Environmental
Geotechnical
Specialists



REPORT

job number J3517/16/EDS	site address 4 MACAULAY ST
date June 2016	HUDDERSFIELD
written by C. E. Mason	WEST YORKSHIRE
	HD1 2JY
checked by S. P. Rogers	issued by C. E. Mason

Rogers Geotechnical Services Ltd
Telephone 0843 50 666 87 Fax 0843 51 599 30
Email enquiries@rogersgeotech.co.uk
www.rogersgeotech.co.uk
Offices 1 & 2, Barncliffe Business Park, Near Bank, Shelley,
Huddersfield, West Yorkshire HD8 8LU.

Constructionline
QMS ISO 9001 REGISTERED
QMS ISO 14001 REGISTERED
QMS OHSAS 18001 REGISTERED

GEOTECHNICAL ENVIRONMENTAL

CONTENTS

		Page
1.	INTRODUCTION	1
2.	GEOLOGICAL DESK STUDY	1
	2.1 Geological Survey Maps	2
	2.2 Coal Authority Mines Report	3
	2.3 Geological Survey Borehole Records	4
3.	RISK ASSESSMENT	5
4.	CONCLUSIONS	6

APPENDIX 1 – SITE PLAN

APPENDIX 2 – COAL MINING REPORT

APPENDIX 3 – BGS BOREHOLE SCANS

A REPORT ON A COAL MINING RISK ASSESSMENT

at

4 MACAULAY ST, HUDDERSFIELD, WEST YORKSHIRE HD1 2JY

for

Mr M ROBERTSON

CONSULTANTS: SGM STRUCTURAL DESIGN LTD

Report No J3517/16/E **June 2016**

1. INTRODUCTION

It is understood that as part of the planning application for development at the site, a Coal Mining Risk Assessment has been requested by the planning authority. Consequently, a desktop study was commissioned in order to assess the risk to the development from coal mining. This report presents the findings of the study.

2. GEOLOGICAL DESK STUDY

The geological desk study has been undertaken using the following sources of information.

- British Geological Survey map sheet[1].
- British Geological Survey *Geology of Britain Viewer*[2].
- Coal Authority Report[3].
- British Geological Survey *Borehole Records*[4].

[1] Sources: British Geological Survey (NERC) Map Sheet 77; Huddersfield; Solid and Drift Edition
[2] Sources: British Geological Survey (NERC) Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Coal Authority Reference: 51001170827001 dated 3rd June 2016.
[4] Sources: British Geological Survey (NERC) Borehole Records [*online resource from* http://www.bgs.ac.uk//]

2.1 British Geological Survey Maps and Viewer

The appropriate map sheet for the site and the geology viewer has been examined and the following table presents the indicated geology:

Table 1: *Geological Data for the Site*

Strata Type	Strata Name	Previous Name[5]	Description[5]
Superficial Geology	Head	-	Polymict deposit: comprises gravel, sand and clay depending on upslope source and distance from source. Poorly sorted and poorly stratified deposits formed mostly by solifluction and/or hillwash and soil creep. Essentially comprises sand and gravel, locally with lenses of silt, clay or peat and organic material.
Solid Geology	Middle Band Rock	-	The Middle Band Rock is a thin and relatively impersistent thinly bedded rubbly sandstone notable mainly in the north of the district and around Huddersfield.
	Pennine Lower Coal Measures Formation (undifferentiated)	Lower Coal Measures Formation	Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.

It may be further appreciated that the site is underlain by superficial head deposits; these deposits are of a limited thickness and are only locally extensive throughout the area. Present beneath these deposits is a sandstone unit named the 'Middle Band Rock'. This unit is impersistent and measures up to 10.0m in thickness. It is anticipated that beneath this unit undifferentiated strata of the Pennine Lower Coal Measures will be encountered. Dip indicators relevant to the site suggest that the solid geology within the local area dips between 4° and 7° to the east. Furthermore, there are no faults within 250m of the site that would pose a risk to the future development.

There is one coal seam within the vicinity of the site that is anticipated to subcrop below ground level. This coal seam is summarised as follows.

Table 2: *Summary of coal seams within the vicinity of the site.*

Seam Name	Seam thickness[5]*	Outcrop distance from site*[5]
Soft Bed Coal	0.0m – 0.80m	750m W

*All distances are given as approximations only. It should be noted that coal seam thicknesses vary over relatively short distances

Additionally, two further coal seams are anticipated to sub crop 600m and 775m east of the site. However, due to the generalised dip of the local strata, these seams are not anticipated to be present below the site surface.

Nevertheless, taking into account the topography of the local area and the generalised dip of the strata, the geological data suggests that the Soft Bed Coal seam may be observed at at depths ranging between 15m and 25m below ground level. It should be appreciated that this depth does not take into account any thicknesses of superficial deposits that are likely be present below the site surface.

[5] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

2.2 Coal Authority Mines Report

As part of this study a Non-residential Coal Authority Mining Report has been obtained. The report is presented as Appendix 2 and for the purposes of discussion has been summarised below:

Table 3: Summary of the Non-residential Coal Authority Mining Report

Has the search report highlighted evidence or potential of:			
Ref	**Mining Feature**	**Yes/No**	**Comments**
2.2.1	Underground Coal Mining: Past	Yes	The property is not within a surface area that could be affected by past underground mining. However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on the Coal Authority information section of the report.
	Underground Coal Mining: Present	No	Please refer to CON29M Non-residential Mining report (Appendix 2) for additional information.
	Underground Coal Mining: Future	Yes	The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods. The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods. The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that
2.2.2	Mine Entries	Yes	There are no known coal mine entries within, or within 20 metres of, the boundary of the property. There may however be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.
2.2.3	Coal Mining Geology	No	Please refer to CON29M Non-residential Mining report (Appendix 2) for additional information.
2.2.4	Opencast Coal Mining: Past	No	
	Opencast Coal Mining: Present	No	
	Opencast Coal Mining: Future	No	
2.2.5	Coal Mining Subsidence	No	
2.2.6	Mine Gas	No	
2.2.7	Hazards Related to Coal Mining	No	
2.2.8	Withdrawal of Support	No	

2.3 Geological Survey Borehole Records

The British Geological Survey (NERC) keeps borehole records from across Britain which are available for public viewing through their website[6]. As part of this study, the records in the area around the site have been reviewed in order to assist in establishing the geological conditions.

