Environmental
Geotechnical
Specialists

REPORT

job number J4141/18/EDS	site address The Gate Inn
date 11.01.18	Barnsley Road
written by R.A. Palmer	Dodworth
checked by C.E. Mason	S75 3LE
issued by R.A. Palmer	

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GEOTECHNICAL ENVIRONMENTAL

Environmental Geotechnical Specialists

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Appendices

Report on a Coal Mining Risk Assessment

Location:	The Gate Inn, Barnsley Road, Dodworth, S75 3LE
For:	JRB Designs Ltd
Report No.	J4141/18/EDS
Report date:	January 2018

For and on behalf of **Rogers Geotechnical Services Ltd**

Rob Palmer MSc FGS
Geotechnical & Environmental Engineer

Charlotte Mason BSc FGS
Geotechnical Engineer

1. Introduction

It is understood that as part of the planning application 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].

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:

[1] Sources: British Geological Survey (NERC) Map Sheet 87; Barnsley Solid and Drift Editions
[2] Sources: British Geological Survey (NERC) Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Coal Authority Reference: 51001753891001 dated 8th January 2018.
[4] Sources: British Geological Survey (NERC) Borehole Records [*online resource from* http://www.bgs.ac.uk//]

Table 1: Geological Data for the Site			
Strata Type	**Strata Name**[5]	**Previous Name**[6]	**Description**[6]
Superficial Geology	None recorded.		
Solid Geology	Pennine Middle Coal Measures Formation	Middle Coal Measures Formation	Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.

The site is situated upon an unnamed sandstone member of the Pennine Middle Coal Measures Formation. There are no dip indicators relevant to the site (i.e. within 500m of the site or within the same fault block) on the geological map. However, taking into account the structure of the regional geology and outcrop patterns, it can be anticipated that the solid geology within the local area dips at shallow angles (around 5°) towards the north-east.

There are two coal seams that are shown to outcrop within the local area. These seams are 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]*****	**Anticipated depth below site**
Lidget Coal (L)	0.3 – 1.5	60m SW	<10m
Low Haigh (LH)	0.0 – 2.6	180m NE	Not anticipated to be present beneath the site.

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

The outcrop of the Low Haigh Coal seam is indicated to be present approximately 180m north-east of the site. Therefore, taking into consideration the position of the seam on the generalised vertical section on the map, the site is situated upon strata stratigraphically below this seam. Therefore, this seam is not anticipated to be present below the site surface.

In light of the above, and taking into account the regional structural geology and the topography of the area, there is one seam of coal anticipated to be present at depths of less than 30m below the surface of the site.

[5] Sources: British Geological Survey (NERC) Map Sheets 77; Huddersfield; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[6] 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**
1	Underground Coal Mining: Past	Yes	The property is in a surface area that could be affected by underground mining in 5 seams of coal at 60m to 260m depth, and last worked in 1967. Any movement in the ground due to coal mining activity should have stopped. In addition, 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 Coal Authority report.
2	Underground Coal Mining: Present	No	The property is not within a surface area that could be affected by present underground mining.
3	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 the land is at risk of subsidence.
4	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.
5	Coal Mining Geology	No	Please refer to CON29M Non-residential mining report (51001753891001)
6	Opencast Coal Mining: Past	No	
7	Opencast Coal Mining: Present	No	
8	Opencast Coal Mining: Future	No	
9	Coal Mining Subsidence	No	
10	Mine Gas	No	
11	Hazards Related to Coal Mining	No	
12	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[7]. 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 4: Notable Geological Features

Borehole	Approx. Distance from Site	Depth of borehole (m)	Notable features
SE30NW327	220m NNE	13	Coal (Intact) – 4.5m (0.18m thickness).
SE30NW328	220m NNE	13	Coal (Intact) – 4.5m (0.45m thickness).
SE30NW319	360m NE	20	Coal (Intact) – 5.4m Coal (Intact) – 15.0m (0.38m thickness).

Whilst there are no borehole records within the immediate vicinity of the site, there are boreholes within the same faulted block to the north-east of the site. Boreholes SE30NW327 and SE30NW328 were located to the west of the Low Haigh Coal outcrop and have indicated one notable coal seam present within 5m of the ground surface. Based on the available geological data, it is anticipated that this seam may represent the Lidget Coal seam.

