



COAL MINING RISK ASSESSMENT

**145 JUBILEE ROAD
MIDDLETON
MANCHESTER
M24 2LY**

Prepared for:

Extensions NW Ltd

By:

ENVIROSOLUTION LTD

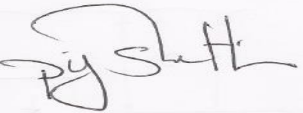
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Date:

18th January 2022



EnviroSolution Ltd Document Verification

Site Address	145 Jubilee Road, Middleton, Manchester, M24 2LY		
Report Title	Coal Mining Risk Assessment		
Job Number	CL101	Document Ref.	CL101
Date Issued	18 th January 2022	Report Version	1
Prepared by	Tom Craig MSc, BSc (Hons), FGS	Signature	
Checked by	Phil Shelton PhD BSc CEng MIMMM FGS	Signature	

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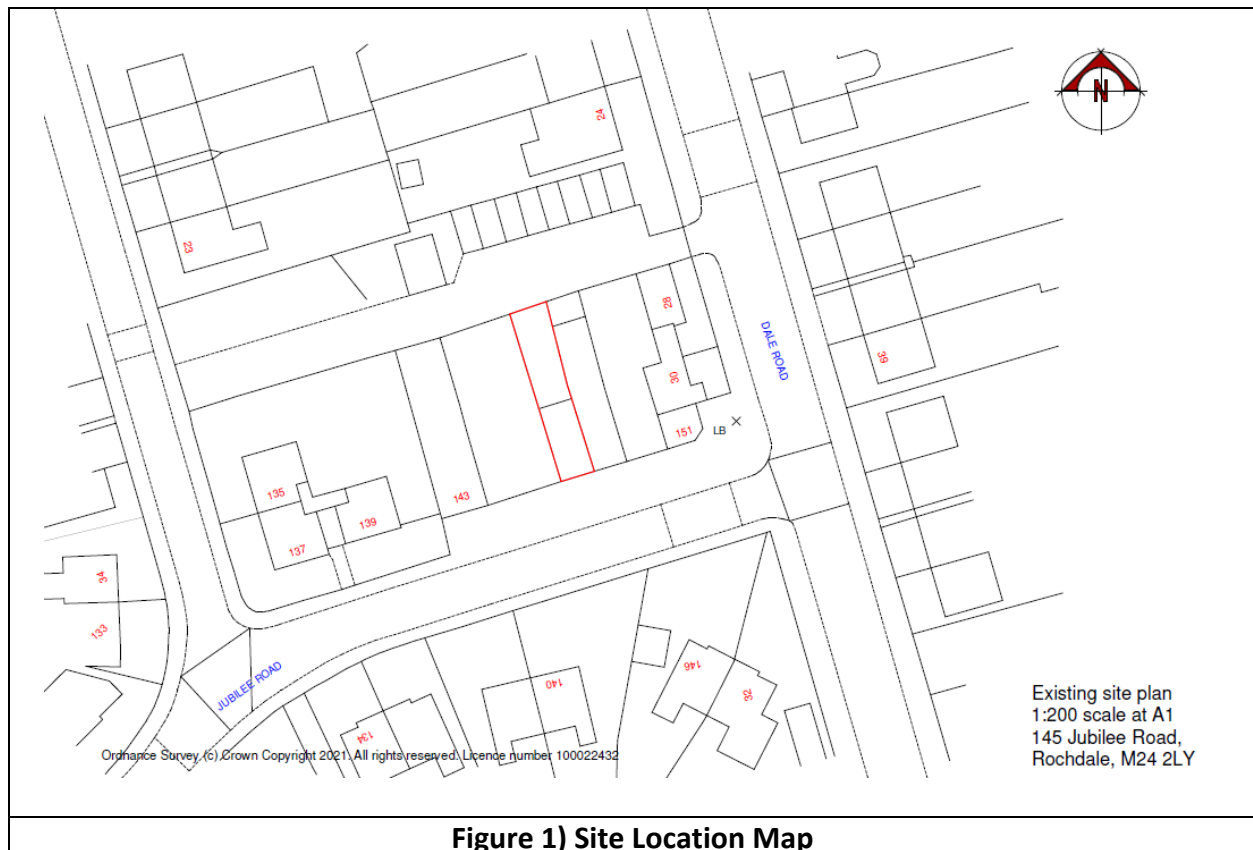
1 Introduction

1.1 Site Location and Description

The site for the proposed residential development is located at 145 Jubilee Road, Middleton, Manchester, M24 2LY. The National Grid Reference for the development site is GR: 387860 406575. The site location is shown in **Appendix A**. The plot is rectangular in shape and covers an area of approximately 100m² and lies on the northern side of Jubilee Road. The site currently encompasses an existing hair salon property which lies in the southern half of the site.

The site lies at an average elevation of about 64m aOD. The topography of the site is generally flat and level with little change in elevation. The site is bounded by a residential property to the west and a commercial property to the east.

A plan showing the location of the site is shown in **Figure 1**.



1.3 Scope of Coal Mining Risk Assessment

EnviroSolution Ltd has been commissioned to prepare a Coal Mining Risk Assessment Report (CMRA) for the proposed development site, in order to provide the Local Planning Authority with information on the coal mining legacy risk(s), an assessment of their potential impact on land stability, and provide recommendations for the need to carry out any further investigations (including intrusive boreholes) to address these risk(s).

The CMRA has been undertaken in accordance with the principles of best practice including the Coal Authority's guidance document "Risk Based Approach to Development Management - Resources for Developers Version 3" (2014) (Ref. 1), CIRIA "SP32 Construction over Abandoned Mine Workings" (2002) (Ref. 2) and CIRIA "C758D Abandoned Mine Workings Manual" (2019) (Ref. 3).

The purpose of the CMRA Report is to:

- present a desk-based review of available information on the coal mining issues that are relevant to the application site;
- use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact issues;
- set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of National Planning Policy with regard to development on unstable land.

1.4 Sources of Information

This report is based on current information of past mining activities relevant to the site. The following information sources have been used:

- Consultants Mining Report dated 10th January 2022 (Ref: 51002883921001 **Appendix B**);
- BGS Geoindex geological map;
- BGS geological 1:50,000 Sheet 85 Manchester;
- Groundsure Environmental Interactive Mapping;
- Coal Authority Interactive Website;
- Historical Ordnance Survey maps.

2 Environmental Setting

2.1 Historic Coal Mining Activity

The development site and surrounding area has been reviewed with reference to historical Ordnance Survey (OS) maps. The history of the site and immediate surrounding area are summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**.

Table 1 - Historic Mapping Review

Date	Scale	Historic Mining Activity
1848	1:10,560	- The site is un-developed. - Tonge Colliery located 550m south of the site.
1890	1:10,560	- Tonge Colliery demolished. - Reservoirs 200m east of the site.
1938	1:10,560	- Site is developed with residential/ commercial property. - Large residential development in the surrounding area.

2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 85 Manchester) shows that the site is directly underlain by glaciofluvial deposits which are of Quaternary age. Glaciofluvial deposits generally consist of sands and gravels.

The bedrock geology is shown to belong to the Pennine Lower Coal Measures Formation which is of Carboniferous age. The Pennine Lower Coal Measures Formation generally consist of interbedded grey mudstones and siltstones with pale grey sandstones and common coal seams. The bedrock is shown to have an approximate dip of about 10° to the southwest. A copy of the geological maps is included in **Appendix D**.

The site lies in close proximity to a geological fault which lies adjacent to the northern boundary. The fault downthrows to the south.

A BGS borehole log (ref: SD08NE6) has been obtained from BGS online records from 160m west of the site. The borehole shows 3.65m of superficial material overlying interbedded shale. A copy of the BGS borehole records is included in **Appendix E**.

The maps show the Ravine (Plodder) seam to outcrop in close proximity to the development site.

