



Rotary Borehole Site Investigation Report

LOCATION	Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE
ISSUE DATE	14 September 2021
FOR	Alan Hayden
CLIENT REF.	
OUR REF.	G21331

Prepared by

Checked by

Ross Nicolson BSc(Hons) MSc(Eng) CEng MIMMM
Principal Geotechnical Engineer

Stuart Howe BSc(Hons) FGS
Senior Geo-environmental Engineer

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Units 3a and 4 Terry Dicken Industrial Estate
 Ellerbeck Way
 Stokesley
 North Yorkshire
 TS9 7AE

Tel. 01642 713779

Fax 01642713923

Email enquiries@geoinvestigate.co.uk

1. Introduction

In accordance with your instruction, Geoinvestigate Ltd carried out a rotary borehole site investigation at Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE on 9th September 2021. The drilling investigation follows on from a CMRA report (our ref. G21288) issued on 22nd July 2021 by Geoinvestigate.

Geoinvestigate's CMRA report is not included in the drilling report.

The approximate centre of the site is at National Grid Reference E413790, N414746. The site is located on a platform at the foot of a wooded slope/hillside rising to the east towards Close Hill Lane. The approximate ground level at the new building is 122m AOD. Two old stone (drystone) walls and a public footpath are present between the site and the wooded slope.

It is proposed to erect 2 single-storey modular classroom units at the site. The building perimeter is shown on the site layout plan presented in Appendix 1 & 4. The plan shows the 8m departure/positional uncertainty radius of Coal Authority mine adit entrance 413414-001 and its alignment. The adit trends southeast into the hillside. The possible zone of influence (ZOI) of the adit is shown on the plan. The ZOI of this mine entry potentially encroaches within the footprint of the nearest of the two classrooms.

According to the plan, the outcrop of the Soft Bed Coal seam lies some 10m to the SE of the adit entrance and therefore, perhaps a little upslope of the site beneath the wooded slope.

Geoinvestigate's CMRA identified a possible mine entry ground stability hazard to the nearest proposed classroom building and perhaps a mine gas hazard.

The purpose of the drilling investigation was to locate the mine entry and to establish whether it poses a ground stability risk to the new development.

2. Previous CMRA Report.

Geoinvestigate's CMRA report suggested the adit entrance might lie further to the east of the new development.

The CMRA report suggested the entrance lay at the SE end of a shallow approach cut for a tramway.

In addition, Geoinvestigate's review of the OS map record suggests that the position of the adit entrance could perhaps be reasonably and accurately inferred from the location of two old walls shown on the map extract of 1887 provided in Appendix 2. In our opinion, these conspicuous/odd walls, which are aligned NW-SE and follow the line of a coal tramway into the adit, are possibly wing walls on either side of a cutting. The tramway is shown on an older faint map extract leading NW to a mine spoil heap. The walls are no longer present at the site.

In our opinion, the existing old public footpath and its two further walls running SW-NE on the site boundary lies over or very close to the entrance of the adit.

Site images provided by the client prior to the drilling works suggested there might be some subsidence damage to the footpath walls, but this was unclear. Geoinvestigate subsequent site visit confirmed that there might indeed be wall subsidence at this point.

The extract of the CAs online interactive mining information provided in Appendix 3 suggests the Soft Bed Coal outcrop and mine working/seam extraction commenced within the adit a little to the east of the entrance, providing additional evidence that the entrance was a little further east. Therefore, the Soft Bed Coal seam and working within are absent beneath the development area both occurring a little higher up the slope to the east of the building area.

So, if Geoinvestigate's initial observations are correct, neither coal seam, shallow mine working nor underground mine adit tunnel would be encountered within the proposed development area.

The purpose of the drilling investigation was to confirm this conceptual model.

3. Intrusive Investigation

3.1 Scope of Works

The intrusive mine working investigation comprised the following components

- The sinking of ten (10) boreholes (RH1 - RH10) to depths of 10m with supervision of the drilling works by a competent and experienced geotechnician driller, Anthony Montgomery and principal geotechnical engineer Ross Nicolson.
- The boreholes were rapidly driven to depth using Geoinvestigate's proprietary, safe, environmentally friendly, high-speed, small volume water injection Microdrilling system.
- Provision of an interpretative report including site plan and borehole logs.

