

**Environmental
Geotechnical
Specialists**



COAL RISK ASSESSMENT

job number C1969/21/E/3016	date 10.08.21
site address Barn at 11a Hopton Hall Lane Mirfield West Yorkshire	
written by C. Mason	checked by S. Alexander
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GEO-TECH-NICAL
ENVIRONMENTAL



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Report on a Coal Mining Risk Assessment

Location: Barns at 11a Hopton Lane,
Mirfield, West Yorkshire WF14 8EL

For: Carter Designs

Report No. C1969/21/E/3016

Report date: August 2021

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

Redacted

Charlotte Mason BSc FGS
Geo-environmental Engineer

Scott Alexander BSc FGS
Geo-environmental Engineer

1. Introduction

It is understood that the site is to be developed by the demolition of existing stable to form a new single storey 3 bedroom dwelling. 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 sheet¹.
- British Geological Survey *Geology of Britain Viewer*².
- Coal Authority Consultants Coal Mining Report³.
- British Geological Survey *Borehole Records*⁴.

¹ Sources: British Geological Survey (NERC) Map Sheet 77; Huddersfield 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: 51002561649001 dated 26th July 2021.

⁴ Sources: British Geological Survey (NERC) *Borehole Records* [online resource from <http://www.bgs.ac.uk/>]



2.1 British Geological Survey Maps and Viewer

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

Table 1: Geological Data for the Site			
Strata Type	Strata Name ⁵	Previous Name ⁶	Description ³
Superficial Geology	None recorded	-	-
Solid Geology	Pennine Lower Coal Measures Formation	-	<p>Unnamed Sandstone Member is present on site.</p> <p>The PLCMF can generally be described as Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.</p>

On the geological map, there is one dip indicator relevant to the site (i.e. within 500m of the site or within the same fault block) that suggests the solid geology beneath the site dips 4° to the south-east. Furthermore, there are numerous coal seam that is 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
Linfit Lousey Coal	0 – 1.3m	240m NW	Within 10m bgl
Shertcliffe Coal	0 – 0.8m	530m NW	Within 30m bgl

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

It should be appreciated that the above seams are part of a group of units referred to as the Beeston Group. This group of coals is loosely defined as a plexus of seams spread through some 10m to 40m of strata; the group are notorious for having a complex series of splits across the coal field. The group also have numerous different local names that were not consistently applied across the district. The term 'Linfit Lousey' is often ascribed to a seam within the Beeston Group that has a distinctive sandstone overlying it. The Term 'Shertcliffe Coal' was usually given to a workable seam of up to 0.8m thickness, and was previously referred to as the 'Lower Losey Coal'.

Due to the complex nature of the splits within the Beeston Group, whilst 2 coal seams are noted to outcrop, there remains the possibility that numerous other discontinuous seams could be present within the stratum profile beneath 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 Coal Authority Consultants Coal 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 Consultant's Coal Mining Report

Has the report highlighted evidence or potential of:			
Ref	Mining Feature	Yes/No	Comments
1	Underground Coal Mining	Yes	The Low Si kstone Coal has been worked beneath the site at a depth of 7m, has an extraction thickness of 0.38m and was last worked in 1882.
2	Probable Unrecorded Shallow Workings	Yes	No further details given.
3	Spine Roadways at Shallow Depth	No	No spine roadway recorded at shallow depth.
4	Mine Entries	No	None recorded within 100m of the enquiry boundary.
5	Abandoned mine plans	Yes	Plans of abandoned mine workings below the site are suggested to be available by the Coal Authority.
6	Outcrops	No	No outcrops recorded.
7	Geological Faults	No	No faults, fissures or breaklines recorded.
8	Opencast Mines	No	None recorded within 500 metres of the enquiry boundary.
9	Coal Authority Managed Tips	No	None recorded within 500 metres of the enquiry boundary.
10	Site Investigations	No	None recorded within 50 metres of the enquiry boundary
11	Remediated Sites	No	None recorded within 50 metres of the enquiry boundary.
12	Coal Mining Subsidence	No	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.
13	Mine Gas	No	None recorded within 500 metres of the enquiry boundary.
14	Mine Water Treatment Schemes	No	None recorded within 500 metres of the enquiry boundary.
15	Future underground mining	No	For further information please see section 3 of the Consultant's Coal Mining Report (ref 51002561649001).
16	Coal mining licensing	No	
17	Court orders	No	
18	Section 46 notices	No	
19	Withdrawal of support notices	No	
20	Payments to owners of former copyhold land	No	

It should be highlighted that the Consultants Report makes reference to workings within the 'Low Silkstone Coal', at a depth of 7m beneath the site. The geological memoir⁷ suggests that this seam is located within the top of the Beeston Group of coals. In view of the above, and given its anticipated depth below surface level, it is reasoned that this seam is linked to the outcrop noted to be present ~250m NW of the site boundary.