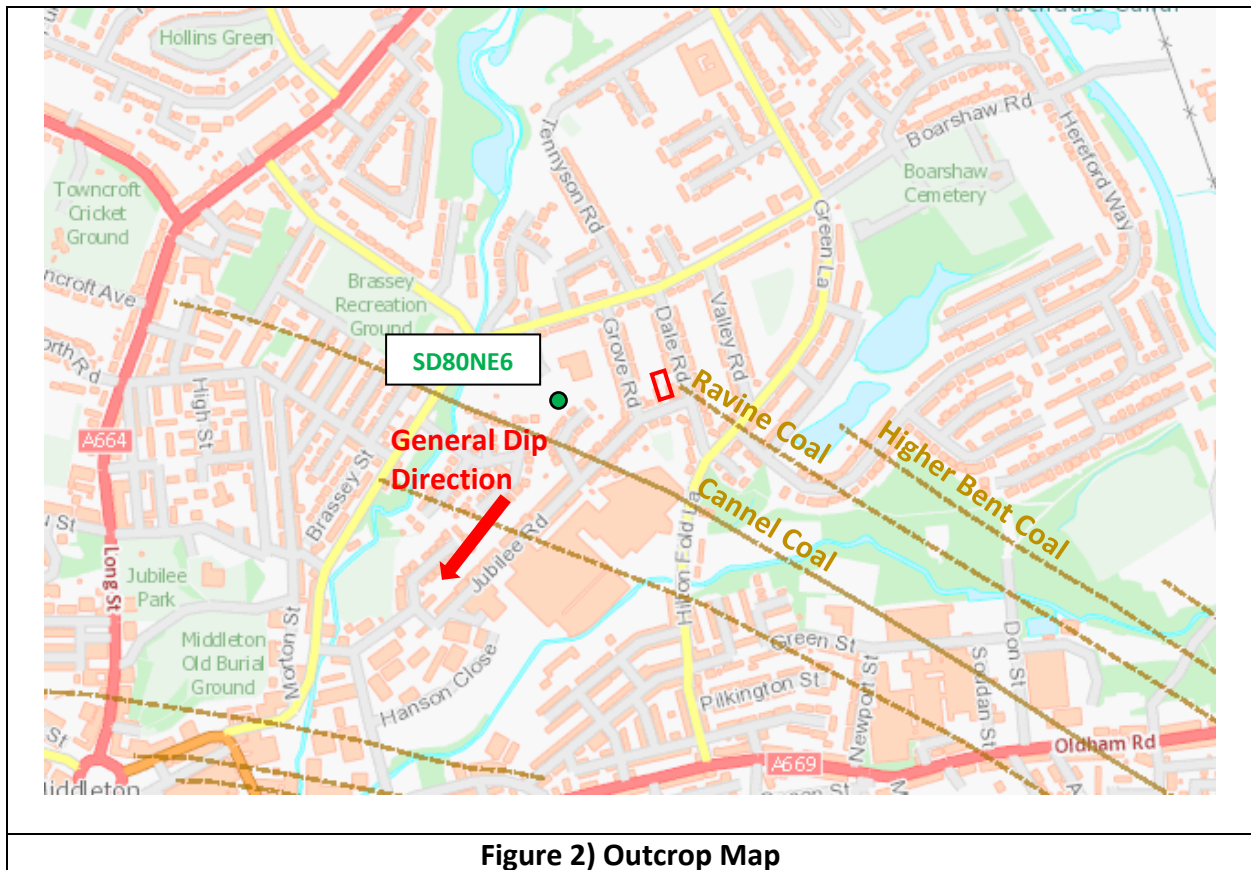


Figure 2) Outcrop Map

The site is situated within a Primary Opencast Coal Resource Area (**Appendix F**), defined by the BGS as “an area which constitutes the main target for opencast coal extraction and comprises a relatively closely spaced succession of variable but generally thick coals. These coals typically occur within a certain discrete stratigraphic interval”. Notwithstanding this, it is considered to be very unlikely that there will be any interest in developing open cast coal mining operations at this location in the short or medium-term.

3 Third Party Investigations

3.1 Geo Investigate Rotary Borehole Site Investigation Report, 147 Jubilee Road. Ref: G17402

An intrusive investigation was undertaken at a site adjacent to the eastern boundary of the site considered in this report (see **Figure 3**). A copy of the investigation report can be found under planning application 19/00308/FUL on the Rochdale Borough Council planning portal. As part of the investigation works 2 no. rotary probe holes were drilled to depths of 30m below ground level.

Ground conditions comprised 3.20m of overburden, overlying siltstone and mudstone with sandstone inclusions. RH2 encountered fractured sandstone interpreted to be a fault which coincides with the know fault position from mapping.

No evidence of coal seams or coal mining voids were recorded during the investigation.

No hazardous gas concentrations were noted from readings taken from the boreholes during drilling.

A copy of the investigation report is included in **Appendix H**.

4 Identification and Assessment of Site Specific Coal Mining Risks

The table below summarises the potential risks associated with the coal mining legacy for the proposed development site, which have been identified from list sources of information.

Table 2 - Coal Mining Hazards Summary

Coal Mining Issues	Yes	No
Coal outcrops	X	
Underground coal mining (recorded at shallow depths)		X
Underground coal mining (probable at shallow depths)	X	
Recorded mine entries (shafts and adits)		X
Unrecorded mine entries (shafts and adits)	X	
Coal mining geology (fissures)		X
Record of past gas emissions		X
Recorded coal mining surface hazard		X
Surface mining (opencast workings)		X

The Coal Authority Interactive Map Viewer (**Appendix G**) has identified that the site lies within a Development High Risk Area associated with the potential presence of unrecorded workings at shallow depth (less than 30m bgl) beneath the site associated with the Ravine Coal.

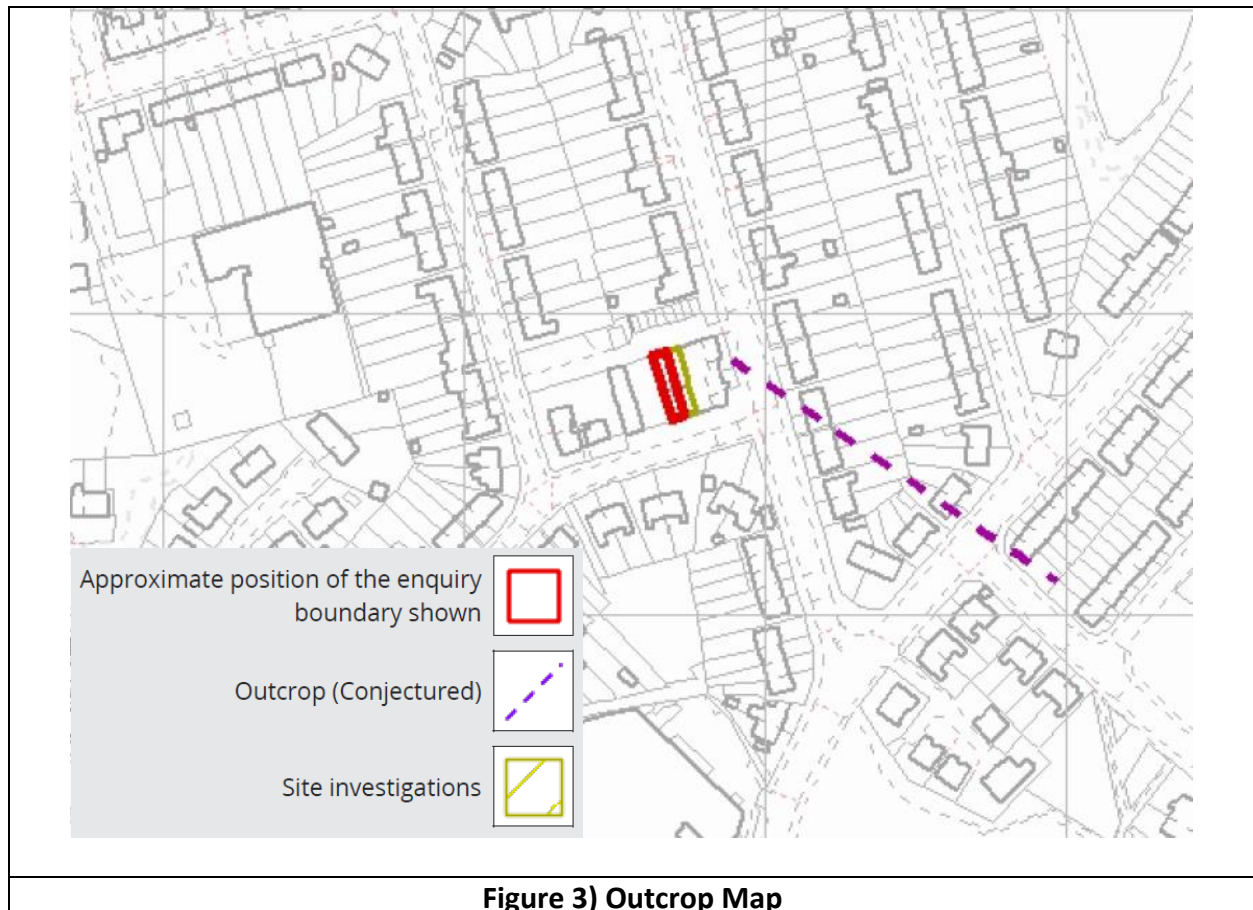
The report obtained from the Coal Authority (Consultants Mining Report, reference 51002883921001, dated 10th January 2022) has revealed the property is in a surface area that is affected by recorded underground mining in a single seam of coal (Arley) at a depth of 136m bgl.

Using the generally accepted 'rule-of-thumb' guidance that a competent rock strata thickness equivalent to at least ten times the extraction thickness provides adequate protection against crown-hole development and surface instability (Refs 2 and 3), it can be concluded that the recorded workings will not result in surface subsidence or crown-hole development.

However, the Coal Authority report states that the property is in an area where the Coal Authority believe there is coal at or close to the surface that may have been worked in the past. The Coal Authority has drawn attention to this and has stated that the presence of unrecorded shallow coal should be considered. Adjacent site investigations have shown no evidence of the Ravine (Plodder) Coal being worked beneath the site.