Microdrill's small volume water injection system offers a faster and safer method of investigating coal mine workings, minimising the risk of combustion or explosion of coal and mine gases and the migration of hazardous gases into nearby buildings. It's small diameter and low energy rotary drilling action also reduces the risk of causing mine roof collapse, and over-estimating mine void thickness and the extent of upward void migration.

Gas monitoring was carried out during drilling. Concentrations of Oxygen (O₂) and potentially toxic and explosive levels of Carbon Dioxide (CO₂) Methane (CH₄) & Carbon Monoxide (CO) gases were measured. However, NO hazardous gas levels were detected during drilling.

A borehole location plan and images of the drilling works are provided in Appendix 4.

The ground conditions encountered in the boreholes (as described by the geotechnician driller) are recorded on the borehole logs provided in Appendix 5.

As the CA online interactive map service provided an assumed adit width of 2m, the initial borehole spacing was 1m between RH1, 2 & 3 increasing to 1.3m between RH1, 4 - 10 approaching the building area and within it.

The current report focuses only on the mining situation beneath the site. It does not deal with the condition of the surface drift horizon (natural and made ground soils) that cover the site, and which may also impact foundation design.

The drilling investigation was carried out under Coal Authority's drill permit No 22729 included in Appendix 6.

3.2 Drilling Method

The condition of the ground with regard to strength and rock type was assessed by the drillers using the variations in drilling progress, drilling flush pressure, "feel", and the nature of the arisings (drill debris) returned to surface in the water flush and whether the flush itself was returned. No rock cores were recovered from the boreholes.

The primary purpose of the boreholes in this investigation was to identify variations in rock strength and rock type and to highlight possible geotechnical hazards such as voids or broken / weak strata indicative of mine working disturbance or upward mine-void migration.

The borehole purpose was also to locate the depth of the drift/bedrock boundary. It was also envisaged that drilling might establish where the speculated approach cutting to the mine adit entrance was positioned and whether a section of adit tunnel underlay the footprint of the proposed building area.

4. Encountered Ground Conditions

The boreholes encountered broadly similar ground conditions.

Drift/bedrock depth was encountered near surface between depths of 2.90m to 3.60m. Given the lower sensitivity of the drilling method to changes in weathered bedrock strength this variation is not unexpected and in our opinion is not significant at this site.

All the boreholes encountered mostly sandstone corresponding with the Soft Bed Flags to termination depth at 10m. According to the geology column, the Soft Bed Flags underlie the Soft Bed Coal, and the former may attain a thickness of up to 25m.

No coal voids or mine workings were encountered in the boreholes confirming that the Soft Bed Coal horizon is absent below the development area and rather this coal horizon occurs below the lower wooded slope section and to the east of the site.

According to the driller, the drift in RH1 was different than elsewhere in that it was darker and more greyish perhaps mostly comprising made ground, possibly corresponding with the grey ashy fill exposed in the trial pit located between RH1 and the boundary wall to locate buried BT services as shown by the image in Appendix 7. The change to orangish brown drift seen in other holes was not present in RH1

The change to orangish brown drift may indicate the presence of natural drift rather than made ground.

Drilling flush was lost in only one-hole (RH3) in coarse cobbly drift.

No hazardous concentrations of mine gases were encountered in the boreholes during drilling.

5. Footpath Wall

Images of the footpath wall opposite RH1 are included in Appendix 8 though not in good condition and both old drystone walls on either side of the public footpath perhaps show sag and subsidence over a 2m length opposite RH1. In our opinion, this may be due to the settlement of deeper cutting infill at the tunnel entrance at this point. However, this is speculation.

However, if so, the adit entrance lies either beneath the footpath or in our opinion more likely several metres to the east of the public footpath and outwith the site boundary. In our opinion, the footpath walls which are a later addition to the slope are unlikely to be located over the top of the adit, but it is possible. The other mining geology information on outcrop position and the underground working limit showing these occur to the east of the site boundary fits with this explanation.

While the evidence is not conclusive, the ten drill holes including the seven sunk within the footprint of the closer classroom unit confirms that no mine tunnels/adit are present beneath this area.

The previous CMRA report and the current drilling investigation has confirmed that no seam mine workings occur within very shallow (< 10m) depth or probably shallow depth (< 30m) below the site.

