



GRM Development Solutions Ltd
Laurus House
First Avenue
Centrum 100
Burton upon Trent
Staffordshire
DE14 2WH

Tel: 01283 551 249
Web: www.grm-uk.com
Our Ref: P9088 – CMRA.1
Date: 8th October 2019

Mr Darren Insley
DCI Architecture Ltd
Unit 2 Barns Heath Farm
Snarestone Road
Appleby Magna
Swadlincote
DE12 7AJ

Dear Mr Insley,

RE: Proposed residential development to the rear of 156-160 Burton Road, Castle Gresley, Derbyshire DE11 9EW.

We have as requested carried out a Coal Mining Risk Assessment in accordance with guidance provided by the Coal Authority and as required by the Local Authority as part of the planning process.

The result of our assessment is detailed below:-

1.0 Introduction

We understand that your Client proposes to develop the site with two three-bedroom bungalows with associated garages and soft landscaping. An existing garage and outbuildings are to be demolished to make way for a driveway to the new properties from Burton Road.

As far as we are aware the site has not been the subject of a Desk Study (Phase I) or Intrusive Ground Investigation (Phase II).

Recommendations will be made as to how the risks associated with coal mining can be mitigated.

A proposed site layout is included in Appendix A. A site location plan is attached to the Coal Authority Consultants Report included in Appendix B.

2.0 Sources of Information

The following sources of information have been used:-

- Coal Authority Consultants Report.
- BGS Geological Mapping at a scale of 1:10,000.
- BGS Memoirs.
- BGS Borehole Records.
- Coal Authority Interactive Mapping.

3.0 Identification and assessment of site specific risks

The Coal Authority (CA) Consultants Report lists recorded workings in eight seams of coal between 57m and 295m depth last worked in 1957. It is considered likely that any ground movement from the above seams, should by now have stopped. Therefore the risk posed to the ground surface from recorded workings is assessed as **negligible** and no mitigation should be required.

The CA report **confirms** the probable presence of un-recorded workings in coal seams at or close to the ground surface. Accordingly the risk posed to the ground surface from any un-recorded workings in shallow coal seams is assessed as **high**.

The CA **confirms** that the site lies approximately 25m from the boundary of a former opencast site. The risk from current or future opencast workings is therefore assessed as **negligible**. The risk from past opencast workings is assessed as **high**.

The CA confirms that there are no known coal mining entries within, or within 100 metres of the boundary of the property. Therefore the risk to surface stability from recorded mine entries is assessed as **negligible**.

If shallow un-recorded workings are present beneath the site, the risk of un-recorded mine entries should be increased to **moderate**.

The CA report **confirms** that the site is within 500m of an incidence of mine gas emissions requiring action by the CA. The risk to the proposed development from mine gas emissions is therefore assessed as **moderate**. This does not preclude a risk from ground gases from other sources.

Where Coal Measures strata lies close to the ground surface foundations could potentially penetrate or encounter coal seams within their excavation. There is therefore a potential for spontaneous combustion. The risk from spontaneous combustion from near surface coal seams is generally assessed as **low** but some form of precautionary mitigation might be required.

The site is underlain by the following geological formations:-

- Chester Formation.
- Moira Formation.
- Pennine Middle Coal Measures Formation.

4.0 Mitigation Strategy Proposed

The mitigation strategy proposed relates to the potential presence of shallow un-recorded workings, un-recorded mine entries, opencast workings and mine gas emissions.

The 1:10000 scale geological mapping, geological memoirs and BGS borehole records suggest the following:-

- The BGS map (sheet SK 21 NE) indicates that Made Ground associated with embankments, colliery or quarry spoil and fill material, which may include surface or shallow mine workings, is present 43m to the north east of the site.
- Nearby BGS borehole logs describe the Chester Formation as initially consisting of sand and gravel underlain by yellow rock with pebbles. The BGS map describes the formation as a buff to grey, coarse grained pebbly sandstone with beds of red mudstone. Only the western part of the site is directly underlain by these strata.