The Coal Authority report states that they are not aware of any recorded mine entries within or within 100m of the development site boundary. Notwithstanding this, it is recognised that there may also be mine entries in the vicinity that have not been recorded.

The Coal Authority report states that they are not aware of any opencast sites within the surrounding 500m of the site. Historic mapping also shows no evidence of surface workings.



5 Proposed Mitigation Strategy

The possibility of unrecorded mine shafts has been highlighted in the Coal Authority report. Historical maps do not show evidence of shafts within the site boundary. The potential risk can be dealt with through vigilance during the earthworks stage of construction.

6 Conclusions

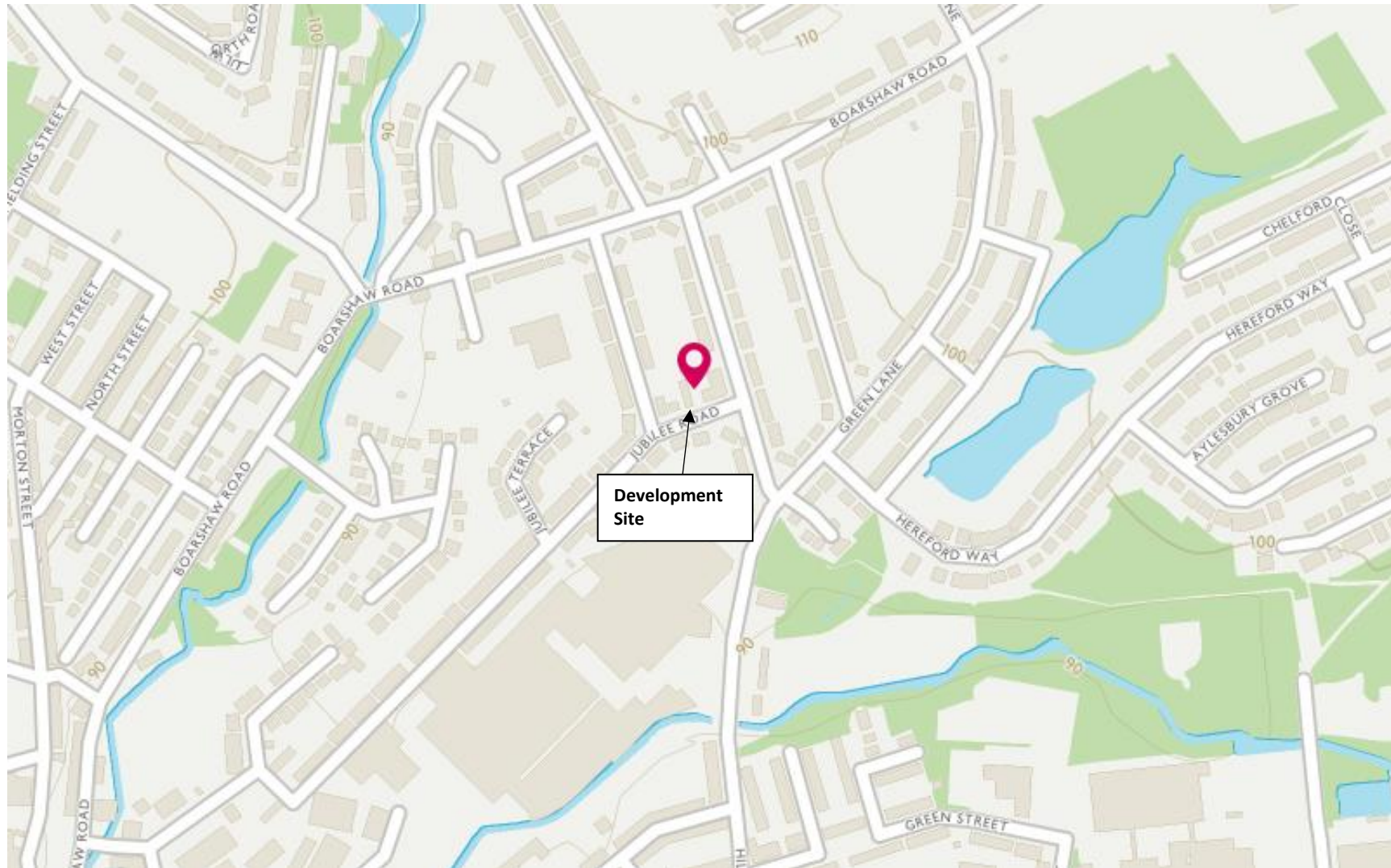
The Coal Mining Risk Assessment for the proposed commercial development at 145 Jubilee Road in Manchester has concluded that the risk associated with coal mining related issues are low based on information from the Coal Authority and geological interpretation and can be suitably mitigated through informed professional practice and vigilance during construction.

No further investigative or remedial works are deemed necessary for the proposed development.

7 References

1. Coal Authority, 2014, Risk Based Approach to Development Management Resources for Developers, Version 3.
2. CIRIA, 2002, SP32 Construction over Abandoned Mine Workings.
3. CIRIA, 2019, C758D Abandoned Mine Workings Manual.
4. CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings.

Appendix A – Site Location



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Site Location Map





Appendix B – Coal Authority Report



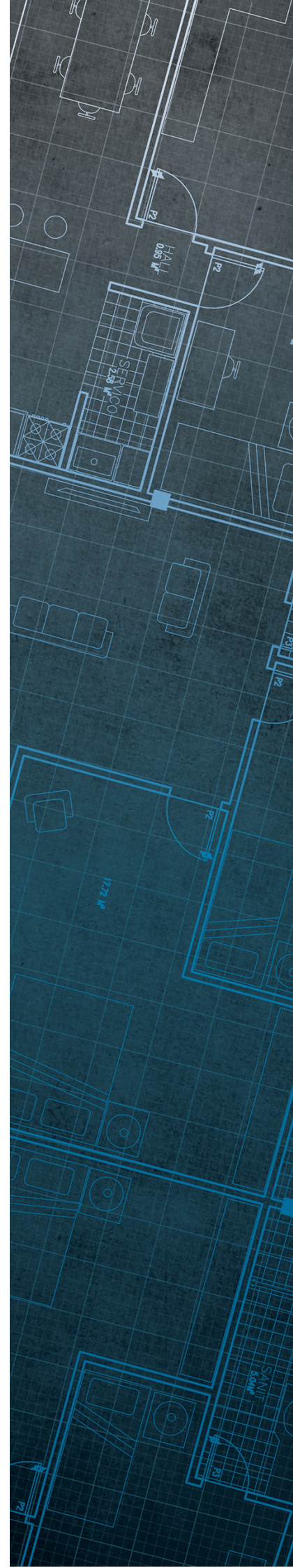
The Coal
Authority

Consultants Coal Mining Report

145 Jubilee Road
Middleton
Rochdale
M24 2LY

Date of enquiry:	10 January 2022
Date enquiry received:	10 January 2022
Issue date:	10 January 2022

Our reference:	51002883921001
Your reference:	ES100122



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

EnviroSolution Limited

Enquiry address

145 Jubilee Road
Middleton
Rochdale
M24 2LY

How to contact us

0345 762 6848 (UK)
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Mansfield
Nottinghamshire
NG18 4RG

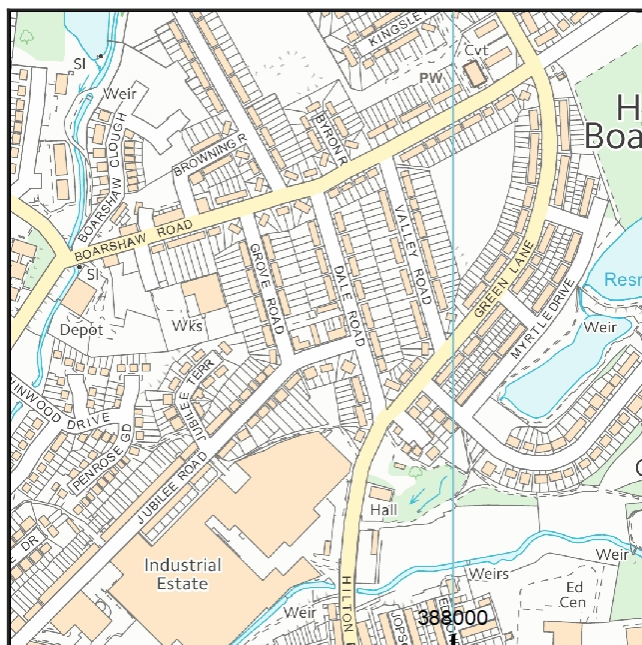
www.groundstability.com

 @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	ARLEY	Coal	3W5I	136	North	7.8	South-West	150	1874

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:

NW173	73	16820
PO0	NW1174	

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
PLODDER	Coal	Yes	20.2	East	124

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

Distance to site investigation (m)	Direction
0.1	East

See Section 4 for further information.

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.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

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.