6 Mine Gas

With regard to mine gas risk, the previous CMRA report states: – *“No mine gas incident or remediation is recorded within 500m of the proposed development and typically, in the UK mine gas is Low risk. Notwithstanding, given the possible presence of a gas pathway provided by a very shallow mine adit and the serious nature of mine gas it is recommended that the risk is raised to **MODERATE** to perhaps High until proven otherwise by gas testing during drilling. Because of the presence of a mine adit longer term gas monitoring may be required in this instance”.*

The drilling investigation has confirmed that the site is not underlain by seam mine working or mine adit. This and the favourable gas monitoring results are encouraging indicating that there is unlikely to be a mine gas problem at this locality. Neither it is understood has there been a reported mine gas incident on the adjacent College property.

Notwithstanding due to the difficulties in identifying coal related gas hazards, it may be prudent as a precaution to adopt basic gas protection measures within the foundation design, which are resistant to permanent gases (carbon dioxide, methane, carbon monoxide) and comparable to that suggested in BR211, as commonly used to protect against radon in residential properties.

Alternatively, if consideration is to be given to avoiding gas measures it is our opinion that in this instance longer term gas monitoring in specially installed gas wells would be required extending to a minimum period of 6 weeks.

7 Conclusions

The drilling investigation has confirmed that no mine workings or mine adit tunnel exists beneath the proposed building area.

In our opinion, the adit entrance lies several metres to the south of the nearest corner of the closest of the two new buildings, this corresponds with localised sagging and distortion of the existing footpath walls on the site boundary.

A possible infilled/buried adit approach cutting perhaps extending to a depth of 2.90m at the site boundary lies close to the west side of the closer of the two classrooms.

Therefore, the closer of the two classrooms does not need to be relocated (as previously suggested in the CMRA report) nor does the ground below it, require mine void treatment by grouting.

However, it may be prudent to locally extend foundations at the south corner of this building deeper into natural drift, perhaps approaching the invert/floor of the adit entrance or its approach cutting which borehole RH1 suggests may lie within sandstone at approx. 2.90m at this point.

The second classroom unit which is distant from the adit does not require any similar foundation measures but should be founded on natural drift below any fill materials that may exist at this location.

The shallower founding conditions of the drift horizon/s above bedrock is unknown. While the upper drift darker horizon may comprise weaker heterogenous mine spoil material, the lower orangish natural ground may be more competent homogenous and reliable in its bearing characteristics. The exact depth of the commencement of the natural drift horizon is uncertain within the building area and foundation depth may have to be adjusted during excavation under a watching brief arrangement with a competent person.

Foundations adjacent to the wooded slope may require to be deepened to avoid ground movements arising from root influence.

With regard to mine gas hazard while the risk is expected to be low, it is our opinion that precautionary basic gas protection measures should be included within the foundation design of both buildings unless longer term gas monitoring in specially installed gas wells shows this to be unnecessary.

END OF REPORT



Units 3a and 4 Terry Dicken Industrial Estate
Ellerbeck Way
Stokesley
North Yorkshire
TS9 7AE

