

**Environmental  
Geotechnical  
Specialists**



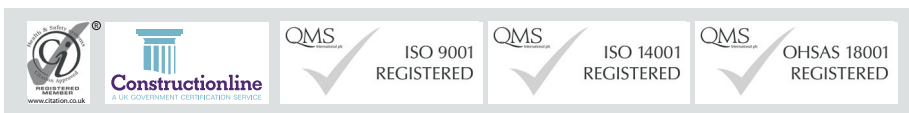
# GEOLOGICAL REPORT

job number	date
site address	
written by	
checked by	
issued by	

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GEO-TECH-NI-CAL  
ENV-I-RON-MEN-TAL





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# Report on a Coal Mining Risk Assessment

Location: St Marys Primary School,  
Upton Street, Batley, WF17 8PH

For: Diocese of Leeds

Consultant: AHR

Report No. J4357/18/E/CRA

Report date: August 2018

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

**Redacted**

**Redacted**

**Imran Sakoor** BEng FGS  
Geo-environmental Engineer

**Steve Rogers** CEng CGeol MICE MCIHT FGS ACIEH  
Technical Director

## 1. Introduction

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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

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

- British Geological Survey map sheet<sup>1</sup>.
- British Geological Survey *Geology of Britain Viewer*<sup>2</sup>.
- Consultants Coal Mining Report<sup>3</sup>.
- British Geological Survey *Borehole Records*<sup>4</sup>.

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<sup>1</sup> Sources: British Geological Survey (NERC) Map Sheet 77 ; Huddersfield Solid and Drift Edition

<sup>2</sup> Sources: British Geological Survey (NERC) Geology of Britain Viewer [*online resource from [www.bgs.ac.uk](http://www.bgs.ac.uk)*]

<sup>3</sup> Coal Authority Reference: 51001900408001 dated 23<sup>rd</sup> August 2018.

<sup>4</sup> 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:

<b>Table 1: Geological Data for the Site</b>			
Strata Type	Strata Name <sup>5</sup>	Previous Name <sup>6</sup>	Description <sup>6</sup>
Superficial Geology			None recorded.
Solid Geology	Emley Rock	-	The Emley Rock is a named sandstone unit of the Pennine Lower Coal Measures Formation and comprises a fine grained flaggy sandstone with mudstone partings.

On the geological map, deposits of alluvium are indicated to be present approximately 170m to the northeast of the site.

There are three coal seams that are shown to outcrop within the local area. These seams are summarised as follows:

<b>Table 2: Summary of coal seams within the vicinity of the site.</b>			
Seam Name	Seam thickness <sup>5*</sup>	Outcrop distance from site <sup>5*</sup>	Anticipated depth below site
Flockton Thick Coal (FK)	0.3m - 1.5m	70m SW 345m NE	Not anticipated to be present below the site.
Flockton Thin Coal (FN)	0.3m - 1.4m	90m N 310m NE	Within 20m of the site surface.
Joan Coal (J)	0.6m - 1.3m	230m SW 390m NE	Not anticipated to be present below the site.

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

The site is located between the outcrops of the Flockton Thin Coal to the north and Flockton Thick coal seam to the south. South of the Flockton Thick coal seam, the outcrop of the Joan coal is shown with undifferentiated strata of the Pennine Middle Coal Measures Formation present beyond. It should be noted that the site forms part of a valley as the outcrops of both the Flockton coal seams curve around and are present north of the alluvium deposits noted above. The outcrop patterns are repeated on the northern side of the valley.

With respect to the generalised vertical section on the geological map, the site is situated on the Emley Rock, which is stratigraphically below both the Joan coal and the Flockton Thick coal seam, but above the Flockton Thin Coal seam. Therefore, the Flockton Thin Coal seam could be present within 15m of the site surface. The next coal seam in the sequence is the First Brown Metal Coal seam, which is indicated to be 10m below the

<sup>5</sup> 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](http://www.bgs.ac.uk)]

<sup>6</sup> Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from [www.bgs.ac.uk](http://www.bgs.ac.uk)]

Flockton Thin Coal seam. Further coal seams are likely to be in excess of 30m depth from the site surface.