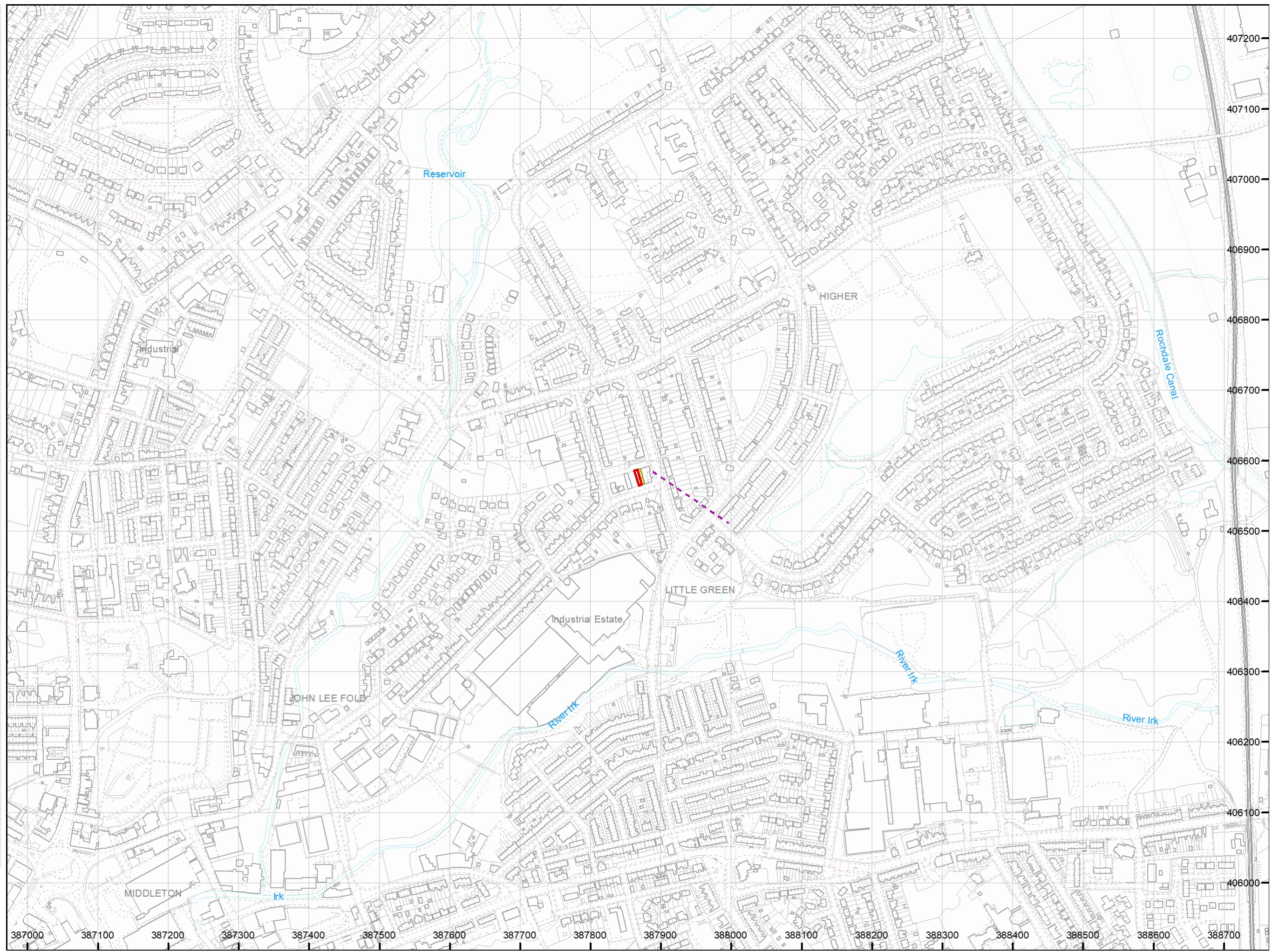
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Outcrop (Conjectured) 
- Site investigations 

