

# Technical Note

25<sup>TH</sup> MARCH 2020

**TY CROES SOLAR FARM: ADDENDUM TO YELLOW SUB GEO COAL MINING RISK ASSESSMENT REPORT, REF. 19158\_R1 DATED DECEMBER 2019**

## 1. INTRODUCTION

Spring Che Ltd (the Client) are seeking to develop a solar farm on three parcels of land between the village of Ty Croes and the A48 in Carmarthenshire (the Site). The proposed planning application boundary includes the route of a connecting cable run between the three land parcels. The Client is in the process of preparing a planning submission for the solar farm. As part of these preparations, a Pre-Application enquiry was made with the Coal Authority (CA) and their response received in a letter dated 17<sup>th</sup> September 2019. This requests that any planning application be supported by a Coal Mining Risk Assessment due to parts of the site falling within the CA 'Development High Risk Area'.

Yellow Sub Geo Ltd (Yellow Sub) prepared a desk-based Coal Mining Risk Assessment and this was submitted to the CA for their review and comment in December 2019, and a subsequent response received dated 6<sup>th</sup> February 2020 (see Annex A to this Technical Note for ease of reference). This Technical Note has been written in response to the points raised by the CA in this most recent letter. It forms an addendum to the Coal Mining Risk Assessment Report (Ref. 19158\_R1 dated December 2019).

## 2. COAL AUTHORITY POINTS RAISED

In a letter dated 6<sup>th</sup> February 2020, the CA reconfirm that any planning application made for the development should be supported by a Coal Mining Risk Assessment. They then state that the:

*"Coal Mining Risk Assessment (December 2019, prepared by Yellow Sub Geo Ltd) .... would be sufficient to accompany future (sic) planning application to meet the requirements of National policy."*

It goes on to state that;

*"the report is able to confirm only a negligible risk posed by potential shallow coal mine workings .... the Coal Authority is satisfied with this conclusion and welcomes the proposed mitigation measures of the mine entries"*.

Yellow Sub Geo Ltd

Registered in England and Wales Company No. 10888960

7 Neptune Court, Vanguard Way, Cardiff, CF24 5PJ.

[www.yellowsubgeo.com](http://www.yellowsubgeo.com)



Notwithstanding the above, the CA go on to state that:

*“assuming there (sic) investigation and remediation is **not intended**, should the detailed layouts remain unchanged, the Coal Authority would object to any subsequent planning application based on the layout (including the route of the cable) conflicting with [the] positions [of the shafts].*

*On account of the above, the Coal Authority is of the opinion that the layout should be amended and designed around both the conjectured positions of the shafts and their respective zones of zones of influence. ”*

The shafts comprise the following:

#### Shafts on cable route

These are listed as CA Ref. 258209-003 and 258209-004 (NGR 258621 209398 and 258639 209377 respectively).

#### Shaft on land near A48

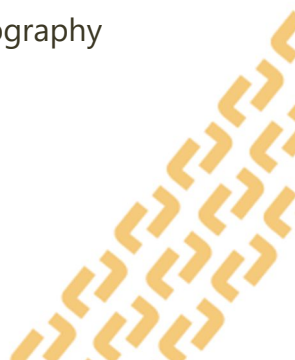
A single possible shaft in the land near the A48 (CA Ref. 257209-001, NGR 257333 209569).

Yellow Sub Geo submitted a letter to the CA in response to the points outlined above, dated 11<sup>th</sup> February 2020 (see Annex B to this Technical Note). In this letter, the Client's commitment to due investigation and assessment of the three shaft features is reconfirmed (i.e. the situation assumed by the CA will not occur, and could be prevented by a suitable planning condition).

In a telephone conversation on 10<sup>th</sup> March 2020, the matter was discussed with Chris MacArthur of the CA. He was unable to comment formally on the letter submitted, due to a matter of procedure (as it was not submitted directly by the original applicant, Spring Che Ltd.). However, he provided informal verbal comment, maintaining the CA position that the development layout should be designed around the potential shaft locations until such time as the precise location of the features has been proven through on-site surveys. However, if this is not possible, Mr MacArthur indicated that the CA would be open to a reasonable and robust approach to the problem. The following sections seek to describe and substantiate such an approach.

### **3. SHAFTS NEAR THE CABLE ROUTE**

Table 1 summarises the details of the two shafts that are indicated by the Coal Authority to be within close proximity to the cable run in the vicinity of the junction of the A483 and B4297. The location of these have been plotted on aerial photography in Figure 1.