## 2.2 Consultants Coal Mining 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:

<b>Table 3: Summary of the Consultants Coal Mining Report</b>	
<b>Mining Feature</b>	<b>Comments</b>
Past Underground Coal Mining	No past mining recorded.
Probable Unrecorded Shallow Workings	Yes.
Spine Roadways at Shallow Depth	No spine roadways recorded at shallow depth.
Mine Entries	None recorded within 100m of enquiry boundary.
Outcrops	No outcrops recorded on site.
Geological Faults/Fissures and Breaklines	No faults, fissure or breaklines recorded.
Opencast Mines	None recorded within 500m of enquiry boundary.
Coal Authority Manged Tips	None recorded within 500m of enquiry boundary.
Site Investigations	None recorded within 500m of enquiry boundary.
Remediated Sites	None recorded within 500m of enquiry boundary.
Coal Mining Subsidence	The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m, since 31 <sup>st</sup> 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.
Mine Gas	None recorded within 500m of enquiry boundary.
Mine Water Treatment Schemes	None recorded within 500m of enquiry boundary.

## 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<sup>7</sup>. 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
SE22SW328	20m N	13.1	Sandstone present to 10.7m depth, over loose material to 11.9m below ground level.
SE22SW337	20m N	13.4	Sandstone present to 11m, over loose material to 11.9m depth.
SE22SW394	344m SE	10.67	Loose material encountered between 5.7m and 7m depth. Underlain by 0.3m band of fireclay.
SE22SW397	360m SE	12.19	Mudstone present to 9m depth. Loose material present to 10.4m depth, over fireclay to 10.7m bgl.
SE22SW399	360m SE	10.67	Sandstone present to 2.75m over mudstone to 7.5m depth. Coal (0.6m thick) encountered at 8.1m depth. Underlain by 0.3m thick fireclay.

It should be appreciated that the boreholes SE22SW328 and SE22SW337, indicate sandstone to be present to around 11m depth, with loose material present to 11.9m below ground level. According to the geological maps, these boreholes are underlain by the Emley Rock, which is up to 12m thick, and are located between the outcrops of the Flockton Thick and Flockton Thin coal seams. On this basis, the thickness of the sandstone correlates with the information from the generalised vertical section on the geological map regarding the Emley Rock (0 to 12m). The underlying loose material could represent workings within the Flockton Thin Coal seam.

Loose material was also encountered within boreholes SE22SW394 and SE22SW397. Whilst loose material was not revealed in SE22SW399, a 0.6m thick coal seam was revealed at 8.1m depth. It should be noted that fireclay was encountered in all three of these boreholes beneath the loose material and coal seam. Therefore, it is conjectured that these features represent workings within the Flockton Thin coal seam. In addition, on the log for borehole SE22SW399, 'ER' has been initialled adjacent to the sandstone present to 2.75m and 'FN' labelled next to the coal seam at 8.1m depth. These are likely to represent the Emley Rock and the Flockton Thin Coal seam. On this basis, it is likely that the loose material recorded within the boreholes represent workings within the Flockton Thin Coal seam.

### 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	Flockton Thin Coal (FN)	Moderate
		First Brown Metal Coal (1BM)	Low to moderate
2	Coal workings at depth	Second Brown Metal Coal (2BM) and deeper seams.	Low

On the basis of all of the information provided above, two coal seams are anticipated to be present within 30m of the surface at the site. Whilst these seams may be of limited thickness, the possibility of these seams being worked below the site cannot be ruled out. Nearby BGS boreholes indicate potential workings, 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 seams, the table below suggests the thickness of competent overburden required above each 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.
Flockton Thin Coal (FN)	0.3 – 1.4	Within 15m	15.4m
First Brown Metal Coal (1BM)	0.0 – 0.8	25m	8.80m

Based on the above information, it is considered that there will not be a sufficient thickness of competent overburden above the shallowest seam in order to prevent the risk of instability posed by the presence of any 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. However, based on its anticipated depth below ground level, there may be a sufficient thickness of competent overburden above the First Brown Metal Coal such that the risk from the collapse of workings is low. Nevertheless, it is strongly recommended that the true thickness and depth of this seam is investigated to validate this opinion. Therefore, a low to moderate risk rating has been assigned to this seam.