⁷ Huddersfield map sheet 77 Explanation <http://pubs.bgs.ac.uk/publications.html?pubID=B06077>



Furthermore, it should be highlighted that whilst the geological maps makes reference to a dip degree of ca. 4°, the Consultant report suggest that the workings within the Low Silkstone Coal are sub horizontal. Nonetheless, the workings recorded to the north-west and south-west of the site, record a dipping rate of 4.2°.

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 website⁷. 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.

Unfortunately, in this instance, there are no borehole scans available within the vicinity of the site that will assist with this assessment. Whilst there are borehole scans present in excess of 500m from the site, these boreholes are not anticipated to represent comparable ground conditions to those anticipated to be present below the site.

3. Risk Assessment

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

- Low - The possibility of instability is unlikely therefore no further action is necessary.
- Moderate - The possibility of instability is likely and further investigation or remedial action may be required.
- High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Table 4: Development Specific Risk Assessment

Item	Risk attributed to	Coal Seam(s) Considered	Risk Rating
3.1	Shallow coal workings	Linfit Lousey Coal / Low Silkstone Coal	Moderate
		Shertcliffe Coal	Low
3.2	Coal workings at depth	No recorded coal workings at depths in excess of 30m beneath the site.	Low
3.3	Mine gas	Shallow coal workings	Moderate
3.4	Mine shafts	No recorded mine shafts have been highlighted.	Low



3.1 Risks Posed by Shallow Coal Workings

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. 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 seams, the table below suggests the thickness of competent overburden required above each seam to mitigate instability at the surface.

Table 5: Required Thickness of Competent Overburden

Seam Name	Seam thickness	Anticipated depth below site	Required thickness of competent overburden.
Linfit Lousey Coal / Low Silkstone Coal	Recorded workings 0.38m Maximum recorded thickness 1.3	7m	4.18m (recorded) 14.3m (maximum thickness)
Shertcliffe Coal	0.8	Within 30m	8.80m

3.1.1 Risk Posed by the Linfit Lousey Coal Seam.

It should be appreciated that the data highlights some discrepancies in nomenclature of the shallowest seam beneath the site. Whilst the Consultants Report highlights workings within the 'low Silkstone Coal' at a depth of 7m beneath the site, the local outcrop patterns highlight that this seam could also be associated with the 'Linfit Lousey Coal', with the Shertcliffe Coal expected significantly deeper.

Nonetheless, it is noted that recorded workings are expected at a depth of 7m bgl. Whilst generally, assuming overburden within the area would be ~2m thickness⁸, the data would suggest that a sufficient thickness of competent overburden is likely to be present. However, the following must be taken into consideration:

1. Recorded working thickness can be unreliable, as they are normally extracted off mine abandonment plans, which are often misleading, or incorrect.
2. Given the limited thickness of the recorded workings, it must be realised that larger roadways may also be present.

In view of the above, a moderate risk rating has been placed on this seam, and further investigation is recommended to prove the true thickness and depth of the recorded workings beneath the property.

⁸ Hypothesis based on professional judgement / local knowledge of the weathering profile of the units within Mirfield.



3.1.2 Risk Posed by the Shertcliffe Coal

Based on its anticipated depth below ground level, there may be a sufficient thickness of competent overburden above the Shertcliffe Coal such that the risk from the collapse of workings is low.

3.2 Risks Posed by Coal Workings at Depth

In regard to deeper mining which could affect the site, the property is not within a surface area that could be affected by past underground mining, such that a low risk rating has been assigned.

3.3 Risks Posed by Mine Gas

This assessment has identified that there is potential for shallow mine workings to be present beneath the proposed development. Whilst the Consultants Coal Mining Report has not reported any incidents of mine gas within the vicinity of the development, shallow mining activity represents a credible source of ground gas. As such, a moderate risk rating has been assigned, and further assessment may be required.