Based upon records provided by the British Geological Survey (NERC) the following table has been produced as a summary for the most applicable features of note in relation to this study, the logs of the boreholes are presented as Appendix 3:

Table 2: *Notable Geological Features*

Borehole	Approx. Distance from Site	Depth below ground level	Coal Seam Thickness
SE11NW33/Q	70m NNE	Cavity observed at 18.50m	1.70m
SE11NW33/F		Coal observed at 18.50m	1.00m
SE11NW33/N		Cavity observed at 18.0m	1.50m
SE11NW33/G		Cavity observed at 17.50m	1.25m
SE11NW33/L		Coal observed at 18.50m	0.50m
SE11NW33/K		Coal observed at 18.50m	1.00m
SE11NW33/J		Cavity observed at 17.50m	1.50m
SE11NW33/C		Cavity observed at 17.70m	1.30m
SE11NW33/I		Cavity observed at 17.50m	1.00m
SE11NW33/B		Cavity observed at 17.30m	1.40m
SE11NW33/H		Cavity observed at 16.60m	1.20m
SE11NW33/O		Cavity observed at 16.50m	1.50m
SE11NW33/R		Cavity observed at 19.30m	1.80m
SE11NW33/D		Cavity observed at 18.50m	1.10m
SE11NW33/E		Coal observed at 18.00m	1.50m
SE11NW214	73m N	Cavity observed at 17.30m	1.30m
SE11NW215	75m N	Coal observed at 18.00m	0.60m
SE11NW50	150m N	Cavity observed at 16.65m	1.20m

It should be appreciated that there were numerous boreholes at similar locations, although, in broad terms, comparable ground conditions were indicated. Furthermore, there were other boreholes at a greater distance from the site; however, these were felt to be of lesser value to this study.

In general terms, the boreholes indicate that clays anticipated to represent the superficial head deposits are present to depths ranging between 2.0m and 6.0m within the local area. These clays are underlain by sandstone and sandstone with clays, before progressing into brown and dark brown mudstones. This sequence of strata is comparable to the published geological data and is summarised within section 2.1of this report.

At depths ranging between 16.65m and 19.30m below ground level, coal and cavities associated with coal workings were observed in various boreholes scans within the local area. Cavities had thicknesses ranging between 1.0m and 1.70m, with some borehole scans recording the material underneath the cavities as ‘soft ground’. Additionally, some borehole scans also recorded the presence of ‘fireclay’, which is likely to have been mined out at the same time as the coal for its use as a furnace liner. This coal seam depth is consistent with the anticipated Soft Bed Coal seam found to outcrop to the east of the site.

[6] http://www.bgs.ac.uk/data/boreholescans/

Therefore it is assumed that the coal present in the borehole scans is the Soft Bed Coal, and the cavities suggest that this seam has been worked.

Considering the close proximity of the borehole positions in relation to the location of the site, these boreholes are anticipated to represent comparable ground conditions to those anticipated below the surface of the site.

3. RISK ASSESSMENT

The risk to the stability of the proposed residential development has been evaluated from the data obtained and with reference to the following ratings and definitions:

Low - The possibility of instability is unlikely therefore no further action is necessary.

Moderate - The possibility of instability is likely and further investigation or remedial action may be required.

High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Table 2: *Development specific risk assessment*

Item	Risk of Instability	Coal Seam(s) Considered	Risk Rating
1	Shallow coal workings	Soft Bed Coal	Moderate
2	Coal workings at depth	The property is not within a surface area that could be affected by past underground mining.	Low

On the basis of all of the information provided above it is concluded that there are shallow coal seams in the vicinity of the site. Whilst these seams may be of limited thickness, the possibility of these seams being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area as borehole scans have revealed cavities at depths between 16.50m and 19.30m. Therefore it is considered that if coal was known to be close to ground level below the site, it could have been removed illicitly via shallow mining methods with relative ease.

It may be noted that guidance available from both the NHBC and the CIRIA publication, SP32 - *construction over abandoned mine workings,* suggests that competent overburden thickness above a coal seam should be greater than 10 times the thickness of a seam plus the seam thickness in order that the collapse of workings would pose a low risk to surface structures.

On this basis, assuming a maximum thickness of the Soft Bed Coal to be 0.80m, 8.80m of competent overburden is required to prevent instability to future surface structures. However, as there is evidence of fireclay mining along with coal within the local area, it is anticipated that if the coal has been removed, cavities greater than 0.80m in thickness may be anticipated. Therefore, a moderate risk rating has been assigned to this seam and further investigation is recommended to prove/disprove the presence of illicit mining activity.

In regards to deeper mining which could affect the site, the Coal Authority holds no records that the property is in the likely zone of influence from past underground workings. Therefore, there is considered to be a low risk of instability at the site due workings at depth.

4. CONCLUSIONS

In light of the potential risks of instability at the site from the working of shallow coal at the site, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.

General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through pillars associated with pillar and stall workings. Furthermore, it is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the thin seams are un-worked. It may therefore be possible to undertake one borehole to 30m in the first instance with the remaining boreholes proving the depth and continuity of the coal seam. In any event, it is considered that approval should be sought with the Local Authority as to the efficacy of this approach.

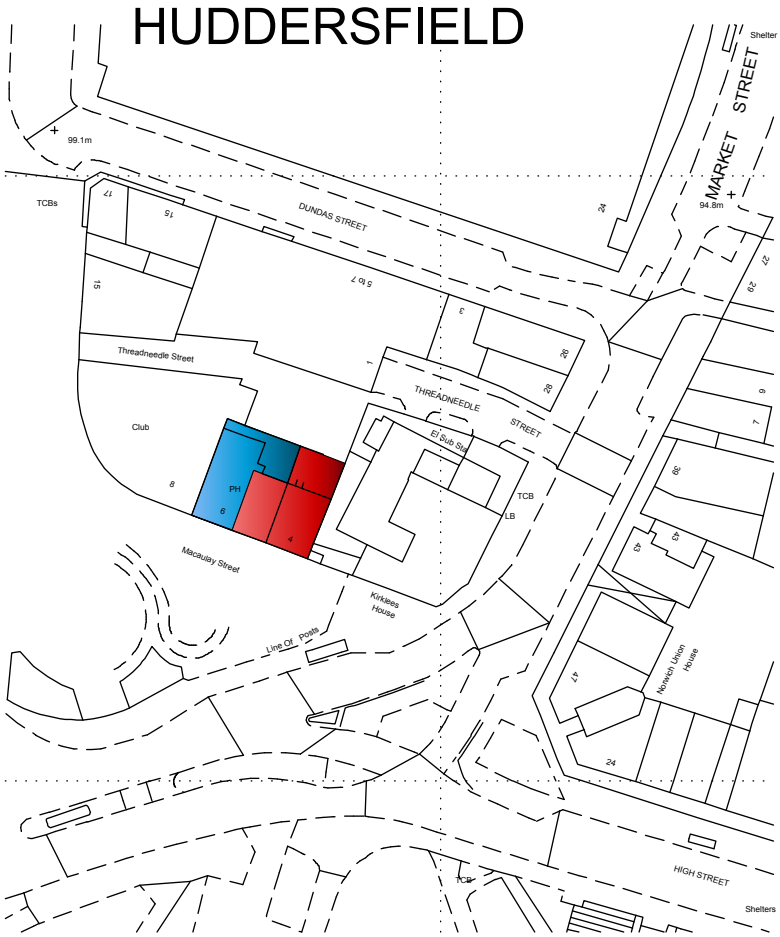
For and on behalf of
Rogers Geotechnical Services Ltd,