**Table 1 Shaft details of those shafts near the cable run**

Shaft Number	NGR	Treatment details	Interaction with cable run
258209-003	258621 209398	None	Located approximately 30 metres from the northern edge of the A483.
258209-004	258639 209377	None	Located approximately within the carriageway of the A483.

**Figure 1 Shaft locations in the vicinity of the cable run**



In Figure 1 the blue line denotes the approximate cable run location. The red dot for each of the shafts indicates the grid reference provided by the CA. The orange shaded circle represents an approximate 10 m radius departure area, reflecting the typical allowance required to reflect uncertainty in extrapolating this position from the historical plans.



Nearby historical boreholes, taken from the British Geological Survey archives (indicated by blue circle in Figure 1), indicate a superficial soil thickness of between 1.85 m and 3.8 m (see Annex C). Taking a conservative depth to bedrock of 5 m and an assumed angle of repose upon collapse of 1:2, this suggests a further 10 m radius zone of influence should be allowed for. This is the shaded yellow outer circle in Figure 1.

The proposed cable run lies completely outside of the zone of influence for shaft 258209-003 and so the risk posed to the development from this shaft is assessed to be negligible.

The proposed cable run route runs in the verge between the A483 to the south and the minor road to the north. This verge lies wholly within the potential zone of influence of shaft 258209-004, as does the carriageway of the A483. Due to constraints elsewhere along the A483, the southern verge is not a feasible option for the cable route. The verge to the north of the minor road remains within the zone of influence of shaft 258209-004. Taking the cable run away from the road verges would require additional third-party agreements and permission, which are not considered viable.

As a result, there is no viable available alternative route for the cable run in this location, with the north verge of the A483 representing the sole workable option. As a result, there is little merit in furthering the investigation work as to the location of shaft 258209-004 at this stage to inform project layout (as no other option is available).

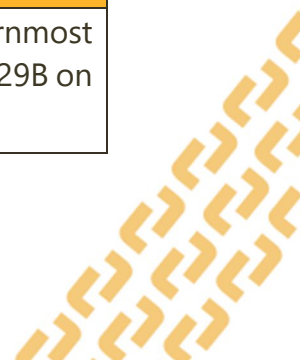
As such, the Client is committed to undertaking suitable works to investigate, assess and (if necessary) remediate the shaft to the satisfaction of the CA as part of the detailed design phase of the project. It is considered appropriate that such work be controlled by use of a suitably worded planning condition, thus ensuring that the CA maintain oversight and approval of the works.

#### 4. SHAFT ON LAND NEAR A48

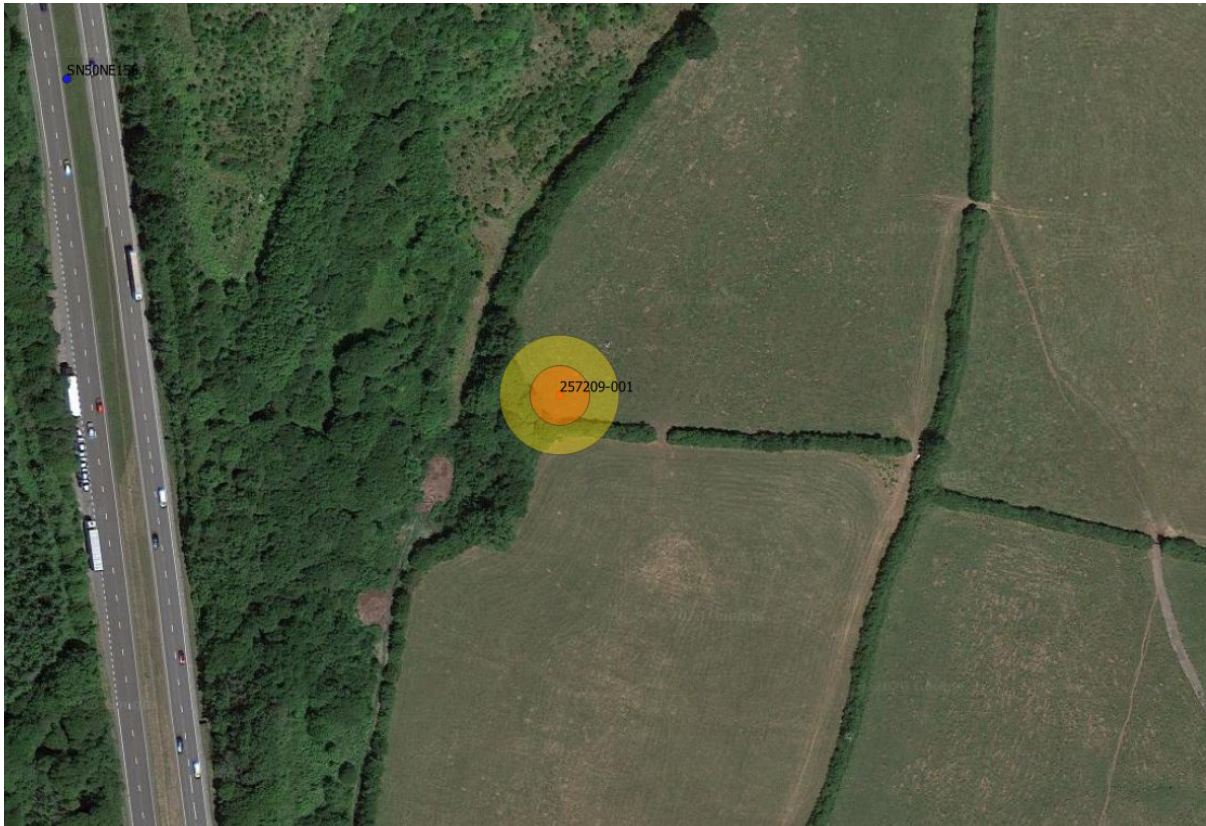
Table 2 summarises the details of the shaft that is indicated by the Coal Authority to be within close proximity to the development layout in the south-western corner of the north-western field in the area of land near the A48. The location of these have been plotted on aerial photography in Figure 2.