- The BGS memoir describes the Moira Formation as a dark purplish brown, unconsolidated sandy gravel with pebbles. The BGS map indicates that these strata underlie the Chester Formation in the western part of the site, whilst they are present from ground level in the eastern part of the site.
- The Pennine Middle Coal Measures Formation is present beneath made ground 35.0m to the north east of the site and comprises grey mudstone, siltstone and clay with coal seams and beds of sandstone.
- The strata below the eastern part of the site generally dip towards the south west at approximately 7°, and 15° in the west.
- The Upper Cannel coal seam subcrops approximately 100m to the north east of the site and within different fault blocks roughly 100m to the east and 230m to the north of the site.
- The Little coal seam subcrops in a different fault block, approximately 55m to the north east of the site.
- A geological fault orientated north west to south east is present across the northern part of the site, downthrowing the strata in the western part of the site. The surrounding area has a number of faults, one of the largest of which runs north west to south east approximately 22m to the east of the site, upthrowing strata to the east relative to the strata below the site.

The strata underlying the site dip towards the south west and therefore the site is underlain by a sequence of coal seams, the shallowest of which is the Upper Cannel seam.

The maximum recorded thickness of the Upper Cannel is 0.99m. The abandonment plan for the nearby opencast workings records the thickness of the Upper Cannel seam as 0.41m and it is predicted, based on the geological mapping, that this underlies the site at approximately 12m to 15m begl. Rockhead in this area is typically between 1.0m and 2.5m begl and therefore, based on a seam thickness of 0.41m, it is considered likely that there is a sufficient thickness of rock cover above the seam to prevent any surface instability if the seam has been worked. However, if the maximum thickness of the Upper Cannel is present below the site then there will be insufficient thickness of rock cover above the seam to prevent surface instability. The Upper Cannel is known to have been worked on a small scale at a shaft of the Oakthorpe Colliery, 5.6km to the south east of the site, but in area close to this site it is typically thin, of poor quality and likely to be broken by faulting.

According to the abandonment plan for the nearby opencast, the Little seam is recorded to be between 1.42m and 1.53m thick, is expected to be at a depth of approximately 39m below the Upper Cannel (so, 51m to 54m begl); at this depth the Little is highly unlikely to have the potential to affect the ground surface below the site even if worked by un-recorded methods to its full thickness.

Accordingly, the risk from shallow unrecorded workings in the Upper Cannel is considered **low**, and for workings in the Little Coal it is considered **negligible**.

In order to confirm the level of risk and the need for mitigation measures, it is recommended that probe holes are progressed below the site to 30m depth to prove the depth to rockhead, confirm the depth of the Upper Cannel seam, whether it is worked, if it has sufficient rock cover to negate the risk of surface instability, and to confirm that the Little Coal is deeper than 30m begl. If workings are found within influencing distance of the surface then a drill and grout programme would be required to reduce the risk to **negligible**.

The site is underlain by a number of shallow coal seams that are generally considered productive and therefore the site remains at a moderate risk from un-recorded mine entries. Following the ground investigation, if no evidence of shallow mine workings is encountered, the risk may be reduced to **negligible**. If workings are found then the risk remains **moderate** and a site strip of the developable areas will be necessary, with drilling and grouting if a mine entry is found on site.

The abandonment plan for the nearby opencast to the north, shows the nearest high wall to be around 100m from the site; on this basis the opencast workings are considered to pose a **negligible** risk to the proposed development.

The site is located 350m to the south west of an incidence of mine gas emissions requiring action by the CA. The primary gases of concern due to a density greater than that of air are carbon dioxide and carbon monoxide, potentially sinking down-seam to below the site. However, the site is on the western, downthrown side of the above mentioned north west to south east trending fault, whilst the incidence of mine gas emissions is on the upthrown side. This therefore significantly reduces the likelihood of a pathway being present between the recorded location of mine gas and the site.

The primary pathways of mine gas emissions to the surface are via mine entries, mining induced fractures or naturally permeable strata. The risk of mine entries has been assessed above as **moderate** and therefore the risk of mine gas emissions via this pathway is assessed as **moderate**; however, if shallow un-recorded workings were not found to be present beneath the site, the risk of mine entries would be decreased to **negligible** and therefore the risk of mine gas emissions would be decreased to **negligible** by this pathway.

There is approximately 12.0m of relatively impermeable mudstone, siltstone and clay rock strata of the Middle Coal Measures Formation above the shallowest coal seam below the site, the Upper Cannel seam. The Moira Formation is described as predominantly a sandy gravel, whilst the Chester Formation is described as a sandstone with beds of mudstone. It is considered that whilst relatively permeable strata directly underlie the site, there is a significant thickness of relatively impermeable Middle Coal Measures Formation between the site and any potential shallow workings to prevent the migration of mine gas to the site. Therefore the risk of gas emissions via this pathway is assessed as **negligible**. The fault in the northern part of the site could also be considered a pathway for mine gas emissions, however, the fault is likely to be filled with cohesive material and this reduces the likelihood of pathway to the surface. The risk of gas emissions via this pathway is therefore assessed as **negligible**.