C. E. Mason BSc
Graduate Geotechnical Engineer

S.P. Rogers CEng, CGeol, MICE, MCIHT, FGS
Technical Director

APPENDIX 1

SITE PLAN



Ordnance Survey (c) Crown Copyright 2016. All rights reserved. Licence number 100022432

Application site

Other land in owner-ship of Applicant

GRID NORTH

PROPOSED CHANGE OF USE EXTENSION
AND ALTERATIONS
AT 4-6 MACAULAY STREET
HUDDERSFIELD

VALLEY PROPERTIES
7 HOLMFIRTH ROAD
MELTHAM
HOLMFIRTH
HD9 4AA

LOCATION PLAN

SCALE: 1/1250
DATE: MAY 2016
DRG. NR. LP 01

APPENDIX 2

COAL AUTHORITY MINING REPORT

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





MACAULAY STREET
4-6
MACAULAY STREET
HUDDERSFIELD
WEST YORKSHIRE
HD1 2JY



Date of enquiry:	03 June 2016
Date enquiry received:	03 June 2016
Issue date:	03 June 2016
Our reference:	51001170827001
Your reference:	J3517/16/EDS

CON29M Non-Residential Mining Report

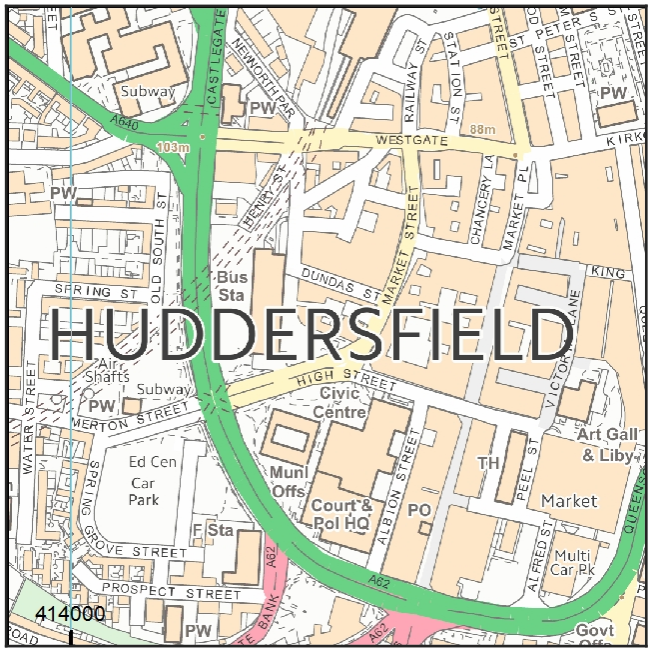
This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

Rogers Geotechnical Services Ltd

Enquiry address

MACAULAY STREET, 4-6, MACAULAY STREET, HUDDERSFIELD, WEST YORKSHIRE, HD1 2JY



Approximate position of property

Mapping sourced from Ordnance Survey

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.gov.uk/coalauthority

/company/the-coal-authority
/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	Yes
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is not within a surface area that could be affected by past underground mining.

However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on the Coal Authority information section of the report.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

There may however be mine entries/additional mine entries in the local area which the Coal Authority has no knowledge of.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Comments on the Coal Authority information

The Coal Authority own the copyright in this report and the information used is protected by our database right.

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

Disclaimer

The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

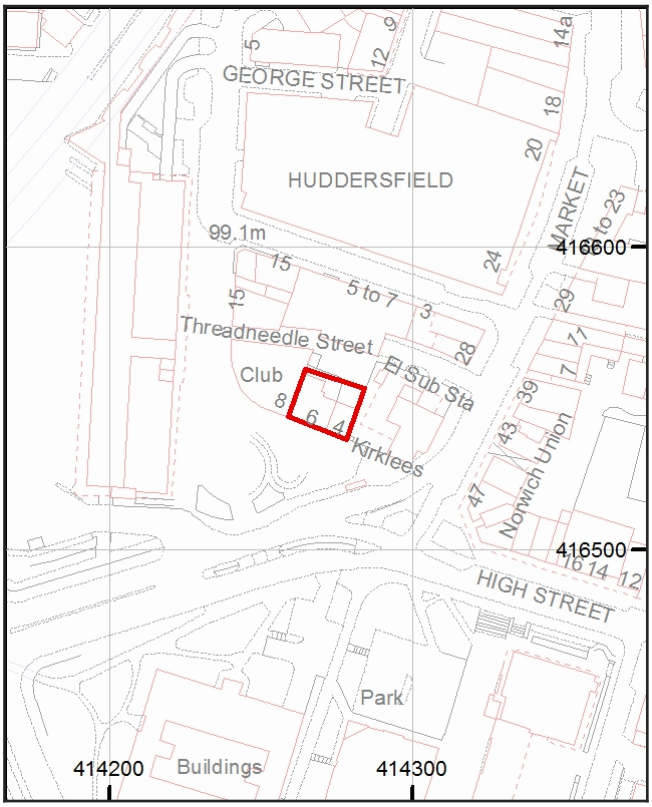
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



Mapping sourced from Ordnance Survey

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.gov.uk/coalauthority

/company/the-coal-authority
/thecoalauthority
/coalauthority

VAT receipt	
Issued by:	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date:	03 June 2016
Issued to:	ROGERS GEOTECHNICAL SERVICES LTD BARNCLIFFE MILLS NEAR BANK HUDDERSFIELD HD8 8LU
Property search for:	MACAULAY STREET 4-6 MACAULAY STREET HUDDERSFIELD WEST YORKSHIRE HD1 2JY
Reference number:	51001170827001
Date of issue:	03 June 2016
Cost:	£77.00
VAT @ 20%:	£15.40
Total received:	£92.40
VAT registration:	598 5850 68

APPENDIX 3

BGS BOREHOLE RECORDS

Norwest Holst Soil Engineering Ltd.