Borehole SE30NW319 was undertaken on the eastern side of the Low Haigh Coal outcrop, therefore, this seam was anticipated to also be present above the Lidget Coal seam. Within this borehole, one seam was found at 5.4m depth and a further seam identified at 15.0m. Therefore, it is considered these seams are associated with the Low Haigh Coal and Lidget Coal seam respectively.

It should be appreciated that the Lidget Coal seam was proven intact in all borehole locations with a seam thickness of up to 0.45m. Furthermore, other borehole scans were available within the area and demonstrated similar ground conditions to those discussed above.

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 5: Development specific risk assessment

Item	Risk of Instability	Coal Seam(s) Considered	Risk Rating
1	Shallow coal seams	Lidget Coal (L)	Moderate
2	Coal workings at depth	The Coal Authority report indicates that the property is within a surface area that could be affected by underground mining in 5 seams of coal at 60m to 260m depth, and last worked in 1967. However, any movement in the ground due to coal mining activity should have stopped.	Low

On the basis of all of the information provided above, one coal seam is anticipated to be present within 30m of the surface at the site. Whilst this seam may be of limited thickness, the possibility of the seam being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area, and therefore it is considered that if coal was known to be close to ground level 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 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 coal seam, the table below suggests the thickness of competent overburden required above the seam to mitigate instability at the surface.

Table 6: Required thickness of competent overburden

Seam Name	Seam thickness	Anticipated depth below site	Required thickness of competent overburden.
Middle Band Coal (MB)	0.3m – 1.5m	<10m	16.5m

Based on the above information, it is considered that if the seam is worked, there will not be a sufficient thickness of competent overburden above the seam in order to prevent the risk of instability posed by the presence of illicit workings. Therefore, a moderate risk rating has been placed on this seam, and further investigation is recommended to prove or disprove the presence of illicit mining activity and identify the true thickness and depth of this seam.

In regard to deeper mining which could affect the site, the Coal Authority has indicated that any movement in the ground due to deep workings should have stopped. Therefore a low risk rating has been assigned for workings at depth.

4. Conclusions

In light of the potential risks of instability at the site from the working of shallow coal, 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 intact columns 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. Furthermore, the generalised vertical section indicates that there are no coal seams within at least 50m depth beneath the Lidget Coal seam. Therefore, drilling to these depths may not be necessary and the objective should be to ensure that the Lidget Coal seam is un-worked or has sufficient competent cover. It may therefore be possible, in the first instance, to undertake one borehole to 15m below the top of the rockhead, 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.

It is of note that Rogers Geotechnical Services would be happy to assist in any further intrusive investigation that may be required.

Appendix 1

Site Plan


The Gate Inn
Barnsley Road
Dodworth
S75 3LE
Legend
Feature 1
Park Hill Grove
B6449
Barnsley Rd
Park Hill Grove
Gale Crescent
Google Earth
© 2017 Google
90 m
N

Appendix 2

Coal Authority Report

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report

THE GATE INN
BARNSLEY ROAD
DODWORTH
BARNSLEY
S75 3LE

Date of enquiry:	08 January 2018
Date enquiry received:	08 January 2018
Issue date:	08 January 2018
Our reference:	51001753891001
Your reference:	J4141/18/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

THE GATE INN, BARNSLEY ROAD, DODWORTH, BARNSLEY, S75 3LE

Approximate position of property

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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 in a surface area that could be affected by underground mining in 5 seams of coal at 60m to 260m depth, and last worked in 1967.

Any movement in the ground due to coal mining activity should have stopped.

In addition 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 of the enquiry boundary, 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