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



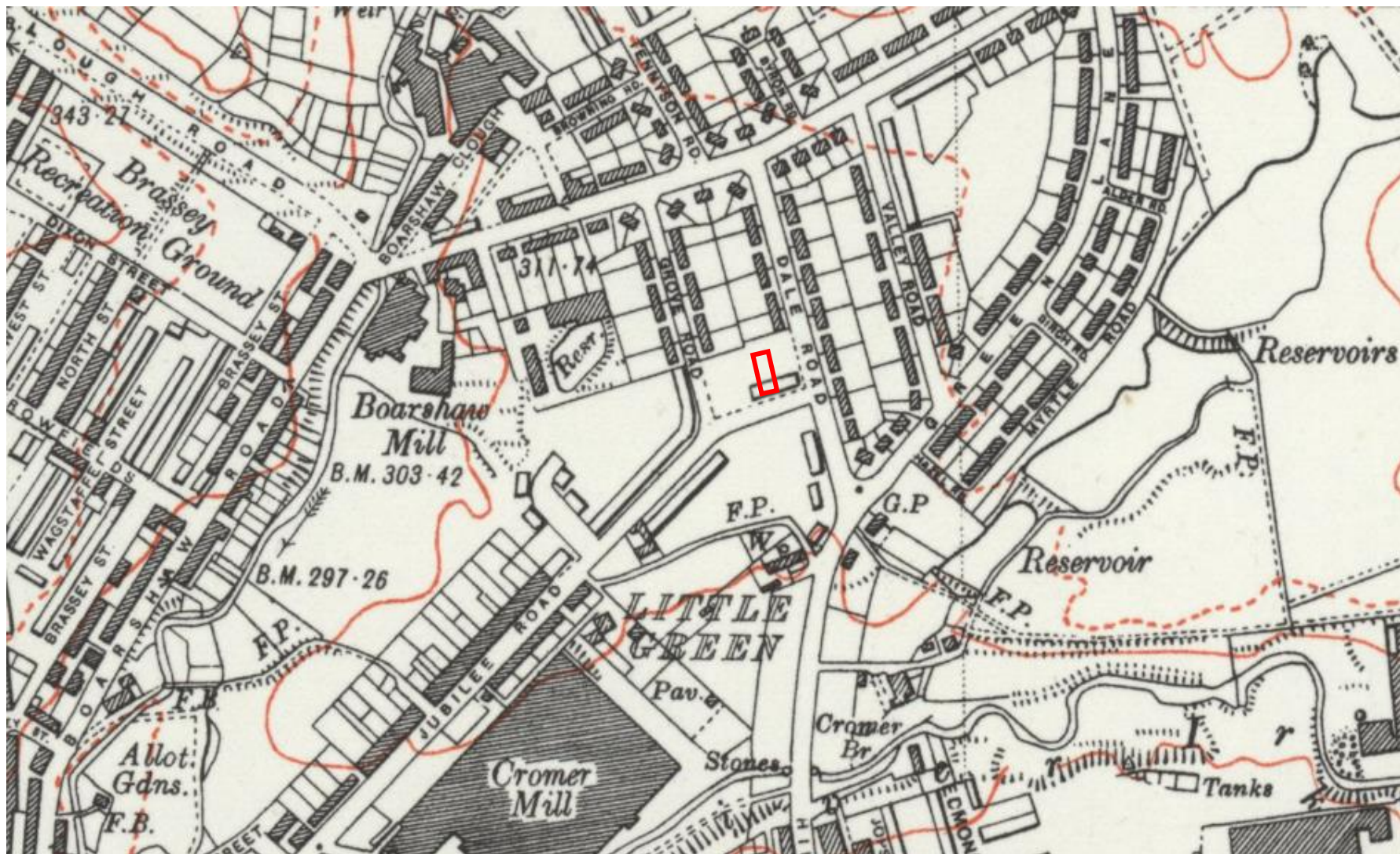
Appendix C – Historic Maps



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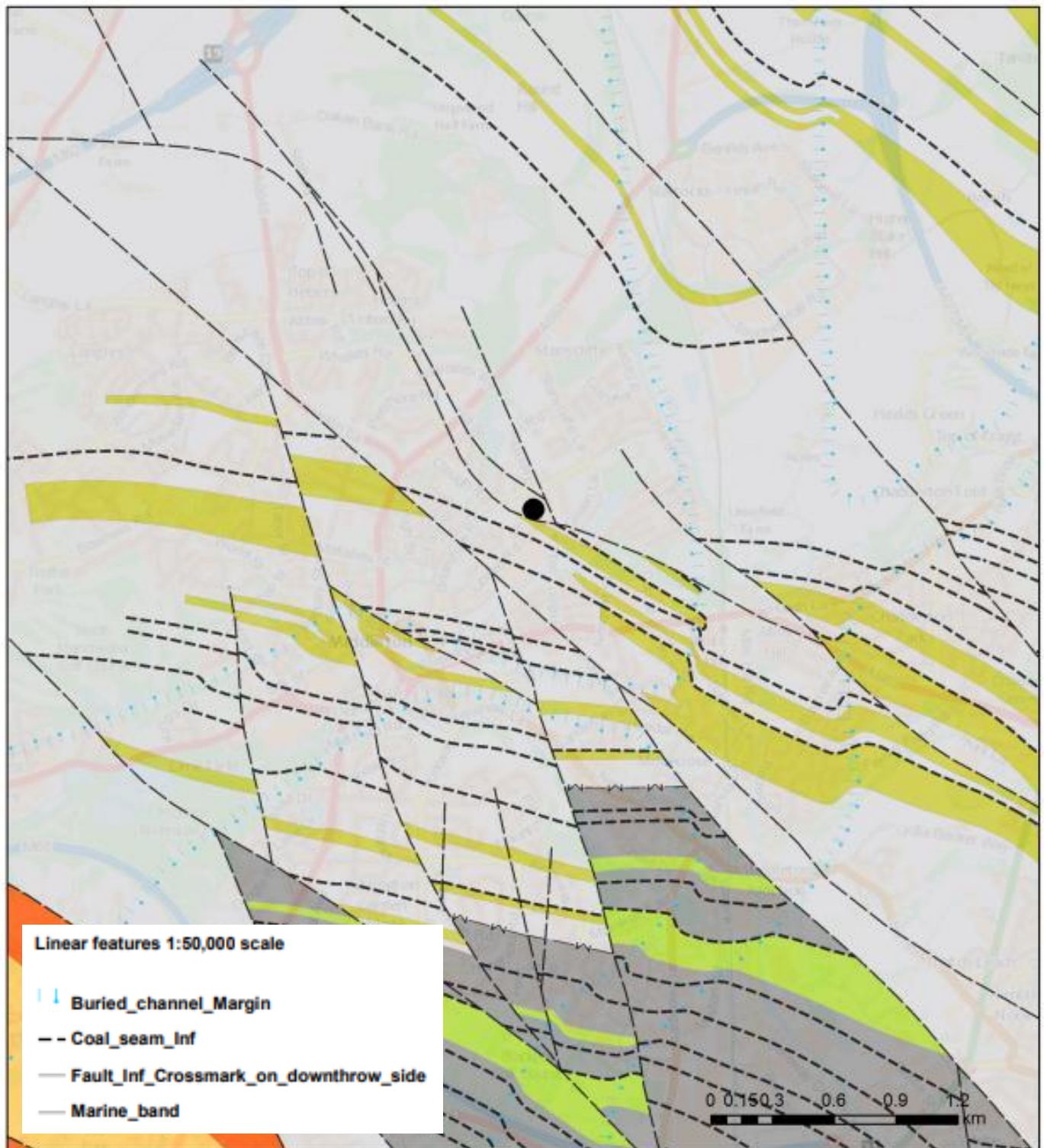
Date: 1848
Scale 1:10,560