Overall, the maximum risk to the proposed development from mine gas emissions is assessed as **moderate**, related to the presence of unrecorded mine entries. This can be dealt with as outlined above for treating mine entries, and the use of gas protection measures if a ground investigation shows the presence of elevated gas concentrations.

There are no coals at or close to founding depths and therefore the risk to structures from spontaneous combustion is considered to be **negligible**.

5.0 Conclusion

The risks amended in line with 4.0 above can be summarised as follows:-

Recorded workings – Negligible.

Un-recorded shallow workings – Low (may be reduced following the recommendations in Section 4.0 above)

Recorded mine entries – Negligible.

Un-recorded mine entries – **Moderate** (may be reduced following the recommendations in Section 4.0 above)

Opencast workings – **Negligible**.

Mine gas emissions – **Moderate** (may be reduced following the recommendations in Section 4.0 above).

Spontaneous combustion – **Negligible**.

6.0 Relevant Appendices

Appendix A – Proposed Site Layout

Appendix B - Coal Authority Consultants Report including site location plan.

We trust that the information provided is sufficient for your current requirements. If you require any additional information or clarification of the contents of this letter then do not hesitate to contact me.

Yours faithfully,

Jane Sell BSc (Hons) MSc FGS
Engineering Geologist

Andrew Brown BSc CGeol FGS
ProfGradIOM3
Principal Geotechnical Engineer



A P P E N D I X A

**GRM Development Solutions provides
multi-disciplinary consultancy services, UK-wide:**

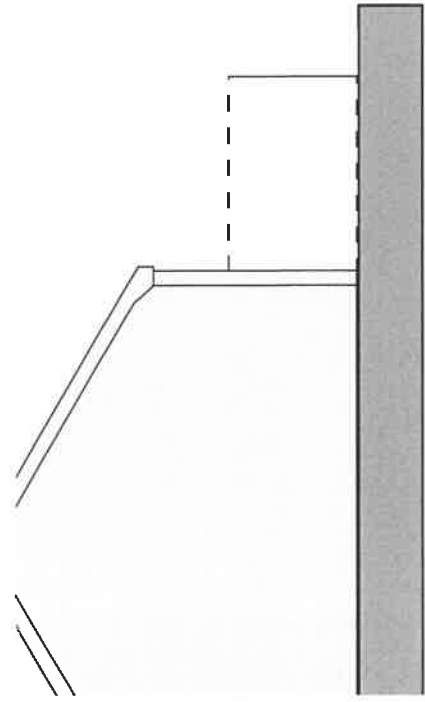
- Geotechnical and Geo-environmental Services
- Civil and Infrastructure Services
- Structural Engineering Services
- Construction Management
- Site Services