Should evidence of workings be proven via further intrusive works, it is strongly recommended that a detailed gas risk assessment is undertaken in accordance with relevant guidance. The risk assessment should take into consideration the current site conditions, and should be subject to reassessment after the formulation and/or completion of any remedial measures and proposed foundation solution. These documents should be prepared by a suitably experienced and qualified specialist.

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, 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.

According to the Coal Authority "*coal seams with a history of spontaneous combustion*" both the Silkstone and the Beeston Group have a history of spontaneous combustion in the Yorkshire area, as such water flush methods should be utilised during drilling.

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

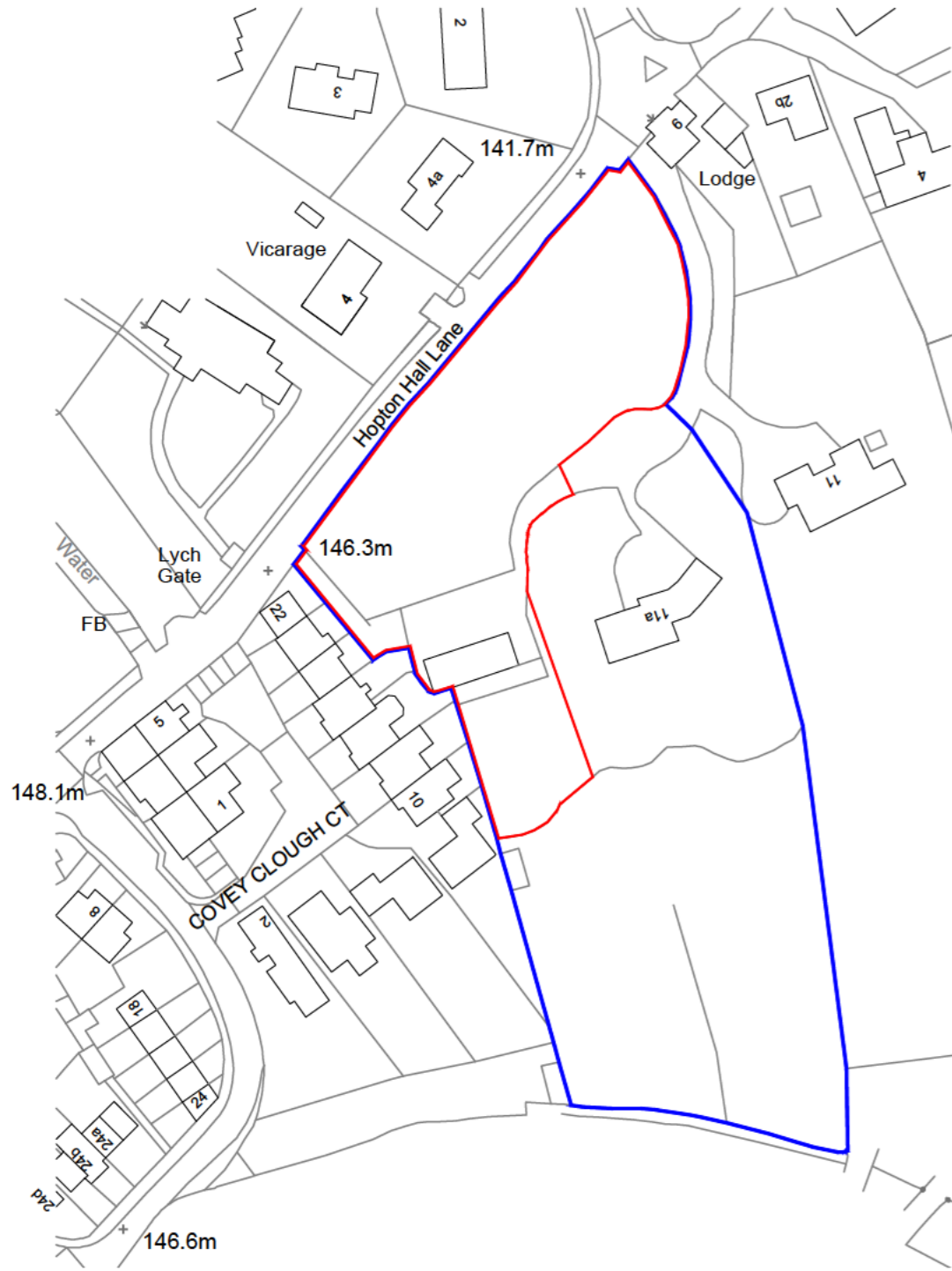


Appendix 1

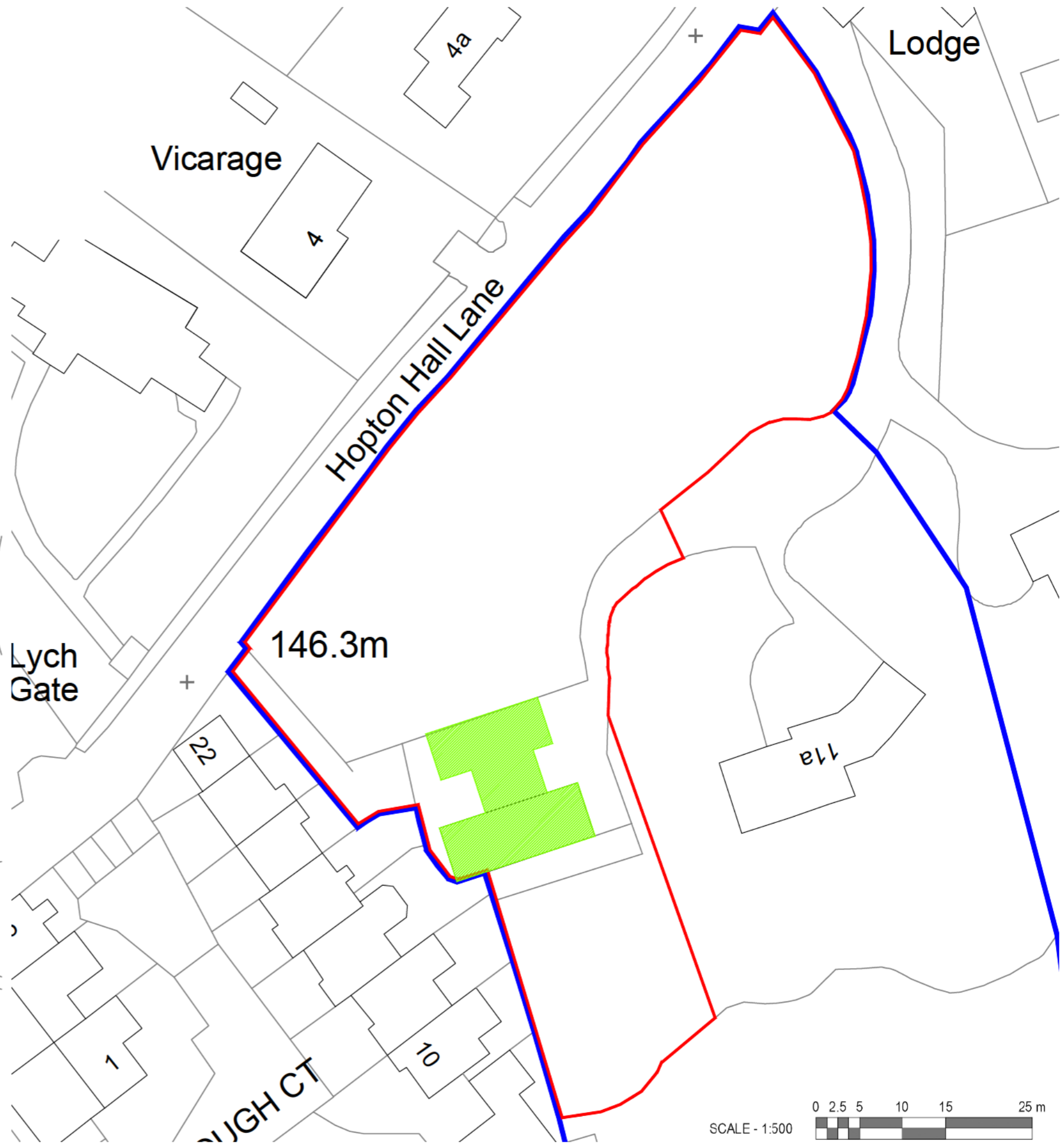
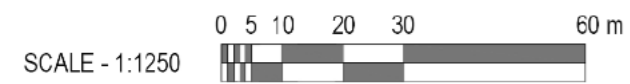
Site Plan