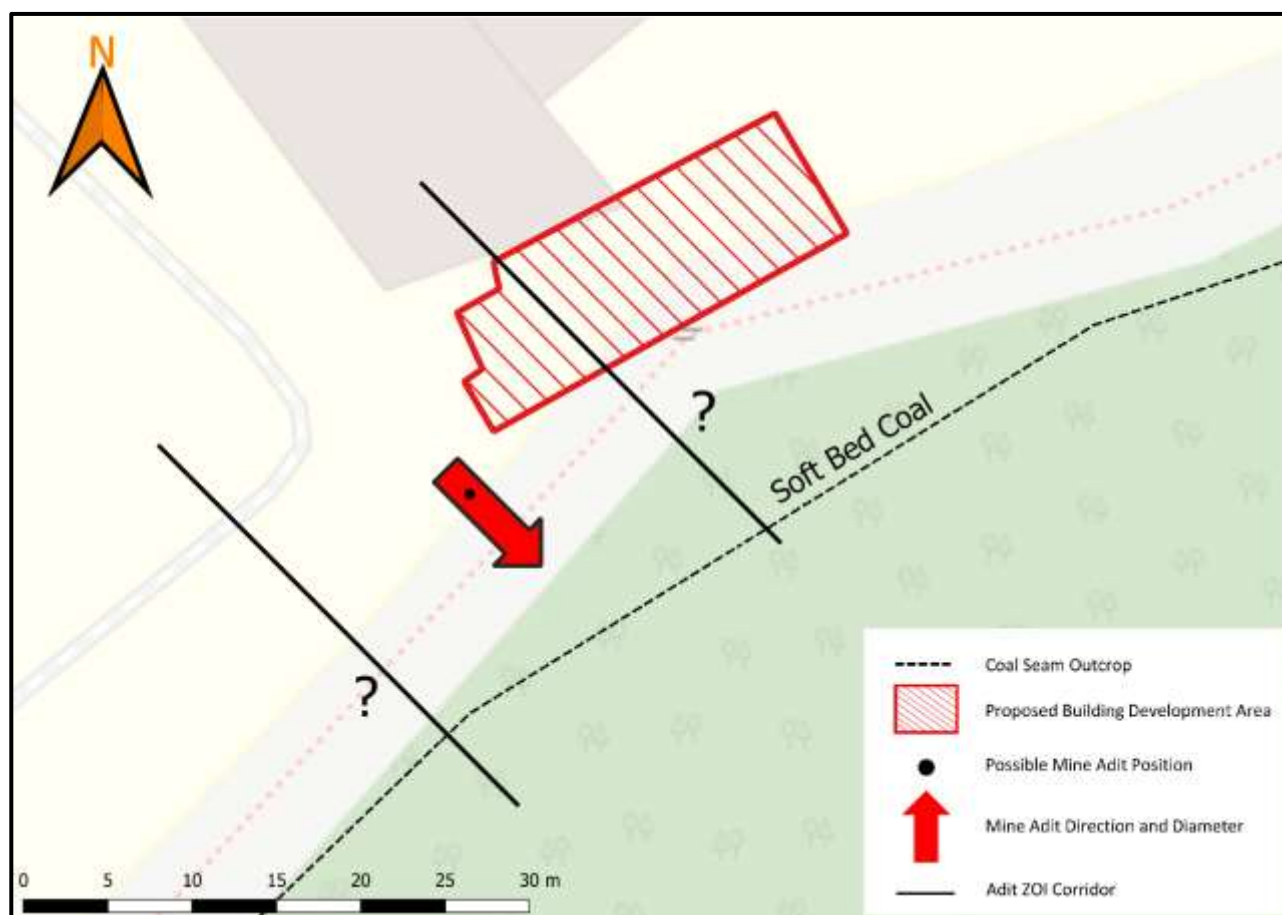
Tel. 01642 713779

Fax 01642713923

Email enquiries@geoinvestigate.co.uk