Borehole No. **1**

BOREHOLE LOG

Contract No. F6193
Location George Street, Huddersfield
Client J. Sainsbury P.L.C.
Method of Boring Percussion/Rotary Open hole
Diameter of Borehole 150mm/105mm

[1425 1663]

SE11NW/214

Sheet 1 of 3
Chainage
Ground Level 98.31 m.A.O.D.
Date 9.10.84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
MADE GROUND: reinforced concrete		0.30	98.01		0.40		
MADE GROUND: loose grey clayey sandy angular, flat sandstone gravel, cobbles and boulders.		2.35	95.96		1.05 s1.50 2.05 s	6 32 for 100mm	
MADE GROUND: brown sandstone boulder		3.00	95.31		2.50		
MADE GROUND: sandy clay with sandstone gravel and cobbles.		3.80	94.51		3.05 s	18	
Stiff brown highly weathered MUDSTONE with sandstone fragments.		5.30	93.01		4.05 (75)		
Dark grey weathered shaly MUDSTONE, weak.		7.00	91.31	150mm + 140mm to 6.50m	5.55 s 6.55 s	97 144	
COAL		7.30	91.01		Openhole drilling from 7.00m		
Black, micaceous, carbonaceous MUDSTONE							

Type of Sample

- Is S.P.T.
- Ic. C.P.T.
- O Jar
- ● Bulk
- ■ Undisturbed
- × Vane
- Δ Water
- Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows

Borehole dry during boring. Water standing in bottom of hole prior to rotary drilling.
Inspection pit dug for services
Chiselling boulder 2.35m to 3.00m, 3/4 hour

Water levels are subject to seasonal or tidal variations and should not be taken as constant

British Geological Survey

Norwest Holst Soil Engineering Ltd.

Borehole No. **1**

BOREHOLE LOG

Contract No. F6193
Location George Street, Huddersfield
Client J. Sainsbury P.L.C.
Method of Boring Rotary Percussion
Diameter of Borehole 105mm

Sheet 2 of 3
Chainage
Ground Level 98.31 m.A.O.D.
Date 12/10/84

SE11NW 21Y

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
MUDSTONE becoming slightly silty below 10m		14.00	84.31				
Dark grey micaceous slightly silty fissile MUDSTONE		17.30	81.01				
VOID		18.60	79.71				
SANDSTONE/MUDSTONE?- no returns							

Type of Sample

- Is S.P.T.
- Ic. C.P.T.
- O Jar
- ● Bulk
- ■ Undisturbed
- ✕ Vane
- Δ Water
- Piezometer

Remarks (Observations of Ground Water etc.)

No returns 18.60m - 22.00m. Descriptions by reference to borehole 2.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

British Geological Survey

Norwest Holst Soil Engineering Ltd.

Borehole No. **2**

BOREHOLE LOG

Contract No. FE193

Location George Street, Huddersfield [1429 1665]

Client J. Sainsbury P.L.C.

Method of Boring Percussion/Rotary Open hole

Diameter of Borehole 150mm/105mm SE11NW 215

Sheet 1 of 3

Chainage

Ground Level 96.68 m.A.O.D.

Date 8.10.84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
MADE GROUND: reinforced concrete		0.25	96.43				
MADE GROUND: sandy sandstone gravel with flat angular sandstone cobbles and boulder, bricks and brick fragments					0.40 1.05 1.40 S	11	
		2.40	94.28		2.05 2.55 S (56)	12	
MADE GROUND: firm brown and dark grey silty sandy clay and sandstone gravel and cobbles.					3.50 4.05 4.75 S	42	
		5.40	91.28	150mm + 140mm to 6.05m	5.05	107	
Brown sandstone BOULDER		6.05	90.63		5.75 6.05 S Open hole drilling from 6.20m	76for 125mm*	
Dark grey carbonaceous MUDSTONE		7.00	89.68				
COAL		7.50	89.18				
Black, slightly micaceous, carbonaceous MUDSTONE, iron staining to 10.00m							

Type of Sample

- Is S.P.T.
- Ic. C.P.T.
- O Jar
- ● Bulk
- ■ Undisturbed
- × Vane
- Δ Water
- Piezometer

Remarks (Observations of Ground Water etc.) () U100 blows *seating blows only

Water struck at 5.40m, rising to 2.80m (20 minutes)

Concrete broken out and pit dug for services

Chiselling boulder 5.40m to 6.05m (1 hour)

Water standing in bottom of hole prior to rotary drilling

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

Borehole No. **2**

BOREHOLE LOG

Contract No. F6193
Location George Street, Huddersfield
Client J. Sainsbury P.L.C.
Method of Boring Rotary Percussion
Diameter of Borehole 105mm

SE11NW 215

Sheet 2 of 3
Chainage
Ground Level 96.68 m.A.O.D.
Date 12/10/84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Black slightly micaceous carbonaceous fissile MUDSTONE.		13.50	83.18				
Dark grey slightly silty fissile MUDSTONE.		18.00	78.68				
COAL		18.60	78.08				
Light grey fine grained SANDSTONE with thin mudstone bands.							

Type of Sample

Is S.P.T. ■ Undisturbed
Ic. C.P.T. × Vane
O Jar Δ Water
● Bulk ◉ Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

British Geological Survey

Norwest Holst Soil Engineering Ltd.

Borehole No. **2**

BOREHOLE LOG

Contract No. EB183
Location George Street, Huddersfield
Client J. Sainsbury P.L.C.
Method of Boring Rotary Percussion
Diameter of Borehole 105mm

SE11NW/215

Sheet 3 of 3
Chainage
Ground Level 96.68 m.A.O.D.
Date 12/10/84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Light grey fine grained SANDSTONE with thin mudstone bands		20.50	76.18				
Grey silty fissile MUDSTONE		21.20	75.48				
White fine grained SANDSTONE with calcareous cement. Becoming very fine grained below 23m.		25.00	71.68				
END OF BOREHOLE							

Type of Sample

Is S.P.T. ■ Undisturbed
Ic. C.P.T. × Vane
O Jar Δ Water
● Bulk ▣ Piezometer

Remarks (Observations of Ground Water etc.)