**Table 2 Shaft details of those shafts near the cable run**

Shaft Number	NGR	Treatment details	Interaction with development layout
257209-001	257333 209569	None	In the corner of the north-westernmost field, and is in an area very near Tree 29B on the arboricultural survey.



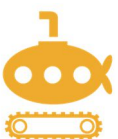
**Figure 2 Shaft location in the land near the A48.**



In Figure 2 the red dot for the shaft indicates the grid reference provided by the CA. The orange shaded circle represents an approximate 10 m radius departure area, reflecting the typical allowance required to reflect uncertainty in extrapolating this position from the historical plans.

The nearest historical borehole, taken from the British Geological Survey archives (indicated by blue circle in the top left corner of Figure 2), indicate a superficial soil thickness of 4.4 m (see Annex C). Taking a depth to bedrock of 5 m and an assumed angle of repose upon collapse of 1:2, this suggests a further 10 m radius zone of influence should be allowed for. This is the shaded yellow outer circle in Figure 2.

In response to this potential constraint, the panel layout in this area has been stepped out to ensure that no panels are proposed within the 20 m radius zone of influence from shaft 258209-001 at NGR 257333 209569. Fence posts for the security fence shall be installed using hand tools only within the yellow shaded zone of influence.



## 5. SUMMARY

Table 3 provides a summary of the measures to be taken to manage and mitigate the risk posed by the three shafts identified to remain of concern by the CA:

**Table 3 Summary of risk management measures to be employed**

Shaft Number	NGR	Risk posed to development (before mitigation)	Proposed mitigation	Risk posed to development (after mitigation)
257209-001	257333 209569	Moderate	Amend panel layout to avoid possible zone of influence (20 m radius exclusion around NGR). Use hand tools for fence installation.	Negligible
258209-003	258621 209398	Negligible	None required	Negligible
258209-004	258639 209377	Moderate	Investigate, assess and (if necessary) remediate shaft to the approval of CA. Required works to be secured by suitably worded planning condition(s).	Negligible



**ANNEX A: COAL AUTHORITY LETTER DATED 6<sup>TH</sup> FEBRUARY 2020**





The Coal  
Authority



INVESTOR IN PEOPLE



RTPI  
Learning Partner

200 Lichfield Lane  
Berry Hill  
Mansfield  
Nottinghamshire  
NG18 4RG

Tel: 01623 637 119 (Planning Enquiries)

Email: [planningconsultation@coal.gov.uk](mailto:planningconsultation@coal.gov.uk)

Web: [www.gov.uk/coalauthority](http://www.gov.uk/coalauthority)

For the Attention of: Spring CHE Ltd

[By Email: [hugo.house@springche.com](mailto:hugo.house@springche.com)]

6 February 2020

Dear Sir or Madam

### **PRE-APPLICATION ENQUIRY: TYCROES SOLAR FARM**

**Proposed installation of a ground mounted Photo Voltaic (PV) solar farm development; land east of the A48 and south west of Tycroes**

Thank you for your email of 17 January 2020 seeking the views of the Coal Authority on the above.