APPENDIX 1

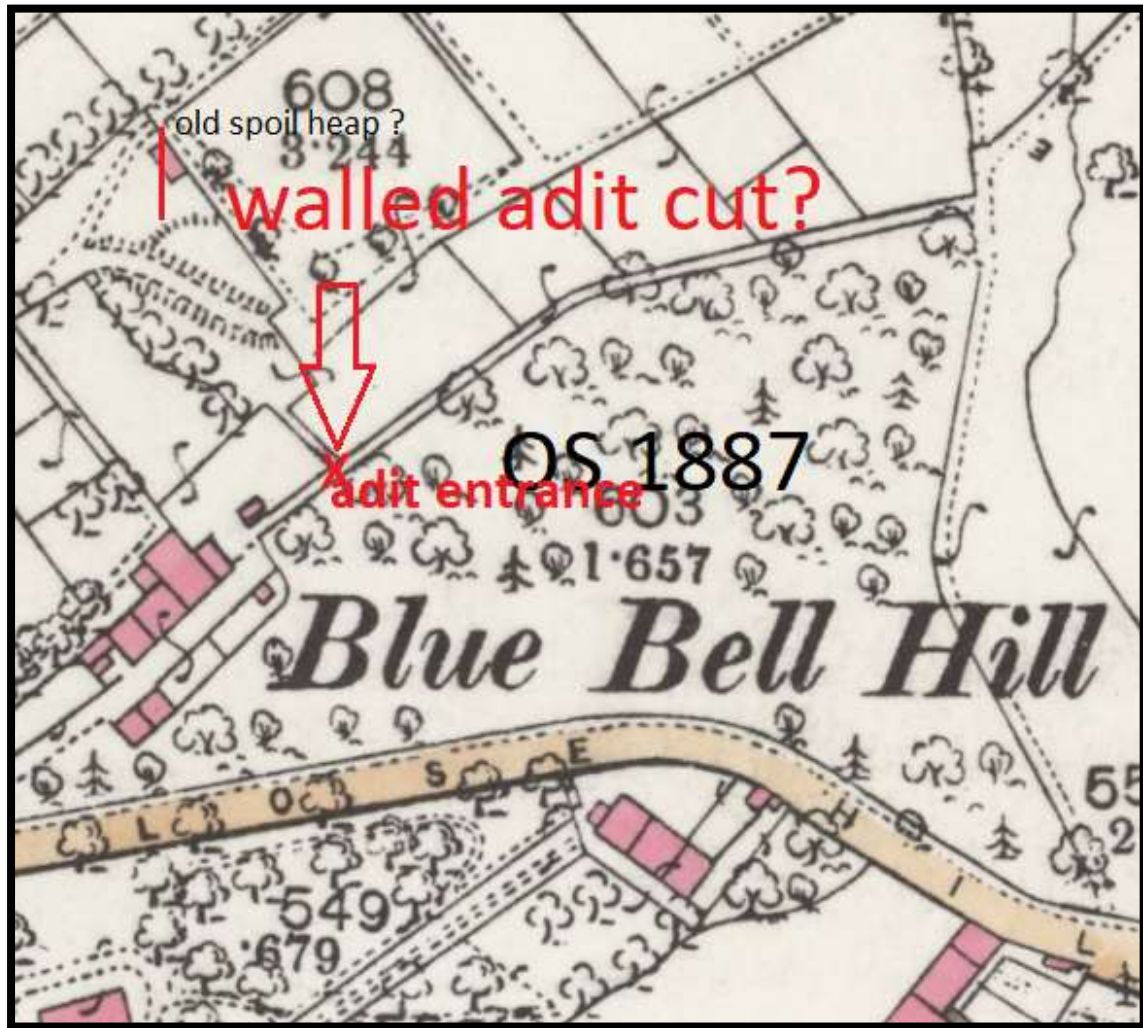
SITE LAYOUT & POTENTIAL MINE ADIT ZOI CORRIDOR