Existing Drawings

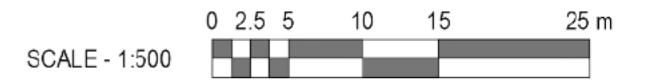
Existing Site Plan E-100 rev -



Existing Site Plan Scale 1:1250



Site Block Plan Scale 1:500



Existing Drawings

Existing Conservation and TPO Map

From Kirklees council

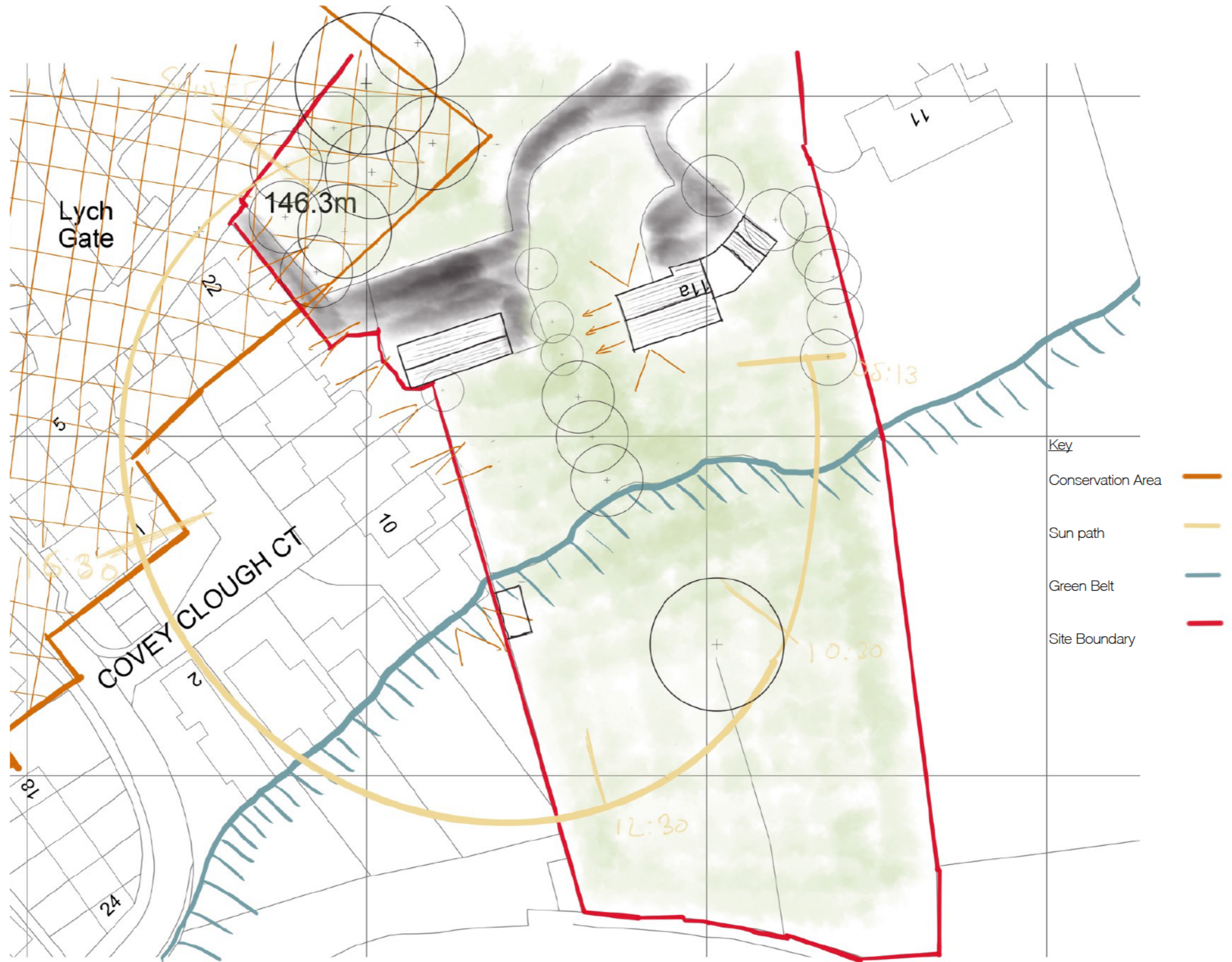


Existing Drawings

Existing Site Analysis E-101 rev -

The site is located in South East Upper Hopton within Kirklees District Council. To the north west of the property, the Upper Hopton Conservation Area partially cuts into the site, likewise to the south the property is divided by land designated as Green Belt. The site itself contains 1no. Two storey dwelling and 2no out buildings formerly used as stables. The total existing site area equates to 2.49 acres.