Tel: 01283 551249

Fax: 01283 211968

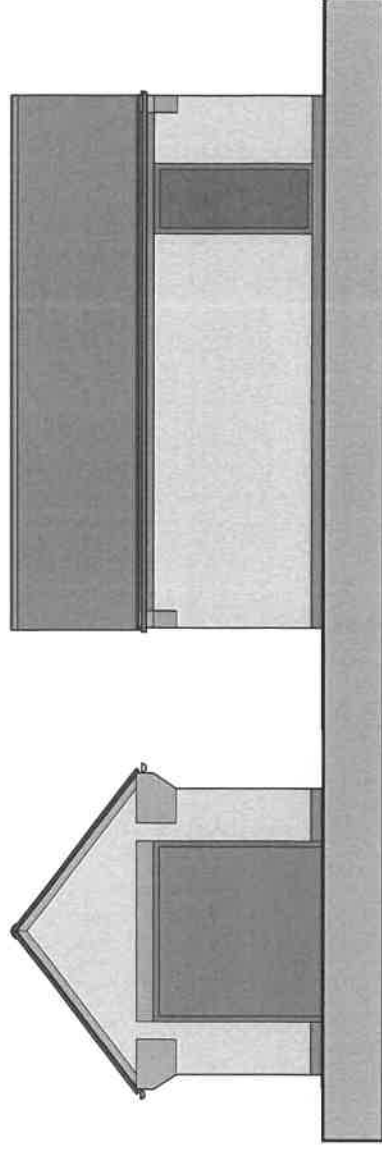
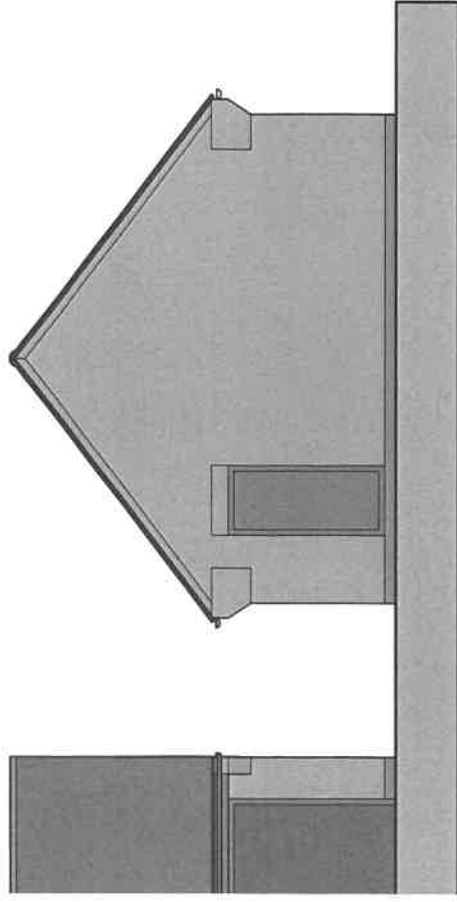
info@grm-uk.com