The Coal Authority is a non-departmental public body sponsored by the Department of Business, Energy & Industrial Strategy. As a statutory consultee, The Coal Authority has a duty to respond to planning applications and development plans in order to protect the public and the environment in mining areas.

#### **The Coal Authority Response: Substantive Concern**

The site falls within the defined Development High Risk Area.

The Coal Authority information indicates that within the site and surrounding area there are coal mining features and hazards, which will need to be considered in relation to the determination of any planning application, specifically probable shallow coal mine workings associated with thick coal seam outcrops and recorded mine entries.

In considering the nature of the development proposed, and on the basis that the site is within the defined Development High Risk Area, the planning application should be supported by a Coal Mining Risk Assessment. In terms of the accompanying Coal Mining Risk Assessment (December 2019, prepared by Yellow Sub Geo Ltd), my personal opinion is that it would be sufficient to accompany any subsequent future planning application to meet the requirements of National policy.



Notwithstanding the above, and terms of the report's content, from a review of appropriate coal mining and geological information the report is able to confirm only a negligible risk posed by potential shallow coal mine workings. However, and whilst the Coal Authority is satisfied with this conclusion and welcomes the proposed mitigation measures of the mine entries, in assuming there investigation and remediation is not intended, should the detailed layouts remain unchanged, the Coal Authority would object to any subsequent planning application based on the layout (including the route of the cable) conflicting with their positions.

On account of the above, the Coal Authority is of the opinion that the layout should be amended and designed around both the conjectured positions of the shafts and their respective zones of influence.

Please do not hesitate to contact me if you would like to discuss this matter further.

Yours faithfully

*Chris MacArthur*

**Chris MacArthur** *B.Sc.(Hons), DipTP, MRTPI*  
**Planning Liaison Manager**

Disclaimer

The above consultation response is provided by The Coal Authority as a Statutory Consultee and is based upon the latest available coal mining data on the date of the response, and electronic consultation records held by The Coal Authority since 1 April 2013. The comments made are also based upon only the information provided to The Coal Authority by the Local Planning Authority and/or has been published on the Council's website for consultation purposes in relation to this specific planning application. The views and conclusions contained in this response may be subject to review and amendment by The Coal Authority if additional or new data/information (such as a revised Coal Mining Risk Assessment) is provided by the Local Planning Authority or the Applicant for consultation purposes.



**ANNEX B: YELLOW SUB GEO LETTER DATED 11<sup>TH</sup> FEBRUARY 2020**



Chris MacArthur  
Planning Liaison Manager  
The Coal Authority  
200 Lichfield Lane  
Berry Hill  
Mansfield  
Nottinghamshire  
NG18 4RG

**Our Ref.:** 19158\_L1\_CA  
**Date:** 11<sup>th</sup> February 2020

### PRE-APPLICATION ENQUIRY, TY CROES SOLAR FARM

Dear Chris,

Yellow Sub Geo are providing consultancy advice to Spring CHE Ltd with respect to coal mining issues associated with their proposed solar farm development on land east of the A48 and south west of Tycroes, Carmarthenshire. Spring CHE Ltd have shared with us the letter from you dated 6<sup>th</sup> February 2020, in which you provide your comments on the Yellow Sub Geo Coal Mining Risk Assessment (report Ref. P19158\_R1).

We welcome your confirmation, on page 1 of your letter, that the submitted Coal Mining Risk Assessment would be sufficient to accompany a future planning application and meets the requirements of National Policy.

In the first paragraph of page two of your letter, you go on to explain that the Coal Authority is satisfied with the conclusions (of the Coal Mining Risk Assessment), and welcomes the measures proposed to mitigate the risk posed by the mine entries, namely;

In order that we can confirm our understanding of the rest of your letter, we felt it important to set out what these proposed mitigation measures comprise:

Mine Entries 258209-003 and 258209-004: These lie within the proximity of the proposed cable run alongside the A483, near its junction with the B4279. Section 7-1-1 of the Coal Mining Risk Assessment recommends that *"further investigation, assessment and if necessary mitigation (be undertaken) to satisfactorily control any risks posed by these shafts during the construction phase of the development"*. Such mitigation may comprise the amendment to cable routing, or treatment of the shaft, if appropriate.