APPENDIX 2

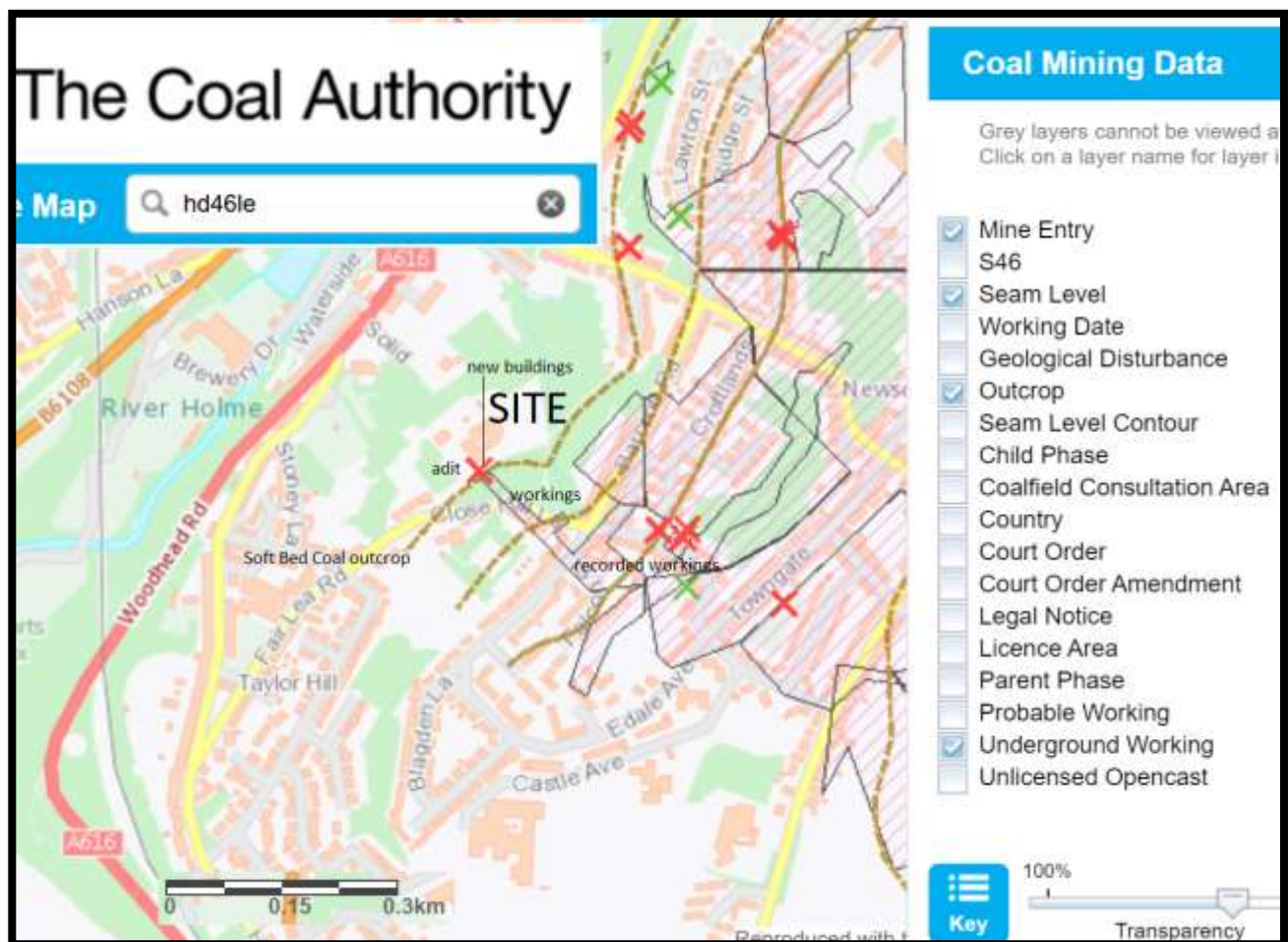
HISTORICAL OS MAPS





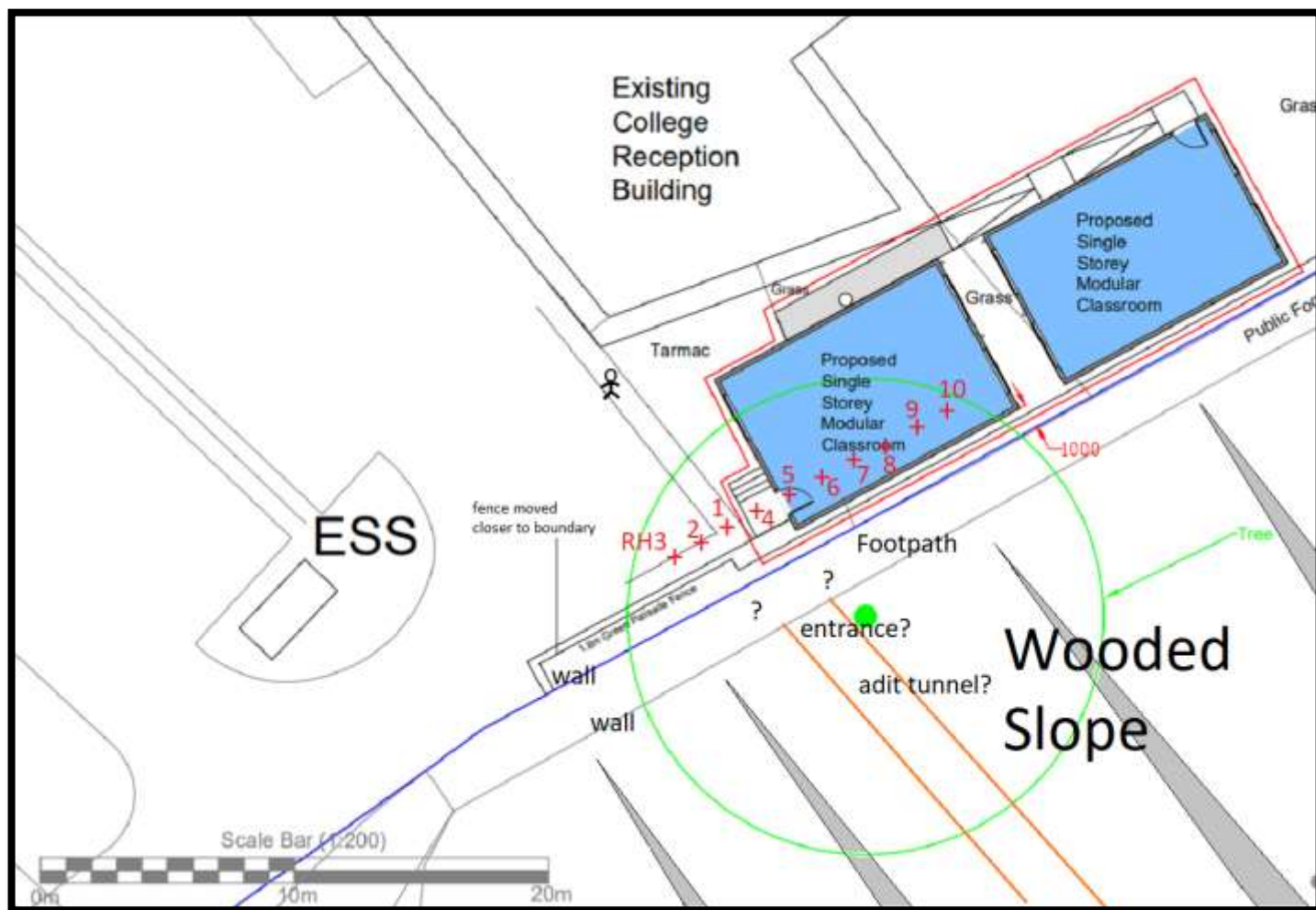
APPENDIX 3

EXTRACT CA ONLINE INTERACTIVE MAP



APPENDIX 4

Building layout, borehole positions & images







APPENDIX 5

BOREHOLE RECORDS

GEOINVESTIGATE Ltd.

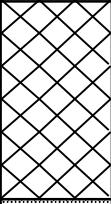
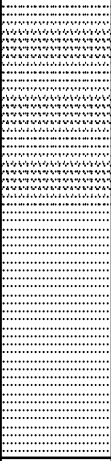
Your Ref.

Our Ref. G21331

RH No.1 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
2.90	TARMAC / Dark brown DRIFT. Possible buried approach cut to adit entrance?	2900							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.70m	7100							5.00
									7.50
							Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

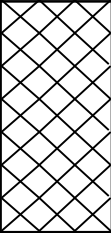
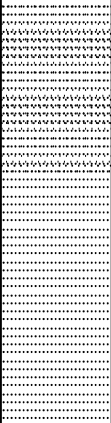
Your Ref.

Our Ref. G21331

RH No.2 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.60	TARMAC / brown DRIFT. Becoming orangish brown from 1.40m	3600							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.50m Becoming light brown from 9.10m	6400							5.00 7.50
	Rotary hole terminated at 10.00m						Full Flush		10.00

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH2

GEOINVESTIGATE Ltd.

Your Ref.

Our Ref. G21331

RH No.3 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.60	TARMAC / brown DRIFT. Many cobbles. Becoming orangish brown	3600					Lost flush at 1.70m		2.50
10.0	SANDSTONE. Occasional MUDSTONE inclusions noted from 7.50m	6400							5.00 7.50 10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m