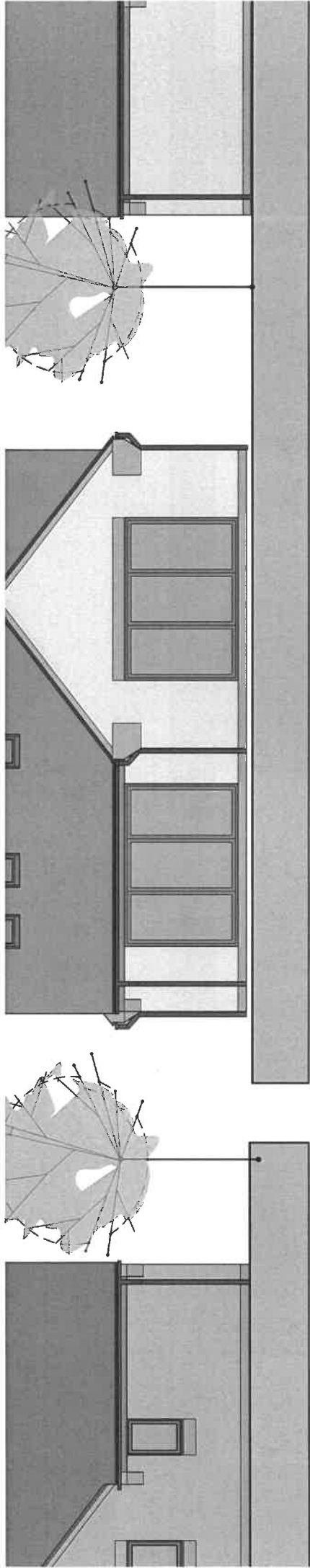
www.grm-uk.com



1:50

PROPOSED GARAGE DETAILS

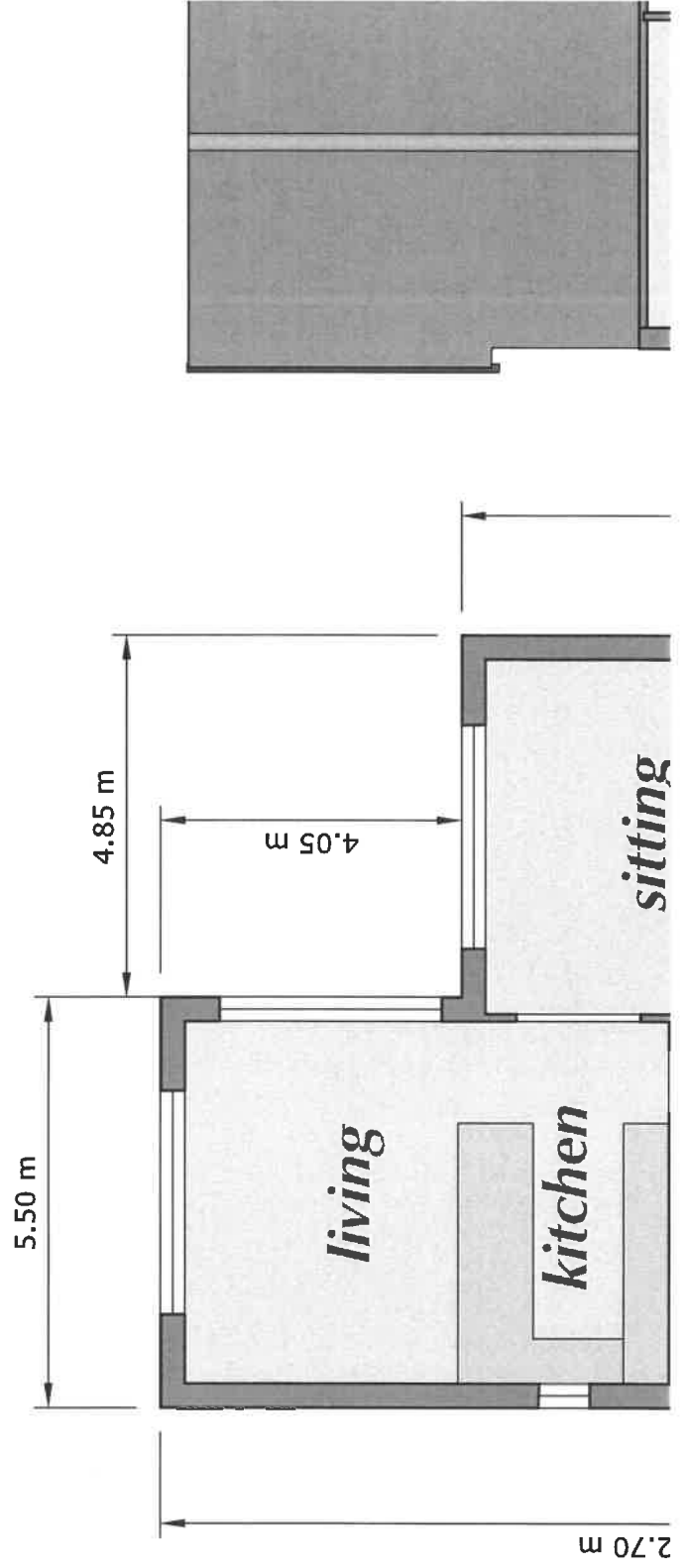




Rear elevation

Side elevation

PLOT TWO





A P P E N D I X B

**GRM Development Solutions provides
multi-disciplinary consultancy services, UK-wide:**

- Geotechnical and Geo-environmental Services
- Civil and Infrastructure Services
- Structural Engineering Services
- Construction Management
- Site Services

Tel: 01283 551249

Fax: 01283 211968

info@grm-uk.com

www.grm-uk.com



The Coal
Authority

Consultants Coal Mining Report

160 Burton Road
Castle Gresley
Swadlincote
Derbyshire
DE11 9EW

Date of enquiry:	2 October 2019
Date enquiry received:	2 October 2019
Issue date:	2 October 2019

Our reference:	51002183044001
Your reference:	P9088



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

GRM DEVELOPMENT SOLUTIONS LIMITED

Enquiry address

160 Burton Road
Castle Gresley
Swadlincote
Derbyshire
DE11 9EW

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

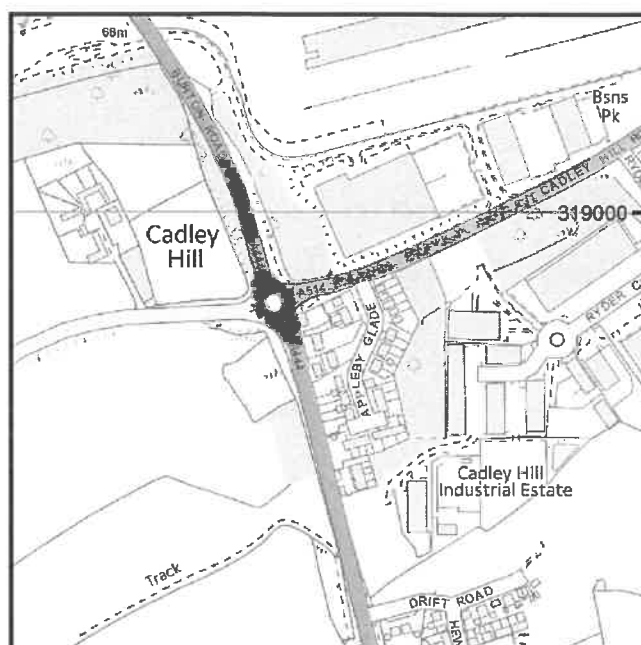
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2018. All rights reserved.