In regard to deeper mining which could affect the site, it is considered that sufficient thickness competent of competent cover will be present, in order to mitigate the risk of surface instability as a result of collapsed workings.

## 4. Conclusions

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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, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the shallow seams are un-worked or have sufficient competent cover. It may therefore be possible, in the first instance, to undertake one borehole to 30m below the top of the rockhead, with the remaining boreholes proving the depth and continuity of the coal seam(s). 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.

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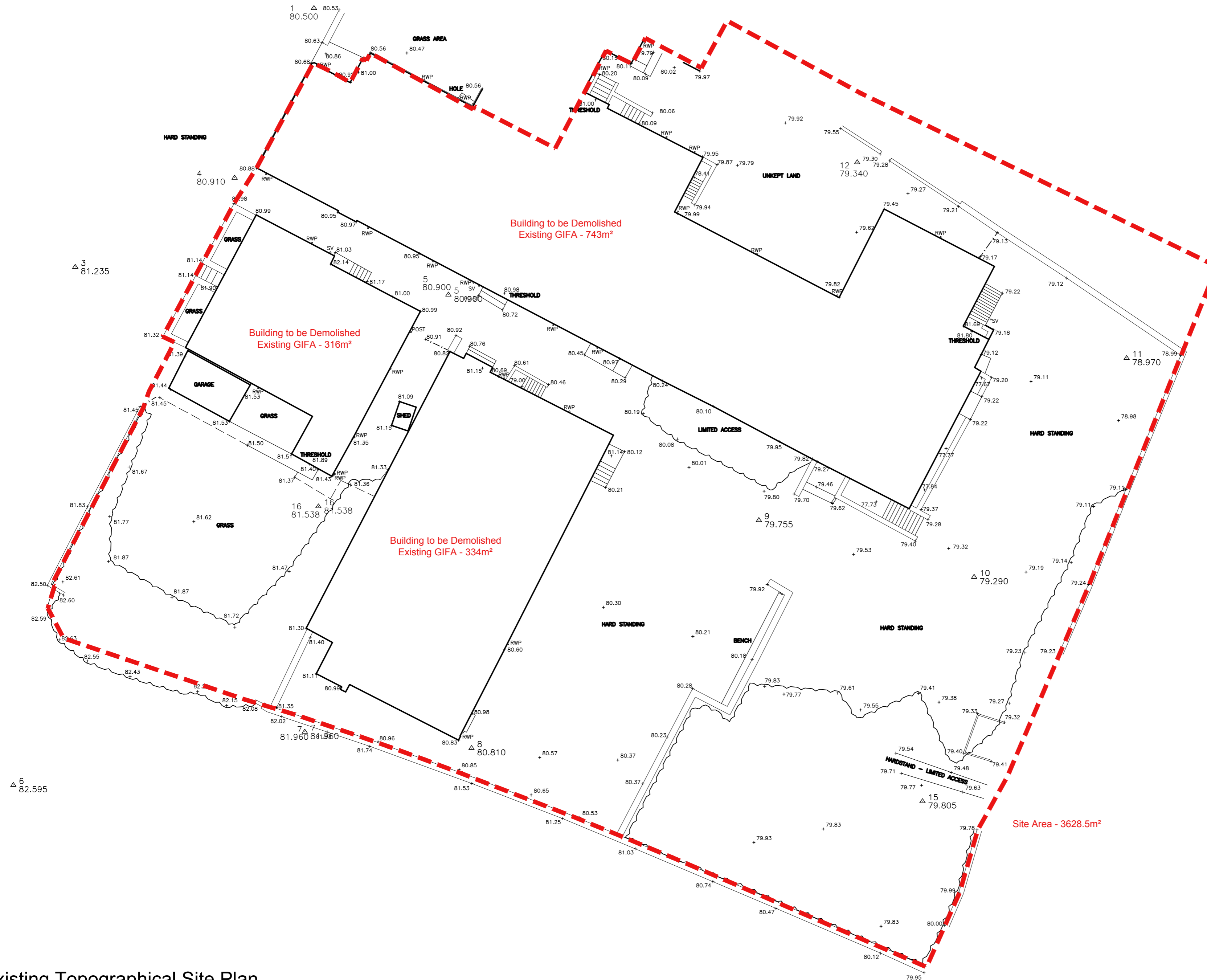
## **Appendix 1**