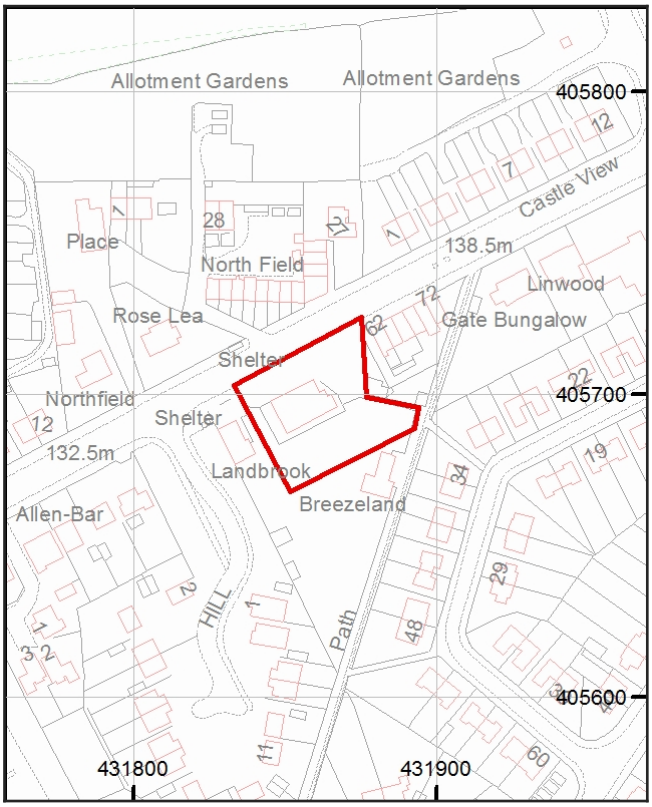
Alternative formats

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

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	08 January 2018
Issued to	ROGERS GEOTECHNICAL SERVICES LTD BARNCLIFFE MILLS NEAR BANK SHELLEY HUDDERSFIELD KIRKLEES HD8 8LU
Property search for	THE GATE INN BARNSLEY ROAD DODWORTH BARNSLEY S75 3LE
Reference number	51001753891001
Date of issue	08 January 2018
Cost	£78.30
VAT @ 20%	£15.66
Total received	£93.96
VAT registration	598 5850 68

Appendix 3

BGS Borehole Records

Location No. 3983

LOG FOR BOREHOLE No 2

SE80NW 327 31891 05927

ASTON – SHEFFIELD – LEEDS MOTORWAY
DODWORTH TO LEEDS

WEST RIDING OF YORKSHIRE COUNTY COUNCIL

Type of Boring: a) Shell and Auger b) Light core drill

Diameter: a) 8" to 8 ft. b) 2½" core.

Date: Sept. 1962

Chainage: 1090

Ground Level: 481.4 ft. above N.D.

Cut: 10 ft. Fill: — ft.

Bridge Site
DODWORTH RAILWAY DIVERSION

Description	Legend	Sample	Depth	Rec %	Test Results & Notes
Ground Level			0' 0"		
Dark grey silty TOPSOIL and roots		1	1'0"		
Firm to stiff mottled light grey and brown silty CLAY.		2		26	C = 1970 ϕ = 0 d = 125 CH.
		3			
			6'6"		
ironstained		4		14	C = 1050 ϕ = 22 CI.
		5			
Soft dark grey shaley SILTSTONE broken and with soft silty mudstone bands below 12 ft. depth					
Shaley COAL			14'9" 15'6"		
		6			
Moderately hard mid grey very silty MUDSTONE with plant remains and occasional ironstone bands, broken at top but becoming more massive with depth, carbonaceous mudstone bands			23'6"		
Moderately hard mid grey very silty MUDSTONE with abundant siltstone laminations and ironstone bands; mainly massive with open ironstained vertical joints.		7			
		8			
		9	34'0"		
very silty					
Moderately hard dark grey slightly silty MUDSTONE slightly broken with closed near vertical joints.		10			
END OF BOREHOLE		11	45'0"		

OBSERVATIONS OF WATER LEVELS IN BOREHOLE

Date	Time	Depth of Hole	Depth of Casing	Depth to Water
9/10	10.30	8'0"	Nil	Dry
9/10	15.00	21'0"	14'0"	15'0"
10/10	08.00	24'0"	14'0"	20'6"
	15.00	45'0"	14'0"	8'0"

* Water added during core drilling.

13572

Location No. 3983 LOG FOR BOREHOLE **BR 4**

SE30NW 328 31905 05923

ASTON – SHEFFIELD – LEEDS MOTORWAY
DODWORTH TO LEEDS

WEST RIDING OF YORKSHIRE COUNTY COUNCIL

Type of Boring: a) Shell and Auger b) Light core drill Diameter: a) 6" to 10'0" b) 2¾" core Date: Sept. & Oct. 1962

Chainage: 1115 Ground Level: 480.7 ft. above N.D. (146 47) Cut: 10 ft. Fill: – ft.