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7 Neptune Court, Vanguard Way, Cardiff, CF24 5PJ.

[www.yellowsubgeo.com](http://www.yellowsubgeo.com)



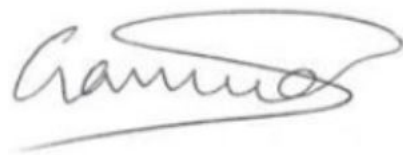
Mine Entry 257209-001: Shown by mapping to be in the south-west corner of the north-westernmost field in Area 3. It is considered probable that this feature is outside of the footprint of the proposed development. Section 7-1-2 of the Coal Mining Risk Assessment recommends that *"this feature be the subject of further investigation, assessment and if necessary mitigation in order to satisfactorily control any risks posed by these shafts during the construction phase of the development."* Again, such mitigation may comprise the amendment to panel layout, or treatment of the shaft, if appropriate.

We therefore reiterate that investigation and remediation (if required) **is intended**. Hence the scenario described (in your penultimate paragraph) under which the Coal Authority would object to the proposals, will not occur.

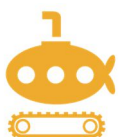
Given that the proposed end-use for the development (a cable route and a solar farm) is low risk with respect to shallow ground instability, we propose that the requirement (and indeed our commitment) to investigate and, if necessary, remediate against coal mining hazards could be made a condition upon any planning permission granted for the proposed layout. This will provide a pragmatic balance between our client's pre-planning commercial and financial risk, and the joint aim of all parties in ensuring that the development is protected from any risks posed by the coal mining legacy.

We welcome confirmation of the Coal Authority's position with respect to this proposed conditioning approach.

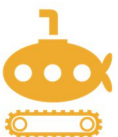
Yours sincerely



**DIRECTOR**



## ANNEX C: HISTORICAL BOREHOLE LOGS



GEO - RESEARCH LTD.		SN 50 NE/104 5860.0931 1:230		B/H No. 502	
CONTRACT M4 PONTARDULAI BY - PASS				SHEET No. 1	
LOCATION PONTARDULAI (SITE R21)				No. of sheets 1:	
CLIENT WELSH OFFICE ROADS DIVISION		Percussion U D SPT B		CASING Size to. Size to. N11	
Weather FDE		Rotary Cored runs O/H		Ground Level 130.96m Chainage 1340 Commenced 2/4/71. Completed 2/4/71.	
STRATUM. (Scale: 20mm to 1 metre)		Blow Count (N) LL/PL/PI		M.C. % Core Rec. %	
1. Thickness		Depth Sample No.		Type of Test	
				Grading % Passing Sieve	
				mm 75 40 20 10 5 mm μm μm μm μm	
				Bulk Density Kg/m <sup>3</sup>	
				Dev. Stress kN/m <sup>2</sup>	
				Lat. U.C.T. Pres. Strain kN/m <sup>2</sup> Shear % kN/m <sup>2</sup>	
				WATER REMARKS	
				10.	
TOPSOIL 0.15 0.15					
Fine light brown/blue mottled CLAY		0.50 D1 1.00 B1 1.50 U1		55.29.26. (CH) (32)	
1.85 2.00				25.9 TAQ	
Hard dark brown/blue mottled sandy stony CLAY		2.30 D2 2.50 B2 3.00 U2		37.16.21. (CI) (58)	
1.80 3.80				14.6 TAQ	
Very weathered blue shaley MUDSTONE		4.00 B3 4.50 P1*		75 for 0.240 total	
1.20 5.00				36.2	
		BOREHOLE		COMPLETED	
				Water Table Not Established	

REMARKS: * P1 Classification : 35.17.18, (CI/GI)		M.C. % D.W.		C. B. R.				COMPACTION					
Sample Depth				Air Voids		Type		TOP BOTTOM		Value	B.S. 1377 No.	Max. Dry Density	Optm. M.C.
								0.1 0.2 0.1 0.2					

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For other symbols used see overleaf



**BOREHOLE RECORD**

SN 50NE156

BOREHOLE No.  
BOREHOLE No.