To the west of the site there are predominantly 2 storey dwellings within Covey Clough Court, a small cul de sac formed circa 1990. The main aspect views are to the South with also the benefit of trees to the North which will help to provide screening from the Road. The sun path is fortunate enough for the proposed site to capture most of the sun throughout the day.





Appendix 2

Coal Authority Report



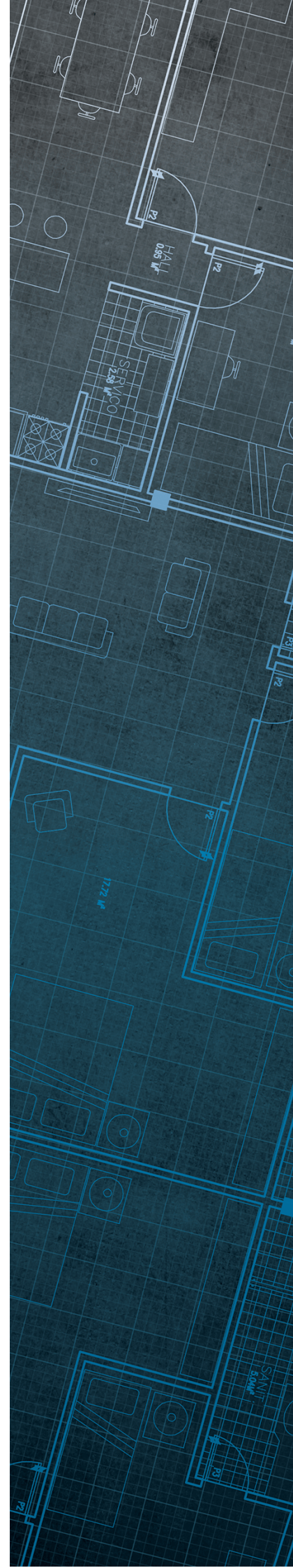
The Coal
Authority

Consultants Coal Mining Report

11a Hopton Hall Lane
Upper Hopton
Mirfield
Kirklees
WF14 8EL

Date of enquiry: 26 July 2021
Date enquiry received: 26 July 2021
Issue date: 26 July 2021

Our reference: 51002561649001
Your reference: C/1969/21/E/3016



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

11a Hopton Hall Lane
Upper Hopton
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Kirklees
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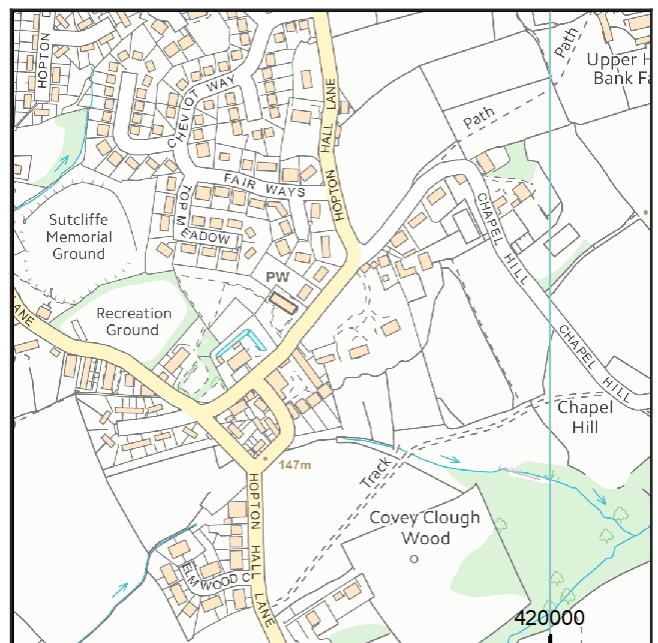
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	LOW SILKSTONE	Coal	6HE2	7	Beneath Property	0.0	East	38	1882
unnamed	BLACK BED	Coal	6HDW	91	South-West	4.2	East	76	1873
unnamed	BETTER BED	Coal	6HE3	128	North-West	4.2	East	46	1912

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:

LF21	1366	11054
LF26	LF23	LF7
LF25	2056	FGB462

Our records show we have more plans than those shown above which could affect the enquiry boundary.

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 31 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

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

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**.

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.