Appendix D – Geological Maps

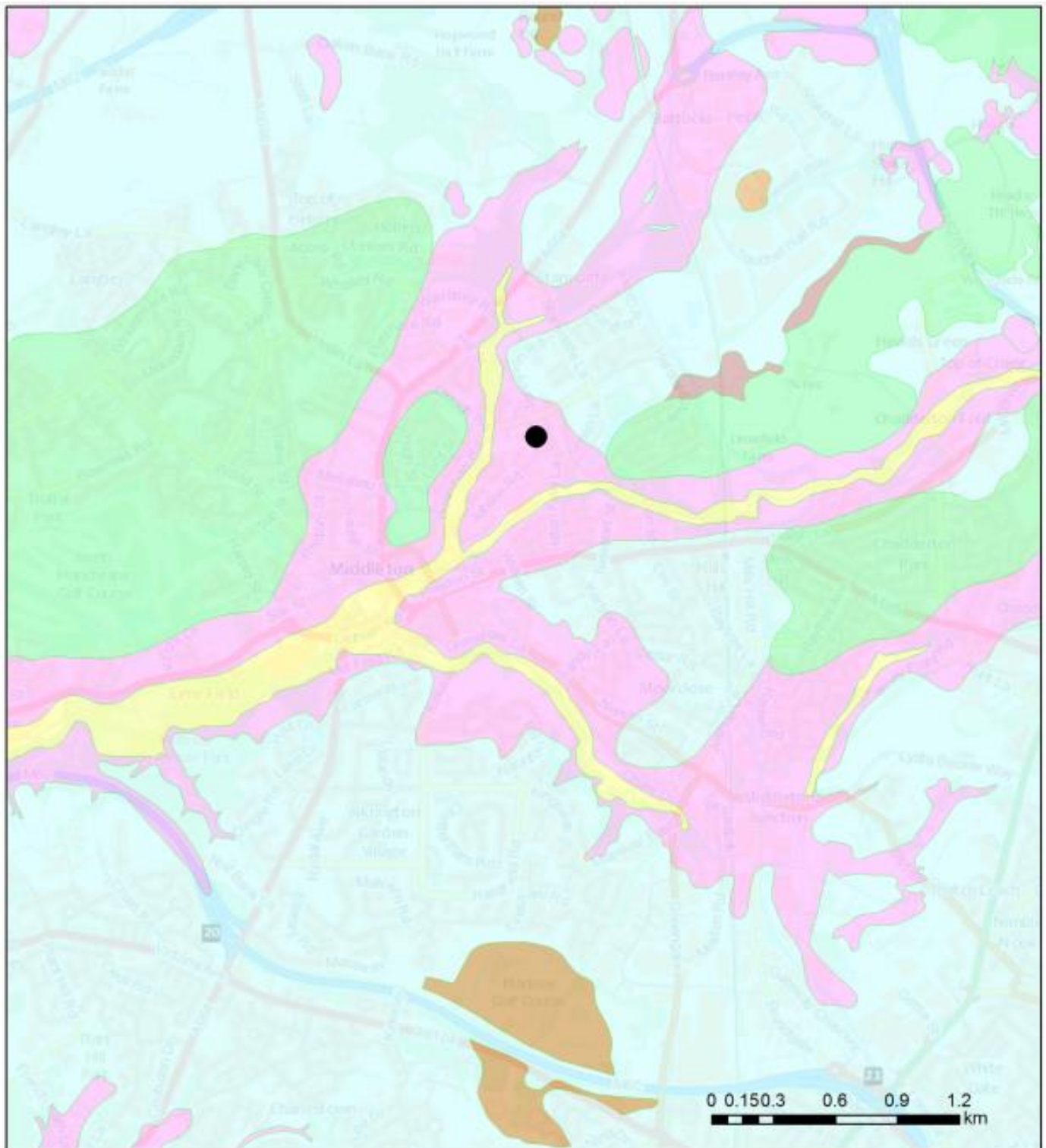
Bedrock Geology



Bedrock geology 1:50,000 scale



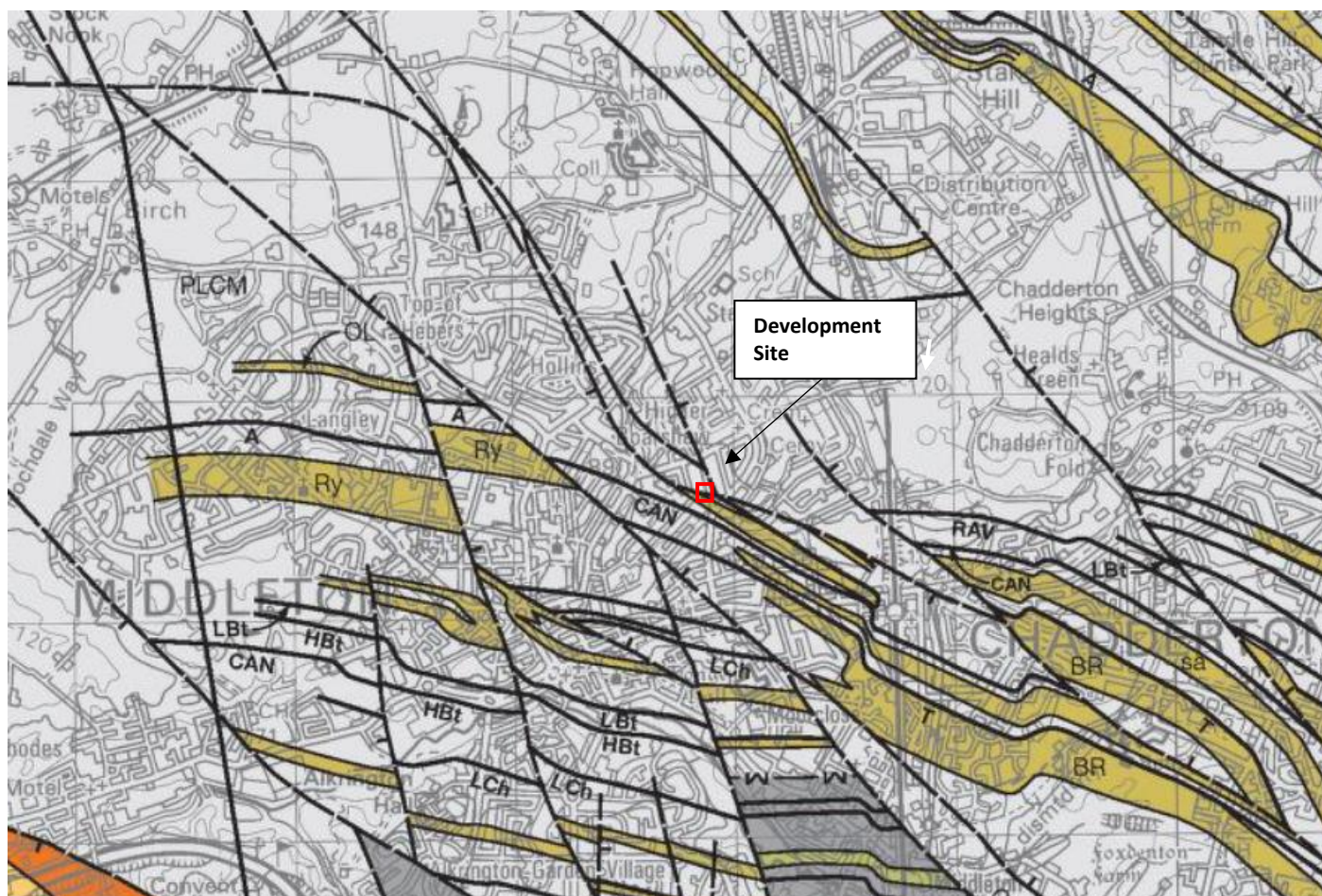
Superficial Geology



Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- HUMMOCKY (MOUNDY) GLACIAL DEPOSITS, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- LACUSTRINE DEPOSITS - SAND AND GRAVEL
- PEAT - PEAT

BGS Geological Survey 1:50,000 Series England and Wales Sheet 85, Manchester



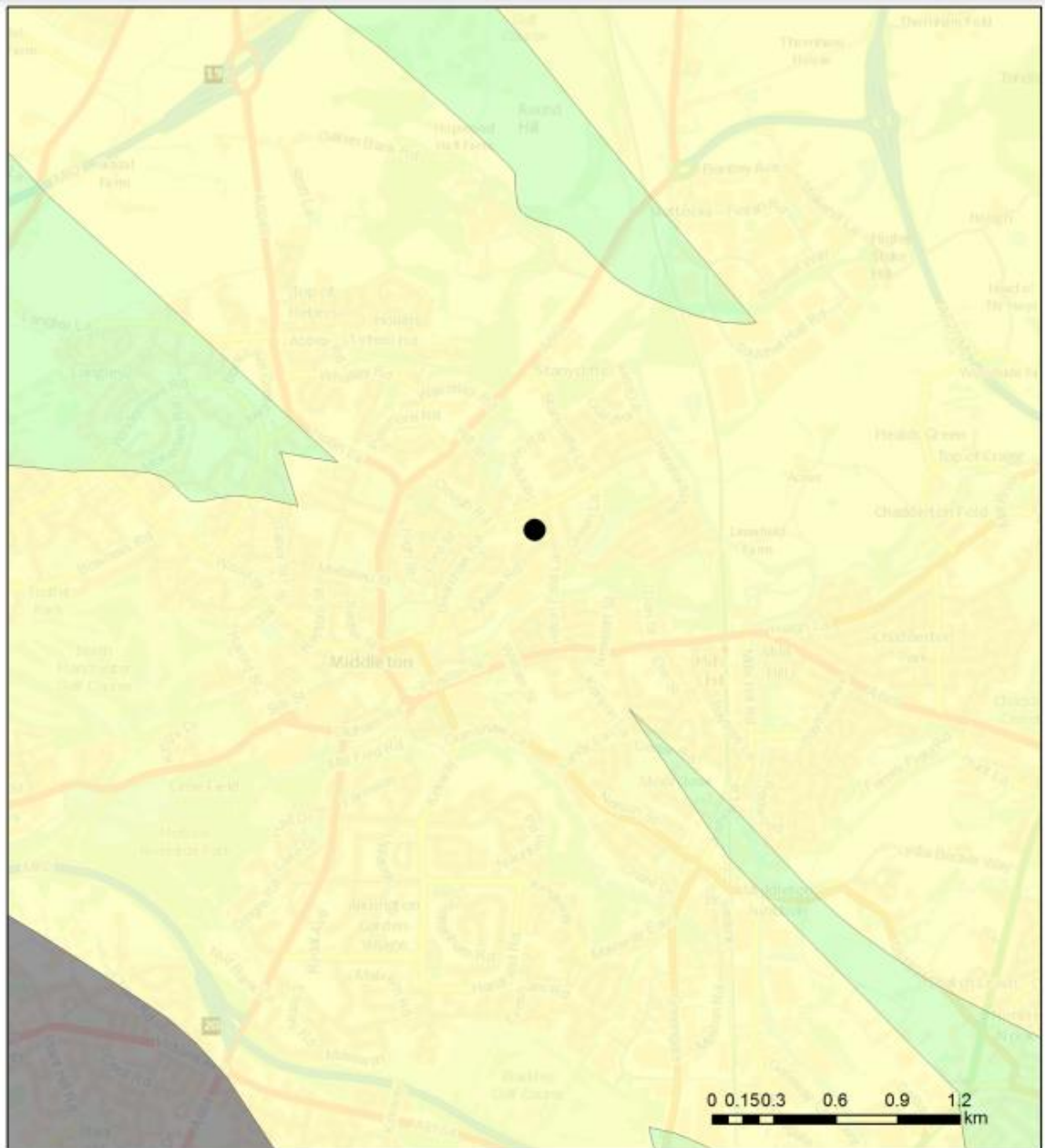
Appendix E – BGS Borehole Logs

SD08NE6

(B10068) Wt. 5086—S111—2,000 6/25 sp. 100. O.A.
 SECTION OF Borehole at Ribble Manufacturing Co.
S. of Boarshaw, Middleton
 Maps: One-inch 85 Six-inch 96 NE.4 County Lancashire
 Height above O.D. ca 300 Latitude _____ Longitude _____
 Communicated by Messrs. Wm. Matthews Ltd. Date of Sinking 1909
 Made by _____ Dip of Strata _____

	Thickness.		Depth from Surface.		T/m	D/m
Blue clay	12	-	12	-		3.65
Blue shale	1	-	13	-		3.96
Rock	1	-	14	-		4.26
Grey shale	22	-	36	-		10.97
Hard brown stone	11	-	47	-		14.32
Grey shale	11	-	58	-		17.67
Rock	3	-	61	-		18.59
Grey shale	22	-	83	-		25.29
Blue shale	10	-	93	-		28.34
Black hind ? L1 Bent Port	68	-	161	-		49.07
Grey rock	62	-	223	-		67.97
Hard grey rock.	2	6	225	6		68.73
Brown hind	2	6	228	-		69.49
Blue shale	5	-	233	-		71.01
Grey shale	2	6	235	6		71.78
Grey rock	2	6	237	-		72.23
Grey shale	2	6	239	6		72.99
Grey rock	2	6	242	-		73.76
Grey shale	2	6	244	6		74.52
Grey rock	11	6	256	-		78.02