Hard drilling at 21.80m, 22.60m and 24.60m

Water levels are subject to seasonal or tidal variations and should not be taken as constant

RECORD OF BOREHOLE IN HUDDERSFIELD

BORING: STARTED 2/5/81
BORING: FINISHED 2/5/81
HOLE SIZE 88mm dia to 22.0m

GROUND LEVEL 96.5m O.D. Open hole rotary air flush 25 degrees to vertical

SAMPLE OR TEST			Vertical		CHANGE OF STRATA
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW / 33b.
					Fill merging down into clay
			3.6	92.9	
					SANDSTONE
			4.5	92.0	
					Dark grey MUDSTONE

REMARKS
1. Cased to 10m.
2. Air return lost between 19.0 and 21.0m (vertical depths of 17.3 and 19.1m.)
3. Borehole encountered ground water.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE E. (CONT) MUDDERSFIELD

BORING: STARTED 2/5/81
BORING: FINISHED 2/5/81
HOLE SIZE 88mm dia to 22.0m

GROUND LEVEL 96.5m O.D. Open hole rotary air flush 25 degrees to vertical

SAMPLE OR TEST			Vertical		CHANGE OF STRATA
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW / 33b.
					Dark grey MUDSTONE
			15.0	81.5	
					Hard, light grey MUDSTONE
			17.3	79.2	
					CAVITY
			18.7	77.8	
					Soft material
			19.1	77.4	
					Hard material
			20.0	76.5	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S { } STANDARD PENETRATION TEST
C { } CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE – RUDDERSFIELD

BORING: STARTED 28/4/81
BORING: FINISHED 28/4/81
HOLE SIZE 88mm dia to 20.0m

GROUND LEVEL 96.3m O.D. Open hole rotary air flush

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
			0.1	96.2	Rubble
			0.4	95.9	Reinforced concrete
					SE 11 NW / 33C.
					Mainly clay (Made ground)
			2.0	94.3	
					CLAY with sandstone
			6.0	90.3	
					Dark grey and black MUDSTONE

REMARKS
1. Cased to 6m.
2. No air return below 17.7m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S { } STANDARD PENETRATION TEST
C { } CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 2 (CONT) HUDDERSFIELD

BORING: STARTED 28/4/81
BORING: FINISHED 28/4/81
HOLE SIZE 88mm dia to 20.0m

GROUND LEVEL 96.3m O.D. Open hole rotary air flush

SAMPLE OR TEST			CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133C
			14.0	82.3	Dark grey and black MUDSTONE
			17.7	78.6	Dark grey MUDSTONE
			19.0	77.3	CAVITY
			20.0	76.3	Solid ground

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 5 [illegible]

BORING: STARTED 30/4/81
BORING: FINISHED 30/4/81
HOLE SIZE 88mm dia to 22.0m

GROUND LEVEL 95.6m O.D. Open hole rotary air flush 20 degrees to vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	Vertical DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW / 33d
			3.8	91.8	Brown clay and sand (Possibly made ground)
			4.8	90.8	SANDSTONE with clay
					Light grey MUDSTONE

REMARKS
1. Borehole dry
2. Cased to 4m
3. Air return lost at 19.5m (vertical depth 18.5m.)

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE [illegible]

GROUND LEVEL 95.6m O.D. Open hole rotary air flush 20 degrees to vertical

BORING; STARTED 30/4/81
BORING; FINISHED 30/4/81
HOLE SIZE 88mm dia to 22.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133d.
					Light grey MUDSTONE
			10.9	84.7	
					Dark grey MUDSTONE
			18.5	77.1	
					CAVITY
			19.6	76.0	
			20.0	75.6	Soft material

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 4 RUDDINGFIELD

BORING: STARTED 4/5/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 95.2m O.D. Open hole rotary air flush

SAMPLE OR TEST DEPTH	TYPE	CHANGE OF STRATA LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133e
					Fill merging down into clay
			6.0	89.2	
					Dark grey MUDSTONE

REMARKS
1. Cased to 6m.
2. No cavity encountered
3. Slight groundwater seepage

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 200 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED, PETERBOROUGH

British Geological Survey

KEY:

GROUND LEVEL 95.2m O.D. Open hole rotary air flush

BORING: STARTED 4/5/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST DEPTH	TYPE	LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33e
					Dark grey MUDSTONE
			15.5	79.7	
					Light grey MUDSTONE
			18.0	77.2	
					COAL
			19.5	75.7	
					Hard, light grey MUDSTONE

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD [illegible] (CONT) HUDDERSFIELD

BORING: STARTED 4/5/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 95.2m O.D. Open hole rotary air flush

SAMPLE OR TEST		CHANGE OF STRATA			
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33 (e)
					Hard, light grey MUDSTONE
			24.0	71.2	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 3 MUDDERSFIELD

BORING: STARTED 4/5/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 95.0m O.D. Open hole rotary air flush 20 degrees to vertical

SAMPLE OR TEST			Vertical		CHANGE OF STRATA
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW / 33 (C)
					Fill merging down into clay
			3.8	91.2	
			4.3	90.7	SANDSTONE with clay
					Dark grey MUDSTONE

REMARKS
1. Cased to 6m.
2. No cavity encountered
3. Groundwater encountered

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 9 (CONT.) HUDDERSFIELD

BORING: STARTED 4/3/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 95.0m O.D. Open hole rotary air flush Vertical 20 degrees to vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW / 33 (1)
					Dark grey MUDSTONE
			15.0	80.0	
					Hard, light grey MUDSTONE
			18.5	76.5	
			19.0	76.0	COAL
					Hard, light grey MUDSTONE

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

GROUND LEVEL 95.0m O.D. Open hole rotary air flush
20 degrees to vertical

BORING: STARTED 4/5/81
BORING: FINISHED 4/5/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST DEPTH	TYPE	LEGEND	Vertical DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW/33 (C)
					Hard, light grey MUDSTONE
			22.8	72.2	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

RECORD OF [illegible]

GROUND LEVEL 98.0m O.D. Open hole rotary air flush

BORING: STARTED 2/5/81
BORING: FINISHED 2/5/81
HOLE SIZE 88mm dia to 20.0m

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW /33 (9)
					Fill merging down into clay
			4.0	94.0	
					SANDSTONE
			6.0	92.0	
					Dark grey MUDSTONE

REMARKS
1. Cased to 4m.
2. No air return below 17.5m.
3. Groundwater encountered at 12m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 8 (CONT.) HUDDERSFIELD

BORING; STARTED 2/5/81
BORING; FINISHED 2/5/81
HOLE SIZE 88mm dia to 20.0m

GROUND LEVEL 98.0m O.D. Open hole rotary air flush

SAMPLE OR TEST DEPTH	TYPE	LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW / 33 (9)
			12.0	86.0	Dark grey MUDSTONE
			15.5	82.5	Light grey MUDSTONE
			17.5	80.5	Dark grey MUDSTONE
			18.75	79.25	CAVITY
			19.3	78.7	Soft material
			20.0	78.0	Hard material

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 7 HUDDERSFIELD

GROUND LEVEL 97.0m O.D. Open hole rotary air flush 20 degrees to vertical

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81
HOLE SIZE 88mm dia to 20.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133(h)
					Fill merging down into clay
			5.7	91.3	
					SANDSTONE
			6.9	90.1	
					Light grey MUDSTONE

REMARKS
1. Cased to 6m.
2. Slight groundwater seepage
3. No air return below 17.5m (vertical depth 16.6m.)