Ordnance Survey Licence number: 100020315

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
CADLEY HILL	LITTLE	Coal	4N57	57	North	11.6	South	137	1951
CADLEY HILL	LITTLE	Coal	4N55	59	South-East	5.7	South-West	137	1951
CADLEY HILL	MAIN COAL	Coal	4N5D	99	Beneath Property	12.8	South	183	1914
CADLEY HILL	LITTLE WOODFIELD	Coal	4NSI	117	North-East	7.8	East	130	1917
CADLEY HILL	MAIN COAL	Coal	4N5B	132	South-East	0.9	North-West	183	1916
CADLEY HILL	WOODFIELD	Coal	4N5N	164	Beneath Property	4.2	South	150	1949
CADLEY HILL	WOODFIELD	Coal	4N50	170	West	4.2	South	150	1949
unnamed	STOCKINGS	Coal	4L5H	174	North	6.6	South	180	1949
CADLEY HILL	WOODFIELD	Coal	4N5P	178	West	8.1	South-East	150	1949
CADLEY HILL	WOODFIELD	Coal	4N5Q	178	North-West	4.9	South-East	150	1949
unnamed	WOODFIELD	Coal	4L46	180	North-West	13.1	South	150	1912
CADLEY HILL	STOCKINGS	Coal	4NSX	184	Beneath Property	4.4	South-West	180	1949
unnamed	STOCKINGS	Coal	4L5C	195	North-West	6.4	South	180	1931
CADLEY HILL	EUREKA	Coal	4N69	198	Beneath Property	2.6	South-West	120	1949
CADLEY HILL	STOCKINGS	Coal	4NSZ	198	West	6.4	East	180	1949
CADLEY HILL	STOCKINGS	Coal	4N62	199	North-West	4.0	North-East	180	1936
CADLEY HILL	STOCKINGS	Coal	4NSY	208	South	6.4	East	180	1949
CADLEY HILL	EUREKA	Coal	4N6A	209	West	7.4	East	120	1939
unnamed	EUREKA	Coal	4L45	214	North-West	4.8	South	120	1949
unnamed	EUREKA	Coal	4L56	216	North	4.9	South	120	1949
unnamed	EUREKA	Coal	4L54	216	North	4.9	South	120	1949
unnamed	EUREKA	Coal	4L50	217	North-East	4.9	South	120	1949

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
CADLEY HILL	STANHOPE	Coal	4N6I	224	Beneath Property	1.6	South-East	122	1910
CADLEY HILL	EUREKA	Coal	4N67	228	North-West	6.6	East	120	1949
CADLEY HILL	STANHOPE	Coal	4N6H	229	South-West	1.6	South-East	122	1908
CADLEY HILL	STANHOPE	Coal	4N6K	236	West	9.4	South-East	122	1915
unnamed	STANHOPE	Coal	4L5T	238	North	6.2	South-East	120	1908
unnamed	STANHOPE	Coal	4L5P	244	North-West	6.4	South-East	122	1923
CADLEY HILL	KILBURN	Coal	4N6N	295	Beneath Property	2.0	East	137	1957

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:

EM898	14432	17924
EM440	EM616	14379
14431	14943	EM608

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

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Fault under or close to the property recorded.

Opencast mines

Please refer to the "Summary of findings" map (on separate sheet) for details of any opencast areas 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

Distance to gas incident/remediation (m)	Direction
313.1	North-East

See Section 4 for further information.

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.

Mine gas remedial works

The site is within an area of previous interest. It is close to where the Coal Authority has investigated and subsequently remediated the effects of mine or ground gas emissions following specific reported hazards.

The site requires further investigation and may influence your risk assessment. We recommend that you order the **Coal Authority Mine Gas Emission Report**, which will include more information about the hazard.