### **Site Plan**

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**Notes**

THIS DRAWING READ IN CONJUNCTION WITH :



**Existing Topographical Site Plan**

Scale 1:200 @ A2

Rev	Description	Date	Dr by	App by
original				
1		July 18		KD



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www.ahr-global.com

client  
**The Diocese of Leeds**

project  
**St Mary's School, Batley  
Demolition of Old School 2016**

drawing  
**Existing Site Plan**

Project number	Scale	
2016.0001.005	As Shown @A2	
Drawing number	Rev	Issue status
PL_002	-	Planning

This drawing is to be read in conjunction with all related drawings. All dimensions must be checked and verified on site before commencing any work or producing shop drawings. The originator should be notified immediately of any discrepancy. This drawing is copyright and remains the property of AHR.

# Notes

THIS DRAWING READ IN CONJUNCTION WITH :



## Proposed Site Plan

Scale 1:200 @ A2

Rev	Description	Date	Dr by	App by
original				
1		July 18		KD

**AHR** AMR Building Consultancy Ltd  
 Norwich Union House  
 High Street  
 Huddersfield  
 HD1 2LF  
 United Kingdom

T +44(0)1484 537411  
 F +44(0)1484 530332  
 E huddersfield@ahr-global.com  
 www.ahr-global.com

client  
**The Diocese of Leeds**

project  
**St Mary's School, Batley  
 Demolition of Old School 2016**

drawing  
**Proposed Site Plan**

Project number	Scale	
2016.00001.005	As Shown @A2	
Drawing number	Rev	Issue status
PL_003	-	Planning

This drawing is to be read in conjunction with all related drawings. All dimensions must be checked and verified on site before commencing any work or producing shop drawings. The originator should be notified immediately of any discrepancy. This drawing is copyright and remains the property of AHR.

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**Appendix 2**  
**Coal Authority Report**

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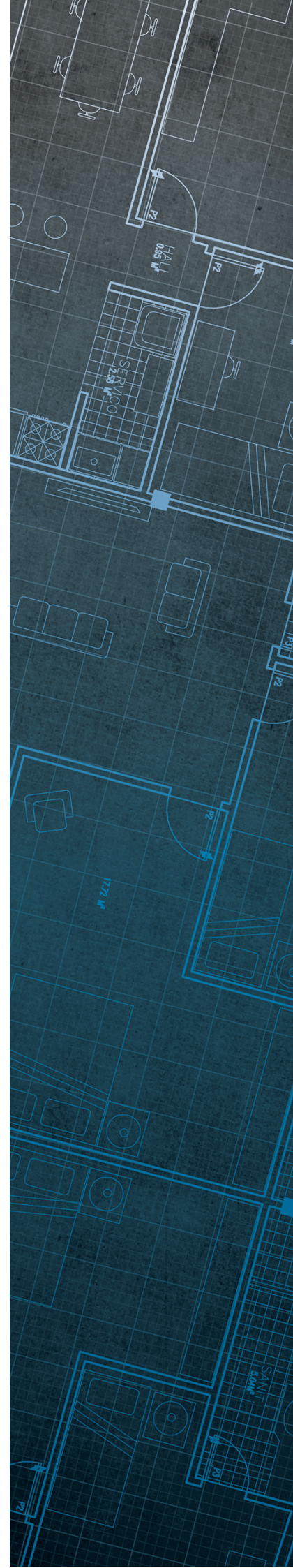
The Coal  
Authority