Bridge Site
DODWORTH RAILWAY DIVERSION

Description	Legend	Sample	Depth	m.?	Test Results & Notes
Ground Level			0' 0"		
Dark grey silty TOPSOIL with roots			1'0"		
Stiff dark grey becoming mottled light grey and brown silty CLAY containing weathered ironstone nodules.		1		20	
		2	5'0"	18	C = 4080 ϕ = 0 d = 133 CI
Soft (weathered) dark grey very silty MUDSTONE with ironstained and micaceous partings.		3		16	OMC = 15 D = 116 CI. (B.S.Compaction) SO_3=0.01 S.G. = 2.59
		4		10	C = 2880 ϕ = 29 d = 139
		5	10'0"	9	N = 75 for 6 in. penetration
Moderately hard pale grey SILTSTONE with abundant silty mudstone laminations.		6	13'6"		
Soft silty MUDSTONE.			14'9"		
COAL			16'3"		
Soft friable slightly silty MUDSTONE with plant remains.		7			
		8	19'6"		
Moderately hard mid grey silty MUDSTONE becoming less silty with depth and with occasional ironstone bands; slightly ironstained and broken at top but becoming more massive with depth, joints about 45°.		9			
		10			
		11	35'0"		
Moderately hard dark grey slightly silty MUDSTONE becoming more silty with depth with occasional mussels at top.		12			
END OF BOREHOLE			45'0"		

OBSERVATIONS OF WATER LEVEL IN BOREHOLE

Date	Time	Depth of Hole	Depth of Casing	Depth to Water
4/9	12.30	10'0"	Nil	Dry
5/10	16.00	22'6"	10'0"	15'0"
8/10	16.00	22'6"	10'0"	DRY

* Water added during drilling.

1372

Location No. 3983

LOG FOR BOREHOLE B177

SE30NW 319 32182, 05848 Sheet No. 1

ASTON – SHEFFIELD – LEEDS MOTORWAY
DODWORTH TO LEEDS

WEST RIDING OF YORKSHIRE COUNTY COUNCIL

Type of Boring: (a) Shell and Auger (b) Medium core drill

Diameter: (a) 6 in. to 3'6" (b) 2½" core

Date: Oct. - Nov. 1962

Chainage: 885 + 30

Ground Level: 444.1 ft. above N.D.

Cut: 15 ft. Fill: - ft.

WHITE SHEPHERD SOUTH 134.43

Description	Legend	Sample	Depth	m %	Test Results & Notes
Ground Level Dark grey silty TOPSOIL		1	0'0" 0'6"		
Moderately hard, pale grey, ironstained SILTSTONE becoming hard and massive below 4 ft. depth.		2		9	SO_3 = 0.03
		3			
		4	8'0"		
Soft, becoming moderately hard ironstained, mid grey silty MUDSTONE, with siltstone laminations.					
Soft, dark grey, slightly silty MUDSTONE.			16'0" 17'0"		
COAL			19'0"		
Soft, slightly silty MUDSTONE with abundant plant debris.		5	21'0"		
		6			
Hard, pale grey SILTSTONE with silty mudstone laminations and bands, mainly massive, with open and closed vertical joints.		7			
		8	32'0"		
		9			
Hard, mid grey silty MUDSTONE, with siltstone laminations, becoming less silty with depth, with occasional ironstone bands, and with closed vertical joints.		10			
		11			

CONTINUED ON SHEET NO.2

Location No. 3783

LOG FOR BOREHOLE

Sheet No. 2

SE80NW 319

B177

ASTON – SHEFFIELD – LEEDS MOTORWAY
DODWORTH TO LEEDS

Description	Legend	Sample	Depth	m %	Test Results & Notes
Continued from Sheet No. 1					
		12			
COAL			49'6" 50'9"		
		13			
mussel band					
Moderately hard, mid grey silty MUDSTONE, less silty in places, with abundant plant debris, with closed vertical joints.		14			
		15			
			68'0"	20	73
END OF BOREHOLE					

OBERSERVATION OF WATER LEVELS IN BOREHOLE.

Date	Time	Depth of B.H.	Depth of Casing	Depth to Water
20/11	15.00	3'0"	-	DRY
21/11	08.00	11'0"	-	8'0"
21/11	18.00	41'0"	8'0"	12'0"
22/11	07.30	41'0"	8'0"	28'0"
22/11	18.00	63'6"	8'0"	28'0"
22/11	07.30	63'6"	8'0"	32'0"

* Water added during drilling.