Microdrill rotary open hole borehole to 10m
No cores recovered from borehole
No gas detected from borehole on completion
Flush lost at 1.70m. No voids encountered.

Key:

 Slotted Pipe
 Plain Pipe
 Bentonite
 Gravel Filter

O Disturbed sample
Cv Shear vane
W Water sample
S Standard Penetration Test
C Cone Penetration Test

RH3

GEOINVESTIGATE Ltd.

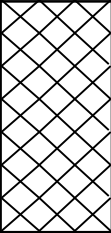
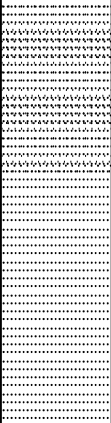
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Our Ref. G21331

RH No.4 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.30	TARMAC / brown DRIFT. Becoming orangish brown from 1.60m	3300							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.90m	6700							5.00 7.50
	Rotary hole terminated at 10.00m						Full Flush		10.00

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe
 Plain Pipe
 Bentonite
 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH4

GEOINVESTIGATE Ltd.

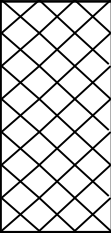
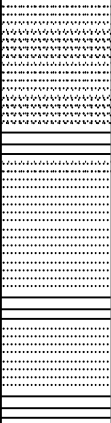
Your Ref.

Our Ref. G21331

RH No.5 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.50	TARMAC / brown DRIFT. Becoming orangish brown from 1.40m	3500							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.20m Occasional MUDSTONE inclusions from 5.80m	6500							5.00 7.50
							Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH5

GEOINVESTIGATE Ltd.