Appendix F – Coal Resource Map



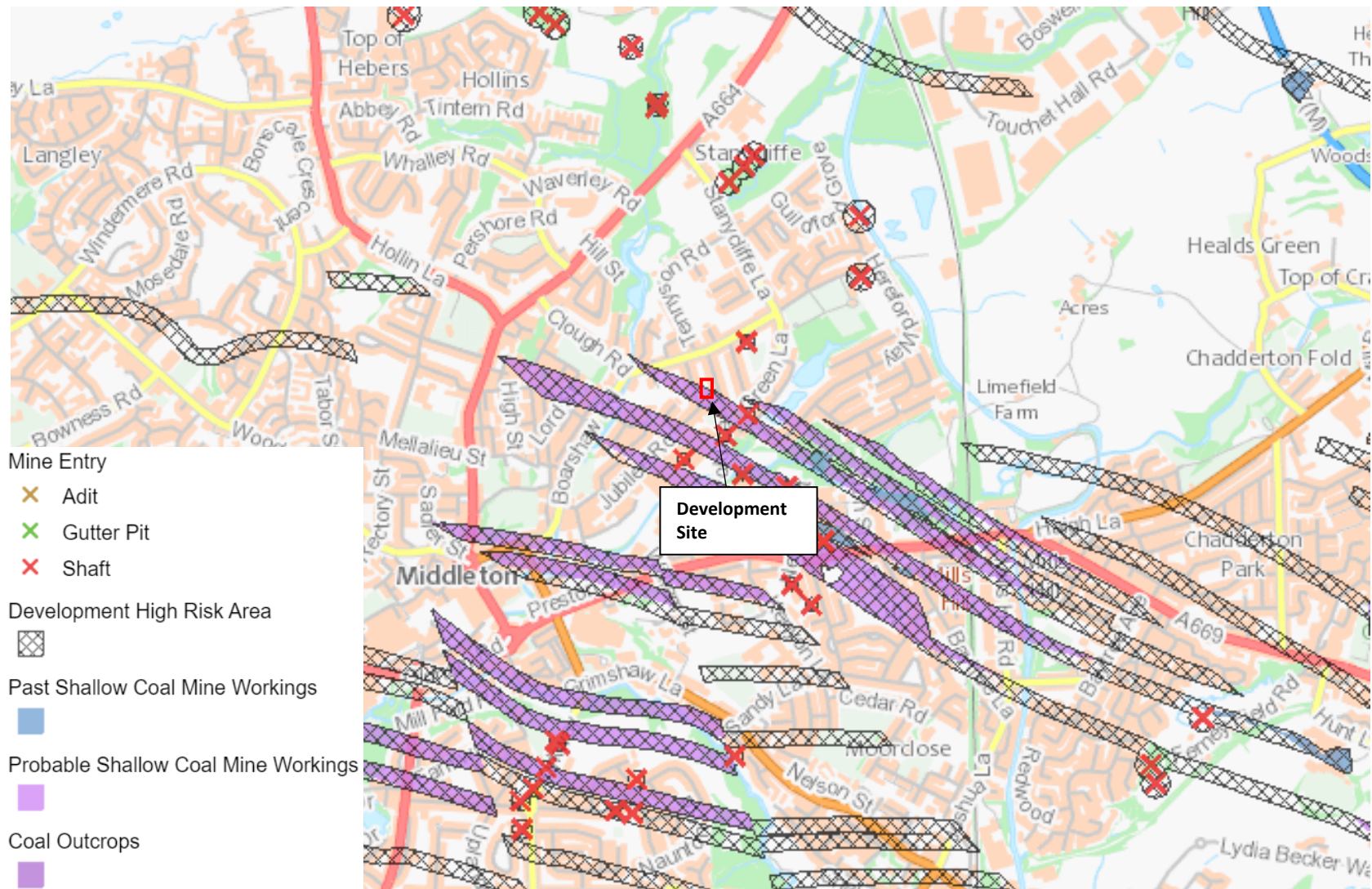
Shallow Coal

-  Buried coal resource overlain by up to 50m overburden
-  Primary opencast coal resource area
-  Secondary opencast coal resource area
-  Tertiary opencast coal resource area

Deep Coal

-  Deep coal at more than 1200m
-  Deep coal between 50m and 1200m

Appendix G – Coal Mining Summary Map



Appendix H – Third Party Investigation Report



Rotary Borehole Site Investigation Report

LOCATION	Proposed Development, 147 Jubilee Road, Middleton, Rochdale M24 2LY
ISSUE DATE	October 2017
FOR	Rachael Levy
CLIENT REF.	
OUR REF.	G17402

Prepared by



Stuart Howe BSc(Hons) FGS
Engineering Geologist

Checked by



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

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Appendix 2	CMRA Report (ref G17356)	



Units 4 and 5 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 an intrusive rotary borehole site investigation on a vacant plot of land on Jubilee Road, Middleton, Rochdale.

It is proposed to infill the gap between two buildings with a new building. National Grid Reference SDE 87872 06581 denotes the approximate centre of the site.

The purpose of this investigation was to investigate the site for the possible presence of shallow abandoned underground coal mine workings beneath the site. Therefore this investigation is limited to this aspect only.

A possible shallow or near surface mining risk at the site had been identified in a mining report provided by the Coal Authority and subsequent Coal Mining Risk Assessment carried out by Ross Nicolson of Geoinvestigate report number G17356. This is discussed in section 2 below.

2. Coal Authority Mining Report

The Coal Authority (CA) and excerpts of the Geoinvestigate reports are provided in Appendix 2.

The main findings of the reports are;

There are **no known mine entries** within 20metres of the boundary of the property, however there is a warning by the CA that additional/hidden mine entries could exist in the local area.

The property is within the likely zone of influence from workings on the surface from past underground workings. Also, the property is in an area where the Coal Authority **believe there is coal at or close to the surface.** (and that) This coal may have been worked in the past.

The 2017 report (by Geoinvestigate) concluded that the site may be underlain at shallow depth by the Plodder coal seam noted to outcrop some 20m to the North East of the site dipping beneath the site at shallow depth, followed by the Higher Bent (HBt) coal seam and the Lower Bent (LBt) coal seam with the Arley coal seam at depth.

The report concluded that *'a site investigation should take place to access the presence of shallow coal mining at the site'* therefore it was considered that drilling should be carried out at the site to try and ascertain if any workings were present within the shallow coal seams.

In light of the possible presence of shallow coal workings below the site, the Client commissioned Geoinvestigate to carry out a borehole investigation to evaluate this possible hazard to the development.

3. Scope of Intrusive Investigation

3.1 Scope of Works

In line with the following borehole drilling investigation was carried out at the site to establish if abandoned coal mine-workings were present in the underlying strata;

- The sinking of two (2) boreholes (RH1 and RH2) to a depth of 30m with supervision of the drilling works by a qualified geotechnical engineer. The boreholes were rapidly driven to depth using Geoinvestigate's proprietary new high speed Microdrilling system.
- Provision of an interpretative report including site plan and borehole logs.

Microdrill's small volume water injection system offers a 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.

Gas monitoring was carried out during drilling to measure concentrations of Oxygen O² and potentially toxic and explosive levels of Carbon dioxide CO², Methane CH⁴ & Carbon Monoxide CO in the ground.

The ground conditions encountered in the boreholes (as described by the driller) are shown on the borehole logs provided in Appendix 1.

The current report focuses only on the mining situation beneath the site. It does not deal with the condition of the surface drift layer (made ground and natural soils) which cover the site.

3.2 Drilling Technique

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 which might indicate abandoned mine workings or upward void migration.

4. Encountered Ground Conditions

4.1 RH1 and RH2

The boreholes encountered overburden to a depth of 3.20m underlain by siltstone with sandstone inclusions to depths of 8.30m and 8.50m. In RH1 solid sandstone was then noted with RH2 encountering fractured sandstone likely indicative of a fault line shown (on the BGS mapping) to run directly beneath the site. Below this mudstone with sandstone inclusions was encountered to a depth of 30.00m where the boreholes terminated.

No hazardous gas concentrations were noted from readings taken from the boreholes during drilling.

No broken ground or voids were encountered in the boreholes.

Water flush was lost below depths of 3.20m in both boreholes.

5 Review of Ground Conditions.

The boreholes suggest that the drift deposits extend to a depth of 3.20m below which siltstone with sandstone inclusions was encountered. RH1 noted solid sandstone between the depths of 8.50m and 16.20m with RH2 encountering fractured sandstone between similar depths. Below this mudstone with sandstone inclusions was found to a depth in excess of 30.00m

The possible geological fault found in RH2 between the depths of 8.30m and 15.70m could have caused the coal to be "faulted out" given that no coal seams were present from 3.20m and the base of the boreholes at 30.00m. However, it is more likely that, due to the absence of coal in RH1 where no possible faulting was observed, that no coal seams were present at shallow depths at the site.

No voids, cavities or broken ground indicative of the presence of mine workings were encountered in the boreholes and as such workings are not expected to occur below the site within the 30.00m depth of the borehole investigation.

Given the above, together with the information from the previous CMRA, carried out by Geoinvestigate it has been concluded that although previous information suggests that the named coal seams above have been worked in the locality, no evidence of working was shown in the boreholes drilled.

6 Conclusions

At the positions drilled, no mine workings were encountered at shallow depth below the site between rock head which commences at a depth around 3.20m and the base of the boreholes at 30.00m.

In conclusion, the drilling has confirmed that no special foundations or ground treatments would be required to mitigate the risk to the site in terms of subsidence, or collapse due to the site's past coal mining legacy.

END OF REPORT



Units 4 and 5 Terry Dicken Industrial Estate
Ellerbeck Way
Stokesley
North Yorkshire
TS9 7AE

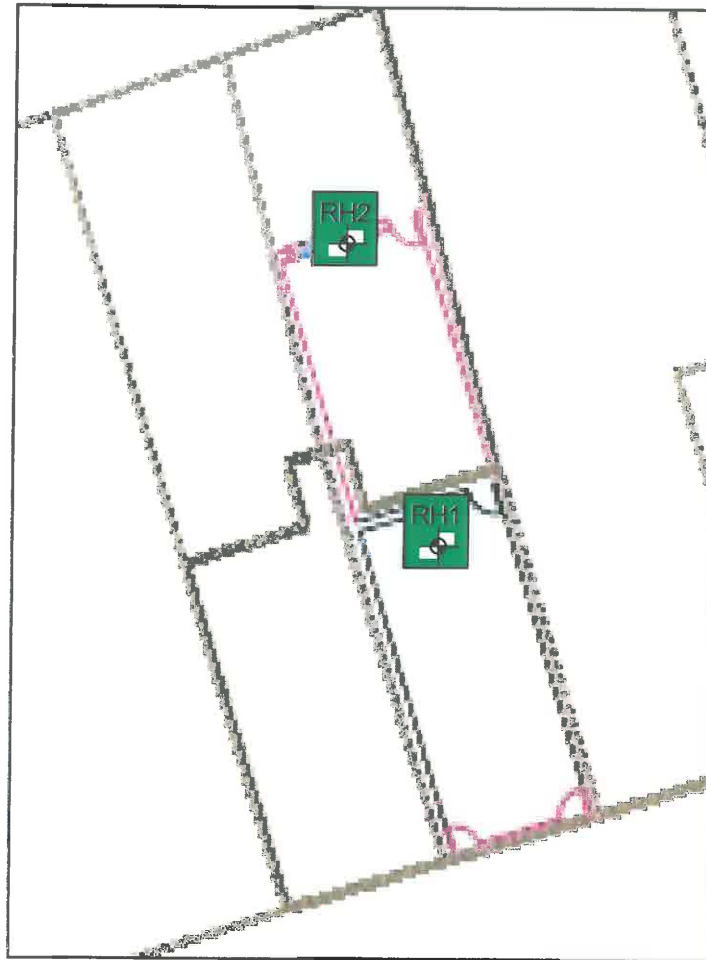
Tel. 01642 713779
Fax 01642 713923
Email enquiries@geoinvestigate.co.uk

APPENDIX 1

Site Plan & Borehole Logs

GEOINVESTIGATE Ltd.