# Consultants Coal Mining Report

St Marys Catholic Primary School  
Upton Street  
Carlinghow  
Batley  
Kirklees  
WF17 8PH

Date of enquiry: 23 August 2018  
Date enquiry received: 23 August 2018  
Issue date: 23 August 2018

Our reference: 51001900408001  
Your reference: J4357/18/E/CRA



# Consultants

# Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

## Client name

ROGERS GEOTECHNICAL SERVICES LTD

## Enquiry address

St Marys Catholic Primary School  
Upton Street  
Carlinghow  
Batley  
Kirklees  
WF17 8PH


## How to contact us


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

200 Lichfield Lane  
Mansfield  
Nottinghamshire  
NG18 4RG

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

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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# Section 1 – Mining activity and geology

## Past underground mining

No past mining recorded.

## Probable unrecorded shallow workings

Yes.

## Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

## Mine entries

None recorded within 100 metres of the enquiry boundary.

## Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

1478	12673	8420
PO0	FGB759	12675
3335		

**Please contact us on 0345 762 6848** to determine the exact abandoned mine plans you require based on your needs.

## Outcrops

No outcrops recorded.

## Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

## Opencast mines

None recorded within 500 metres of the enquiry boundary.

## Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

## Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

### Site investigations

None recorded within 50 metres of the enquiry boundary.

### Remediated sites

None recorded within 50 metres of the enquiry boundary.

### 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.

### Mine gas

None recorded within 500 metres of the enquiry boundary.

### Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

## Section 3 – Licensing and future mining activity

### Future underground mining

None recorded.

### Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

### Court orders

None recorded.

### Section 46 notices

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

### Withdrawal of support notices

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.

### 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.

## Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

## Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at [groundstability@coal.gov.uk](mailto:groundstability@coal.gov.uk)**.

### Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

### Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

### Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

### Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

### Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

### Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

### Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

### **Opencast mines**

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

### **Coal Authority managed tips**

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

### **Site investigations**

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

### **Remediated sites**

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

### **Coal mining subsidence**

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

### **Mine gas**

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

### **Mine water treatment schemes**

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

### **Future underground mining**

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

### **Coal mining licensing**

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

### **Court orders**

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

### **Section 46 notices**

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

### **Withdrawal of support notices**

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

### **Payment to owners of former copyhold land**

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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## VAT receipt

<b>Issued by</b>	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
<b>Tax point date</b>	23 August 2018
<b>Issued to</b>	ROGERS GEOTECHNICAL SERVICES LTD BARNCLIFFE MILLS NEAR BANK SHELLEY HUDDERSFIELD KIRKLEES HD8 8LU
<b>Property search for</b>	ST MARYS CATHOLIC PRIMARY SCHOOL UPTON STREET CARLINGHOW BATLEY KIRKLEES WF17 8PH
<b>Reference number</b>	51001900408001
<b>Date of issue</b>	23 August 2018
<b>Cost</b>	£106.79
<b>VAT @ 20%</b>	£21.36
<b>Total received</b>	£128.15
<b>VAT registration</b>	598 5850 68



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## **Appendix 3**

### **BGS Borehole Records**

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# HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS115SX.