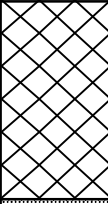
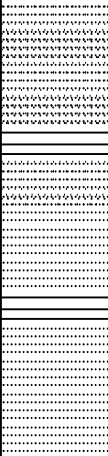
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Our Ref. G21331

RH No.6 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.10	TARMAC / brown DRIFT. Becoming orangish brown from 1.30m	3100							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.40m Occasional MUDSTONE inclusions from 5.50m	6900							5.00
									7.50
							Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH6

GEOINVESTIGATE Ltd.

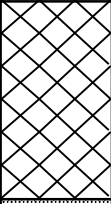
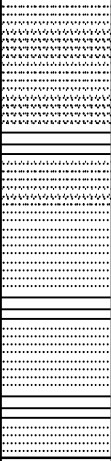
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Our Ref. G21331

RH No.7 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.30	TURF / orangish brown DRIFT.	3300							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.60m Occasional MUDSTONE inclusions from 6.10m	3700					Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH7

GEOINVESTIGATE Ltd.

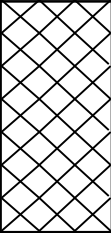
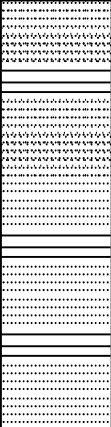
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Our Ref. G21331

RH No.8 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.40	TURF / orangish brown DRIFT.	3400							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.20m Occasional MUDSTONE inclusions from 5.50m	6600							5.00 7.50
							Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH8

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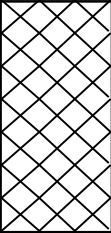
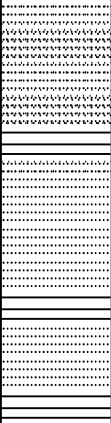
Your Ref.

Our Ref. G21331

RH No.9 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.40	TURF / orangish brown DRIFT.	3400							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.10m Occasional MUDSTONE inclusions from 5.90m	6600							5.00 7.50
							Full Flush		10.00
	Rotary hole terminated at 10.00m								

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH9

GEOINVESTIGATE Ltd.

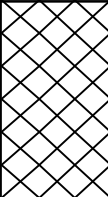
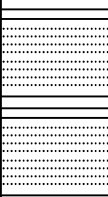
Your Ref.

Our Ref. G21331

RH No.10 Sheet No. 1 of 1

Location: Kirklees College, Close Hill Lane, Newsome, Huddersfield HD4 6LE

DATE: 09/09/21

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.20	TURF / orangish brown DRIFT.	3200							2.50
10.0	Light orange SANDSTONE. Becoming grey from 5.20m Occasional MUDSTONE inclusions from 5.70m	6800	 						5.00 7.50
	Rotary hole terminated at 10.00m						Full Flush		10.00

Remarks: Casing to 1.50m

Microdrill rotary open hole borehole to 10m

No cores recovered from borehole

No gas detected from borehole on completion

Full flush returned. No voids encountered.

Key:

 Slotted Pipe

 Plain Pipe

 Bentonite

 Gravel Filter

 Disturbed sample

 Cv Shear vane

 W Water sample

 S Standard Penetration Test

 C Cone Penetration Test

RH10

APPENDIX 6

CA DRILL PERMIT 22729



The Coal
Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 22729

Name and Address of Permit Holder:

*Mcavoy Group Site
Taylor Hill Centre
Taylor Hill
Huddersfield
HD4 6LE*

Site Location:

*Land at
Kirklees College
Close Hill Lane
Newsome
Huddersfield
HD4 6LE*

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Probe drilling to 10m to locate one mine entry

within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of 12 months from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e. into mine entries/workings) is strictly prohibited.*
- *Water flush*
- *Gas Monitoring CO, CH₄, CO₂, O₂, H₂S at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: _____ Granted Date: **24 August 2021**

For and on behalf of The Coal Authority

Nominated Representative: Paul Hobson, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG

Tel: 01623 637450; E-Mail: permissions@coal.gov.uk



The Coal
Authority

Granted Permit Boundary

Permit Ref: 22729

Permit Boundary:



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APPENDIX 7

IMAGE OF TRIAL PIT TO LOCATE BT SERVICES



APPENDIX 8

IMAGES OF PUBLIC FOOTPATH