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED, PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 7 (CONT) HUDDERSFIELD

GROUND LEVEL 97.0m O.D. Open hole rotary air flush 20 degrees to vertical

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81
HOLE SIZE 88mm dia to 20.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133(N)
					Light grey MUDSTONE
			13.8	83.2	
					Dark grey MUDSTONE
			16.6	80.4	
					CAVITY
			17.8	79.2	
					Hard material
			19.0	78.0	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 7 (CONT) HUDDERSFIELD

GROUND LEVEL 97.0m O.D. Open hole rotary air flush 20 degrees to vertical

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81
HOLE SIZE 88mm dia to 20.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133(N)
					Light grey MUDSTONE
			13.8	83.2	
					Dark grey MUDSTONE
			16.6	80.4	
					CAVITY
			17.8	79.2	
					Hard material
			19.0	78.0	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 8 HUDDERSFIELD

BORING; STARTED 1/5/81
BORING; FINISHED 1/5/81
HOLE SIZE 88mm dia to 20.0m

GROUND LEVEL 96.9m O.D. Open hole rotary air flush

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW /33(i)
					Fill merging down into clay
			6.0	90.9	
					CLAY and SANDSTONE
			9.5	87.4	
					Dark grey MUDSTONE

REMARKS
1. Cased to 6m.
2. Air return lost below 17.5m.
3. Slight groundwater seepage

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
B{ } STANDARD PENETRATION TEST
C{ } CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 8 (CONT.) HUDDLESTEAD

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81

GROUND LEVEL 96.9m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 20.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					Dark grey MUDSTONE
			11.0	85.9	
					SE 11 NW / 33 (1)
					Light grey MUDSTONE
			17.5	79.4	
					CAVITY
			18.5	78.4	
					Soft material
			19.0	77.9	
					Hard material
			20.0	76.9	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE

GROUND LEVEL 96.3m O.D. Open hole rotary air flush

BORING: STARTED 28/4/81 FINISHED 28/4/81

HOLE SIZE 88mm dia to 20.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW /33 (J)
					Mainly clay
					(Made ground)
			2.0	94.3	
					Brown CLAY with sandstone
			6.0	90.3	
					Dark grey and black MUDSTONE

REMARKS 1. Cased to 6m.
2. No air return below 17.5m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
B( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

RECORD OF BOREHOLE 9 (CONT) HUDDERSFIELD

BORING: STARTED 28/4/81
BORING: FINISHED 28/4/81
HOLE SIZE 88mm dia to 20.0m

GROUND LEVEL 96.3m O.D. Open hole rotary air flush

SAMPLE OR TEST DEPTH	TYPE	Vertical LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW (33G)
					Dark grey and black MUDSTONE
			14.5	81.8	
					Grey to dark grey MUDSTONE
			17.5	78.8	
					CAVITY
			19.0	77.3	
					Solid ground
			20.0	76.3	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
B( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 10 HUDDERSFIELD

GROUND LEVEL 95.7m O.D. Open hole rotary air flush

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST DEPTH	TYPE	LEGEND	Vertical DEPTH	Vertical O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133 (K)
					Fill overlying sandstone with clay
			5.5	90.2	
					Grey MUDSTONE

REMARKS
1. Cased to 4m.
2. Groundwater seepage below 5m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING

RECORD OF BOREHOLE 10 (CONT) HUDDERSFIELD

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81

GROUND LEVEL 95.7m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST		Vertical			CHANGE OF STRATA
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133(K)
					Grey MUDSTONE
			13.0	82.7	
					Dark grey MUDSTONE
			18.5	77.2	
			19.5	76.2	COAL
					Light grey MUDSTONE (Fire clay)

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

GROUND LEVEL 95.7m O.D. Open hole rotary air flush

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST DEPTH	TYPE	Vertical LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33 (K)
					Light grey MUDSTONE (Fire clay)
			24.0	71.7	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 200 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 11 HUDDERSFIELD

BORING: STARTED 30/4/81
BORING: FINISHED 30/4/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 95.0m O.D. Open hole rotary air flush 20 degrees to vertical Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133 (L)
					Fill overlying brown clay and sandstone
			3.8	91.2	
					SANDSTONE with CLAY
			5.2	89.8	
					MUDSTONE

REMARKS 1. Cased to 6m.
2. Slight groundwater seepage from 5 to 6m and below.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 11 (CONT) HUDDERSFIELD

BORING: STARTED 30/4/81
BORING: FINISHED 30/4/81

GROUND LEVEL 95.0m O.D. Open hole rotary air flush 20 degrees to vertical HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST		Vertical	CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133 (1)
					MUDSTONE
			18.5	76.5	
					COAL
			19.0	76.0	
					Light grey MUDSTONE

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 11 (CONT) HUDDERSFIELD

GROUND LEVEL 95.0m O.D.

Open hole rotary air flush
20 degrees to vertical

BORING: STARTED 30/4/81
BORING: FINISHED 30/4/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST			Vertical		CHANGE OF STRATA
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133 (C)
					Light grey MUDSTONE
			22.8	72.2	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 13 HUDDERSFIELD

GROUND LEVEL 99.0m O.D.

Open hole rotary air flush
20 degrees to vertical

BORING: STARTED 2/5/81
BORING: FINISHED 2/5/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST		CHANGE OF STRATA			
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33 (n)
					Fill merging down into clay
			3.8	95.2	
					SANDSTONE with CLAY
			4.8	94.2	
					SANDSTONE
			6.0	93.0	
					Light grey MUDSTONE
			8.6	90.4	
					Dark grey MUDSTONE

REMARKS
1. Cased to 6m.
2. Groundwater encountered below 12m.
3. No air return below 18m vertical depth.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
B( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED, PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 13 (CONT.) HUDDERSFIELD

BORING: STARTED 2/5/81
BORING: FINISHED 2/5/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 99.0m O.D.