8

Investigation

4717-0988

Office

SITE

A48 Trunk Road Pont Abraham - Cwmgwill

Sheet 1 of 2

Job Ref. S1 1594

Level	Samples in situ tests and coring runs		N Value or Core Recov.	Depth	Description of Strata	Reduced Level	Legend
	Depth						
	From	To					
					Metres Ordnance Datum	96.39	
					TOPSOIL		
11.1.	0.45			0.42			
11.1.	0.50	0.95				95.97	
	0.50	1.40					
	1.00						
	1.45						
	1.50	1.95			Firm becoming stiff brown and grey mottled sandy silty CLAY with rounded and sub-angular fine medium and coarse gravel, roots above about 1.9m, and rare coal fragments.		
	1.90	2.90			Becomes stiff to very stiff and grey below about 2.35m.		
	2.00						
	2.35	2.85			Sandstone boulder 4.2m - 4.4m.		
	2.90						
	3.00	3.45	47				
	3.00	3.50					
	3.50	3.95					
	4.00				(GF/CI) becoming (GF/CL)		
	4.20	4.237	75#				
	4.250	4.302	130#				
	4.400	4.458	100#				
	4.46	4.80	100% (0%)	4.40		92.19	
	4.80	4.95	100% (0%)	5.00	Slightly weathered becoming fresh at 4.5m, grey well cemented strong to moderately strong SILTSTONE laminated with silty fine sandstone and occasional layers of carbonaceous mudstone with thin partings of coal.		

GLACIAL DEPOSITS

MIDDLE COAL MEASURES

CONT.  
 Percussion 150mm  
 Silicon Mayfarer). Rotary H size  
 sh 4.45 - 9.00m. HNAF core  
 bit (Pendant attachment  
 (Hards-England 4.95 - 9.00m)

Remarks: Water struck at 4m. - see separate sheet for measurements. Standing at 0.72m on 18th, 19th, 0.73m on 20th, 0.7m on 21st Jan, at 0.6m on 9th and 10th March 78. Coring attempted at 4.2m - no progress. Rock roller used 4.2m-4.25m. Chiselled 1hr 4.25m - 4.4m. Rotary coring recommenced at 4.46m. No recovery 4.2m - 4.46m. open hole 4.95m - 5.3m - descriptions based on driller's observations.  
 Plogometer installed



SN 50 NE 103

5880.0944

GEO - RESEARCH LTD.

1":230

B/H No. 501

CONTRACT M4 PONTARDULAIS BY - PASS

SHEET No. 1

LOCATION PONTARDULAIS (SITE R21)

No. of sheets 1.

CLIENT  
WELSH OFFICE  
ROADS DIVISION

Percussion  
U  
D  
SPT  
8  
Casing  
Size to. Size to.  
0.200 5.000

Ground Level 135.08m  
chainage 1130  
Commenced 2/4/71.  
Completed 3/4/71.

Weather FINE

Rotary Cored runs O/H	M.C. % Core Rec. %	Type of Test	Grading % Passing Sieve					TRIAXIAL TEST			WATER REMARKS
			75 mm	40 mm	20 mm	10 mm	5 mm	Bulk Density Kg/m <sup>3</sup>	Dev. Stress kN/m <sup>2</sup>	Lat. U.C.T. Pres. Strain kN/m <sup>2</sup> Shear/σ <sub>v</sub> kN/m <sup>2</sup>	

STRATUM. (Scale:20mm to 1 metre)

1.	Thickness	Depth 2. m	Sample No.	Blow Count (N) LL/PL/PI
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Dark brown highly* 0.15	0.15			
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Very soft brown/blue silty CLAY.	1.85	2.00	B1	39.23.16. (CI)
	1.50			

Highly weathered laminated grey iron-stained SILTSTONE.	2.50		P1	75 for 0.300 total
	3.00		B3	
	3.50		P2	75 for 0.250 total
	4.00		B4	
	4.50		P3	75 for 0.230 total
3.00	5.00			



6.	7.	8 Results of any other Tests
	SO <sub>v</sub> 3	5.49 pH 6.00
	17.6	6.9

8 Results of any other Tests

10

WS @ 1.000  
SWL 1.000  
WL - 1.000

2/4/71  
PH. 4.0  
CaS  
SWL

3/4/71  
Water Sample  
@ Ground Level  
OCW @ 1.000  
CaS @ 5.000  
Water Standin.  
@ Ground Level  
OCW

BOREHOLE

COMPLETED

REMARKS:

\* organic TOPSOIL.

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Sample	Depth m	M.C. % D.W.	C. B. R.				Value	COMPACTION	
			Air Voids	Type	TOP			B.S. 1377 No.	Comp. M.C.
					0.1	0.2			

For other symbols used see overleaf