2407 2447  
SE22SW 399

Contract No. L4331/F1684

Location Batley C of E School

Client WEST RIDING COUNTY ARCHITECT

Borehole No. 11

Ground Level

Date

## BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	$\sigma$ lb/in <sup>2</sup>	$\phi$ deg	m.c. %	$\gamma$ lb/cu. ft.	N
MADE GROUND:- Ash		5'0"	5'0"	2'6" 5'0"					22
Light brown clay with sandstone fragments		7'6"	2'6"	7'6"					32
Brown weathered sandstone		9'0"	1'6"	I					196
Mudstone									
				15'6"					
				24'6"					
Coal		26'6"	2'0"						
Fireclay		27'6"	1'0"						
Mudstone				7'6"					
				35'0"					

ER

FN

Water Struck at None Encountered

Maximum Observed Water Level

Undisturbed Sample [ ]  
Disturbed Sample o  
Water Sample  $\Delta$   
Penetration Test I

c = Cohesion  
 $\phi$  = Angle of Internal Friction  
m.c. = Moisture Content  
 $\gamma$  = Bulk Density  
N = Standard Penetration Value

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



# HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS115SX.

2403 2444  
SG22SW 394

Contract No. L4331/P1684

Location Batley C of E School

Client WEST RIDING COUNTY ARCHITECT

Borehole No. 6

Ground Level

Date

## BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/in	φ deg	m.c. %	γ lb/cu. ft.	N
MADE GROUND:- Clay, mudstone and silt		4'6"	4'6"	2'6" I					5
Dark brown clay		8'0"	3'6"	5'0" □	5.4	0	39.0	111	30 94 for 12"
Soft clay and sandstone fragments		9'6"	1'6"	8'0" I					
Mudstone weathered at upper levels		19'0"	9'6"	9'6" I					
Loose material		23'0"	4'0"						
Fireclay		24'0"	1'0"						
Mudstone		35'0"	11'0"						

Water Struck at **None Encountered**

Maximum Observed Water Level

Undisturbed Sample □  
Disturbed Sample ○  
Water Sample Δ  
Penetration Test

c = Cohesion  
φ = Angle of Internal Friction  
m.c. = Moisture Content  
γ = Bulk Density  
N = Standard Penetration Value

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

# HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS115SX.

SE22SW 337

Contract No. SI0082/F1930

Borehole No. 11

Location Batlèy R.C. Junior School

Ground Level

Client WEST RIDING COUNTY ARCHITECT

Date

## BOREHOLE LOG

2367 2454

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c	φ	m.c.	y	N
					lb/in <sup>2</sup>	deg	%	lb/cu. ft.	
MADE GROUND:- Brick rubble			6'0"						
Firm brown stony sandy clay		6'0"	4'0"						
Brown sandstone Weathered at upper levels		10'0"	15'0"						
Grey sandstone		25'0"	11'0"						
Loose material		36'0"	3'0"						
Grey sandstone		39'0"	5'0"						
		44'0"							

Water Struck at None Encountered

Maximum Observed Water Level

Undisturbed Sample [ ]  
Disturbed Sample o  
Water Sample Δ  
Penetration Test I

c = Cohesion  
φ = Angle of Internal Friction  
m.c = Moisture Content  
y = Bulk Density  
N = Standard Penetration Value

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

# HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS115SX.

SE22SW 328

Contract No. SI0082/F1930

Location Batley R.C. Junior School

Client WEST RIDING COUNTY ARCHITECT

Borehole No. 2

Ground Level

Date

2367 2457

## BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	$\sigma$ lb/in <sup>2</sup>	$\alpha$ deg	m.c. %	$\gamma$ lb/cu. ft.	N
Made ground:- Ash, brick and sandstone		3'9"	3'9"	2'0" I					7
Weathered brown sandstone		10'0"	6'3"	5'0" I 7'0" I					115 127
Brown sandstone Weathered at upper levels		25'0"	15'0"						
Grey sandstone		35'0"	10'0"						
Loose material		39'0"	4'0"						
Light grey sandstone with coal traces		43'0"	4'0"						

Water Struck at None Encountered

Maximum Observed Water Level

Undisturbed Sample ( )  
Disturbed Sample o  
Water Sample  $\Delta$   
Penetration Test I

c = Cohesion  
 $\alpha$  = Angle of Internal Friction  
m.c. = Moisture Content  
 $\gamma$  = Bulk Density  
N = Standard Penetration Value

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