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

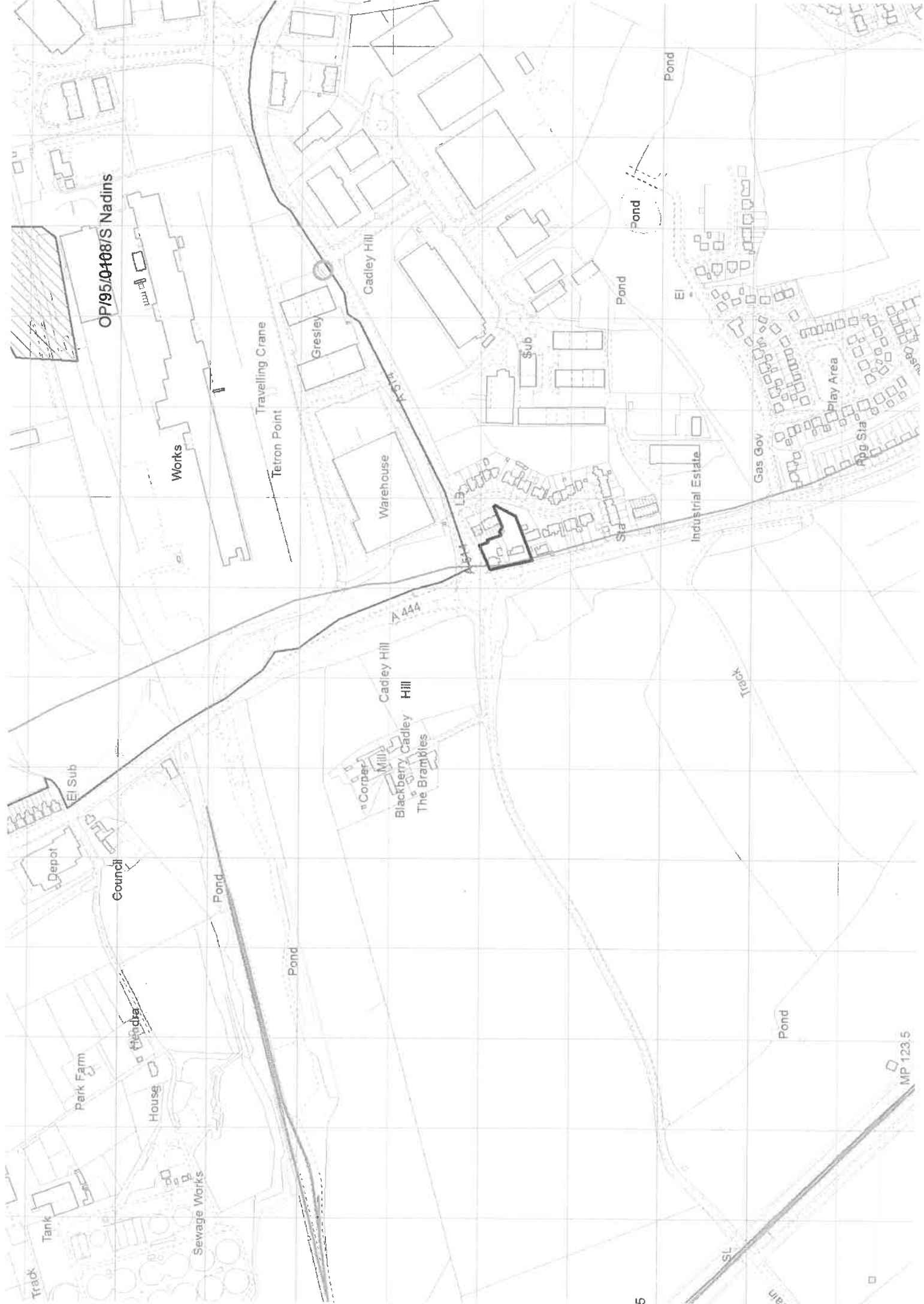
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

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.



OP/95/0408/S Nadins

Works

Travelling Crane

Tetron Point

Cadley Hill

Gresley

Warehouse

Sub

Pond

Pond

Pond

Industrial Estate

Gas Gov

Play Area

Rugby Sta

Track

Pond

MP 123.5

SL

ain

A 444

Cadley Hill

Hill

Blackberry Cadley Hill
The Brambles

Corner

Mill

Council

Park Farm

House

House

Sewage Works

Track

Tank

Depot

EI Sub

