sample Number:

Base Depth (m):

Sample Type

U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell	Corr. Max.	Shear	Failure Strain (%)	Mode of Failure	Undisturbed Sample
				Pressure	Deviator	Strength			Sample taken from top of tube
				(kPa)	Stress	Cu			Rate of strain = 2 %/min
				θ_3	(kPa)	(kPa)			Latex Membrane used 0.2 mm thick,
					$(\theta_1-\theta_3)_f$	$\frac{1}{2}(\theta_1-\theta_3)_f$			Correction applied 0.34
1	13	2.25	2.00	60	104	52	14.4	Plastic	See summary of soil descriptions



4043

PSL

Professional Soils Laboratory

Land at Manchester Road, Rochdale

Contract No:

PSL19/5919

Client Ref:

19-493