Open hole rotary air flush
20 degrees to vertical
Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33 (n)
					Dark grey MUDSTONE
			14.2	84.8	
					Light grey MUDSTONE
			17.1	81.9	
					Dark grey MUDSTONE
			18.0	81.0	
					CAVITY
			19.5	79.5	
					Soft ground

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 13 (CONT) HUDDERSFIELD

BORING: STARTED 2/5/81

BORING: FINISHED 2/5/81

GROUND LEVEL 99.0m O.D.

Open hole rotary air flush
20 degrees to vertical

HOLE SIZE 88mm dia to 24.0m

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
			20.9	78.1	Soft ground
			22.8	76.2	SE 11 NW 133 (N) Hard material

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 1: HUDDERSFIELD

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81

GROUND LEVEL 96.0m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 20.0m

SAMPLE OR TEST			CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW/33 (0)
					Fill merging down into clay
			4.0	92.0	
			4.5	91.5	SANDSTONE with clay
			5.25	90.7	SANDSTONE
					MUDSTONE

REMARKS
1. Cased to 4m.
2. Slight groundwater seepage
3. No air return below 16.5m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 200 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

British Geological Survey

RECORD OF BOREHOLE 14 (CONT) HUDDERSFIELD

BORING: STARTED 1/5/81
BORING: FINISHED 1/5/81

GROUND LEVEL 96.0m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 20.0m

SAMPLE OR TEST			CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW /33 (0)
					MUDSTONE
			16.5	79.5	
					CAVITY
			17.5	78.5	
					Soft ground
			19.0	77.0	
					Hard material
			20.0	76.0	

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S( ) STANDARD PENETRATION TEST
C( ) CONE PENETRATION TEST NO. OF BLOWS FOR 200 mm PENETRATION IN BRACKETS

SOILS ENGINEERING LIMITED PETERBOROUGH

GROUND LEVEL 97.8m O.D. Open hole rotary air flush BORING: FINISHED 19/4/81
HOLE SIZE 88mm dia to 22.0m

SAMPLE OR TEST		CHANGE OF STRATA			
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					SE 11 NW 133 (9)
					Fill overlying brown clay with sandstone
			6.0	91.8	
					Dark grey to black MUDSTONE

REMARKS
1. Cased to 6m.
2. Groundwater seepage below 5 to 6m to bottom of hole.
3. No air return below 18.5m.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S { } STANDARD PENETRATION TEST
C { } CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 16 (CONT) HUDDERSFIELD

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81

GROUND LEVEL 97.8m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 22.0m

SAMPLE OR TEST		STRATA	CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
					Dark grey to black MUDSTONE
			11.0	86.8	
					SE 11 NW 133 (9)
					Grey to dark grey MUDSTONE
			18.5	79.3	
					CAVITY

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 16 (CONT) HUDDERSFIELD

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81

GROUND LEVEL 97.8m O.D. Open hole rotary air flush HOLE SIZE 88mm dia to 22.0m

SAMPLE OR TEST			CHANGE OF STRATA		
DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	DESCRIPTION
			20.2	77.6	CAVITY
			22.0	75.8	Solid material

SE 11 NW /33 (9)

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

British Geological Survey

RECORD OF BOREHOLE 17 HUDDERSFIELD

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81
HOLE SIZE 88mm dia to 24.0m

GROUND LEVEL 97.5m O.D. Open hole rotary air flush 20 degrees to vertical

Vertical

SAMPLE OR TEST DEPTH	TYPE	LEGEND	DEPTH	O.D. LEVEL	CHANGE OF STRATA DESCRIPTION
					SE 11 NW 133 (r)
					Fill overlying brown clay with sandstone Sandstone predominant at base
			7.1	90.4	
					Dark grey to black MUDSTONE

REMARKS
1. Cased to 6m.
2. Groundwater seepage from 5 to 6m to base of hole.
3. No air return below 19.3m vertical depth.

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
B { } STANDARD PENETRATION TEST
C { } CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

RECORD OF BOREHOLE 17 (CONT.) HUDDERSFIELD

GROUND LEVEL 97.5m O.D.

Open hole rotary air flush
20 degrees to vertical
Vertical

BORING: STARTED 29/4/81
BORING: FINISHED 29/4/81
HOLE SIZE 88mm dia to 24.0m

SAMPLE OR TEST DEPTH	TYPE	LEGEND	CHANGE OF STRATA DEPTH	O.D. LEVEL	DESCRIPTION
					Dark grey to black MUDSTONE
					SE 11 NW/33 (r)
			12.8	85.2	
					Grey to dark grey MUDSTONE
			19.3	78.2	
					CAVITY

REMARKS

KEY: D — DISTURBED SAMPLE
B — BULK DISTURBED SAMPLE
W — WATER SAMPLE
U — UNDISTURBED SAMPLE
S ( ) STANDARD PENETRATION TEST
C ( ) CONE PENETRATION TEST
NO. OF BLOWS FOR 300 mm PENETRATION IN BRACKETS

[illegible] SURVEYS LTD.
[illegible]HESTER

BOREHOLE No. 1
Ref:- SE 11 NW / 50

Phase One

EXPLORATORY BORING RECORD

SITE Huddersfield Site Ref:- 73/215

Boring Method Rotary (H) Ground Level _____ O.D.

Date	Depth of Casing Below G.L.* (m)	Water Level Morning & Evening	Depth of Strata Below G.L.	STRATA APPROX SCALE	Dip of Samp	Type of Samp	Penetration of Sampler or Core Barrel (metres) From	To	RQD %	Core Recovery %
7.1.74				Ashes, bricks and topsoil Fill Material			2.5	3.5	0	95
			0.6				3.5	[illegible].3	0	95
				Soft/firm grey silty CLAY			4.3	6.7	0	100
			1.0				6.7	7.3	0	100
				Stiff brown and grey mottled sandy CLAY with numerous sandstone cobbles			7.3	9.2	0	100
7.1.74	2.5						9.2	10.0	0	100
8.1.74	2.5						10.0	11.8	12	100
							11.8	13.3	0	100
			3.5				13.3	15.3	74	100
				Highly weathered poorly bedded orange brown weak SANDSTONE			15.3	16.9	17	100
							16.9	17.85	0	70
			4.3				17.85	18.7	65	80
				Highly weathered thinly laminated brown and black weak shale (core badly broken)			18.7	19.3	100	100
							19.3	20.8	40	100
							20.8	21.8	100	100
			5.3				21.8	23.8	85	100
			approx	Highly weathered laminated black weak SHALE (core badly broken)			23.8	24.85	80	100
							24.85	26.6	84	100
							26.6	27.9	95	100
			6.2				27.9	30.9	86	100
			approx	Slightly to moderately weathered thinly laminated black weak SHALE. Ironstained bedding plane surfaces. Core stick lengths average 0.01m. Minor discontinuities vertical to bedding on broken	0°		30.9	34.05	72	100
							34.05	37.2	84	100
							37.2	40.35	79	100
							40.35	43.05	82	100
							43.05	45.15	70	100
							45.15	46.0	71	100
							46.0	49.15	47	100
							49.15	50.0	54	100

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

Water Observed at the Following Depths * - overnight seepage	Depth of Casing when Sealed (N.B. - Not Sealed)	Estimated Seepage	Water Added at Following Depths to Assist Boring	Water Level in Cased/Uncased Borehole on Completion: Date	Water Level	Depth of Casing
			DIA. OF CASING	___ m.m. to depth of _____ metres		
				___ m.m. to depth of _____ metres		
				___ m.m. to depth of _____ metres		

REMARKS:

I) Loss of circulating water at 16.65m

II) It should be noted that the above descriptions of the Drift deposits are the driller's descriptions only from observations of the water return and have not be [illegible]

...SURVEYS LTD.
...CHESTER

BOREHOLE No. ...
Ref:- SE 11 NW / 50

EXPLORATORY BOREHOLE RECORD

SITE Huddersfield — Site Ref:- 73/315

Boring Method Rotary (H) — Ground Level: ... O.D.

Date	Depth of Casing Below G.L. (m)	Water Level Morning / Evening	Depth of Strata Below G.L.	STRATA APPROX. SCALE	Dip or Script	Type of Samp	Penetration of Sampler or Core Barrel (Min. Int) From	To	RQD %	Core Recovery %
				core From approx 9.8m core sticks average 0.025m. Joint discontinuities at 9.9 (75°) 10.2 (v), 10.35 (65°), 10.5 (v), 10.7 (v) 11.2 (75°), 11.9 (60°). Mainly bedding plane fractures	0° 5° 8°					
9.1.74	6.3		11.6 approx	Faintly weathered thinly laminated dark grey and black weak SHALE. Strong bedding plane fractures Core sticks average 0.03m Small joint discontinuities at 12.15 (v), 12.3 (75°), 12.8 (80°-v), 13.0 (85°) 13.4 (v) 14.15 (v), 14.6 (50°), 14.75 (75°-v), 15.0-15.2 (85°-v), 16.05 (v), 16.2 (80°-v), 16.75-16.8 (85°) Fossil Lamellibranch horizons at 14.4, 14.9, 15.9 and 16.5m	5°					
9.1.74	6.3		16.65 approx	Black SHALE and grey shaly CLAY - CAVITY (possible collapsed mine workings)						
			17.85 approx							

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

Water Observed at the Following Depths	Depth of Casing When Seated (m. B. = Not Seated)	Estimated Seepage	Water Arose at Following Depths in Casing	Water Level in Casing Observed Before & After Completion — Date / Water (m) / Time
1.				
2.				
3.				
4.				

DIA. OF CASING: ... m.m. to depth of ... metres; ... m.m. to depth of ... metres; ... m.m. to depth of ... metres

REMARKS:

British Geological Survey

...IL SURVEYS LTD
...CHESTER

BOREHOLE No. Cont 1
Ref:- SE 11 NW / 50

EXPLORATORY BORING RECORD

Huddersfield — Site Ref:- 73/215

...Method Shell — Ground Level ____ O.D.

Depth of Casing Below G.L. (m)	Water Level Morning & Evening	Depth of Strata Below G.L.	STRATA APPROX. SCALE	Dip of Samp	Type of Samp	Penetration of Sampler or Core Barrel (metres) From	To	RQD %	Core Recovery %
		17.85	Faintly to slightly weathered laminated light grey strong medium grained micaceous SANDSTONE, joint surface at 18.55 (20°)						
		19.3	Slightly to moderately weathered thinly laminated dark grey and black weak SHALE. Thin sandstone band from 19.5-19.55m Joint surfaces at 19.7-19.8 (v), 20.45 (v) Lamellibranch horizon at 20.7m	5°					
		20.8	Faintly weathered laminated light grey strong medium grained micaceous SANDSTONE Current bedded. Strong joint surfaces at 21.85-22.3 (80°-v) and 23.5-23.7 (70°-v)						
18.4									
18.4									
		23.8							

...shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

...	Depth of Casing when Sealed (N.B. - Not Sealed)	Estimated Seepage	Water Added at Following Depths to Assist Boring	Water Level in Cased/Uncased Borehole on Completion: Date	Water Level	Depth of Casing
			DIA. OF CASING	____ m.m. to depth of ____ metres		
				____ m.m. to depth of ____ metres		
				____ m.m. to depth of ____ metres		

British Geological Survey

...SURVEYS LTD.
...ESTER

Ref:- SE 11 NW / 50

EXPLORATORY BORING RECORD

SITE Huddersfield

Site Ref:- 73/215

Boring Method Shell

Ground Level ____ O.D.

Date	Depth of Casing Below G.L. (m)	Water Level Morning & Evening	Depth of Strata Below G.L.	STRATA APPROX. SCALE	Dip of Samp	Type of Samp	Penetration of Sampler or Core Barrel (metres) From	To	RQD %	Core Recovery %
			23.5	Alternating series of fresh thinly laminated light grey stony fine grained SAND-STONE and fresh thinly laminated grey weak MUD STONE. Joint discontinuities (fresh) at 24.85 (70°), 25.65 (40°) 26.25-26.35 (v) Mainly current bedding plane partings. From 27.8m., becoming dominantly mudstone with thin sandstone bands.	5°					
				Joint discontinuities at 27.15 (v), 28.7 (80°-v) 28.95-29.2 (70°-v) - all fresh surfaces.	6°					
10.1.74	18.4									
11.1.74	18.4			Joint discontinuities at 31.3 (80°-v), 31.4-31.6 (70°-v), 32.25-32.35 (v) - all surfaces fresh Joint discontinuities at 33.2 (60°), 34.35 (70°), 34.4-34.55 (85°), 34.6 (30°), 35.4 (40°)- all fresh surfaces, 35.8 (60°)	0°					

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

Water Observed at the Following Depths * - overnight seepage	Depth of Casing when Sealed (D.B. - Not Sealed)	Estimated Seepage	Water Added at Following Depths to Assist Boring	Water Level in Casing Unsealed Borehole on Completion: Date	Water Level	Depth of Casing
1.						
2.						
3.						
4.						

DIA. OF CASING ____ m.m. to depth of ____ metres
____ m.m. to depth of ____ metres
____ m.m. to depth of ____ metres

REMARKS:

British Geological Survey