OUR REF: G17402	YOUR REF:	SITE PLAN (NOT TO SCALE)
DATE: 16/10/17	LOCATION: 147 Jubilee Road, Middleton, Rochdale M24 2LY	



GEOINVESTIGATE Ltd.

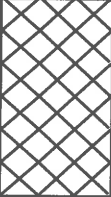
Your Ref.

Our Ref. G17402

RH No.1 Sheet No. 1 of 2

Location: 147 Jubilee Road, Middleton, Rochdale, M24 2LY

DATE: 16-10-17

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.20	Brown DRIFT	3200					Lost return at 3.20m		2.50
8.50	SILTSTONE, SANDSTONE inclusions	5300							5.00
16.2	SANDSTONE	7700							7.50
									10.00
									12.50
									15.00
									17.50
									20.00
									22.50
30.0	MUDSTONE, SANDSTONE inclusions	13800							25.00

Remarks: Casing to 1.00m

Microdrill rotary open hole borehole to 30.00m

No cores recovered from borehole

No gas detected from borehole on completion

Lost flush at 3.20m. 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. G17402

RH No.1 Sheet No. 2 of 2

Location: 147 Jubilee Road, Middleton, Rochdale, M24 2LY

DATE: 16-10-17

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
30.0	MUDSTONE, SANDSTONE inclusions	13800							27.50
	Rotary hole terminated at 30.00m								30.00

Remarks: Casing to 1.00m

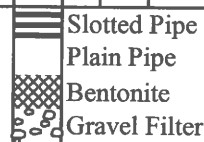
Microdrill rotary open hole borehole to 30m

No cores recovered from borehole

No gas detected from borehole on completion

Flush lost at 3.20m. No voids encountered.

Key:



O Disturbed sample

Cv Shear vane

W Water sample

S Standard Penetration Test

C Cone Penetration Test

RH1

GEOINVESTIGATE Ltd.

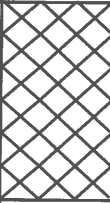
Your Ref.

Our Ref. G17402

RH No.2 Sheet No. 1 of 2

Location: 147 Jubilee Road, Middleton, Rochdale, M24 2LY

DATE: 16/10/17

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
3.20	Brown DRIFT	3200					Lost return at 3.20m		2.50
8.30	SILTSTONE, SANDSTONE inclusions	5100							5.00
									7.50
15.7	Fractured / faulted SANDSTONE	7400							10.00
									12.50
									15.00
30.0	MUDSTONE, SANDSTONE inclusions	14300							17.50
									20.00
									22.50
									25.00

Remarks: Casing to 1.00m

Microdrill rotary open hole borehole to 30.00m

No cores recovered from borehole

No gas detected from borehole on completion

Lost flush at 3.20m. 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. G17402

RH No.2 Sheet No. 2 of 2

Location: 147 Jubilee Road, Middleton, Rochdale, M24 2LY

DATE: 16-10-17

Depth (m)	Description of Strata	Thickness	Legend	Gas Well	Sample	Test Type Result	Flush	Depth to Water	Depth (m)
30.0	MUDSTONE, SANDSTONE inclusions	14300							27.50
	Rotary hole terminated at 30.00m								30.00

Remarks: Casing to 1.00m

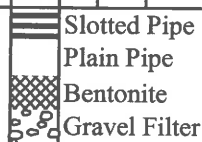
Microdrill rotary open hole borehole to 30m

No cores recovered from borehole

No gas detected from borehole on completion

Flush lost at 3.20m. 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

APPENDIX 2

Coal Authority Coal Mining Report & Geoinvestigate CMRA (Report Number G17042)



GEOLOGICAL
GEOTECHNICAL
GEOENVIRONMENTAL
DATA AQUISITION
CONSULTANCY



Coal Mining Risk Assessment

LOCATION	147 Jubilee Road, Middleton, Rochdale, M24 2LY
ISSUE DATE	4 th September 2017
FOR	Rachel Levy
CLIENT REF.	
OUR REF.	G17356

Prepared by

A handwritten signature in black ink, appearing to read "Ross Nicolson".

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

1. INTRODUCTION

Name of Applicant: Rachel Levy

Issuing Company: Geoinvestigate Ltd, Units 4 & 5, Terry Dicken Industrial Estate, Stokesley, North Yorkshire TS9 7AE

Competent Person: Ross Nicolson BSc (Hons.) Eng. Geol., MSc Eng., CEng IOM³ - Principal Geotechnical Engineer

Site Location and Description:

The boundary shown in red on the Coal Authority report provided in Appendix A corresponds with the planning application. It assumed that the current gap between existing corner shops is to be infilled with a new building.

National Grid Reference SDE 87872 06581 denotes the approximate centre of the plot. The plot is a 22m long x 4.5m wide strip. Google Satellite and Street View imagery shows the site was originally covered by roof and was probably a single storey shop. Subsequently the roof has been removed and the front of the plot boarded-up. The rear of the strip appears to have been a small garden. Small single and two storey shops are present on either side of the development site. Two storey semi-detached and terrace housing is present in the surrounding area.

Ground level at the site lies at an elevation of about 94m AOD.

A review of historical OS maps dating back to 1841 shows the site was farmland/undeveloped land up to 1952. Circa 1841 Tonge Colliery was present well to the southeast of the site while "coal pits" were present to the northeast. Sometime between 1960 and 1977 the front of the property was first occupied by a building, presumably a shop. The surrounding area was developed with housing between 1922 and 1932. Another gap larger site exists to the west of the site on the same shop row.

The reason for the demolition of building which previously occupied the site and the presence of another gap site next door but one to this is unknown.

The map record provides no evidence that the development site has been subject to surface mining activity though historical mine working has occurred in the distant vicinity.

Description & Layout of Proposed Development:

It is proposed to erect a building on the plot.

Risk Methodology Applied

This document and the risk assessment methodology adopted herein is based on CA publication RISK BASED APPROACH TO DEVELOPMENT MANAGEMENT - GUIDANCE FOR DEVELOPERS Version 3, 2014 and Version 4 - 2017. The template contained therein is adopted with minor amendments made by Geoinvestigate Limited.

Scope of the Coal Mining Risk Assessment

The purpose of this Coal Mining Risk Assessment Report is to:

- Present a desk-based review of selected items of available information reviewed on the coal mining issues which are relevant to the application site;
- Use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;

- Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary further intrusive site investigation works and/or remedial works and/or demonstrate how coal mining issues have influenced the proposed development;
- Demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

2. SOURCES OF INFORMATION USED TO INFORM THIS REPORT

The following sources of information have been used and form the basis of the risk assessment of coal mining issues provided in this report. Relevant reports/extracts have been appended.

- An up-to-date Coal Mining Report from the CA dated 22nd August 2017 referenced 51001593281001.
- Geological information on the bedrock and superficial geology obtained from the British Geological Survey (BGS) Sheet 85 Manchester at 1:50000 scale.
- The Coal Authority's online interactive map viewer.
- A site history based on limited Ordnance Survey map records of the area dating back to 1841.
- Historic borehole logs obtained from the BGS archive.
- Google Street View and Satellite images.

3. IDENTIFICATION AND ASSESSMENT OF SITE SPECIFIC COAL MINING ISSUES

The table below summarises the potential risks associated with coal mining legacy for the proposed development site, identified from list sources of information.

Coal Mining Issues	Yes	No	Risk Assessment/Remarks
Past underground coal mining	Yes		<i>The CA report in Appendix A lists mine workings in one seam of coal at a depth of 136m beneath the property.</i> <i>Historical mine working at a depth of 136m would not normally be expected to affect surface stability. As such this issue needs no further assessment in this report.</i>
Probable unrecorded shallow workings	Yes		<i>The CAs interactive map viewer shows the site falls within a DHRA or development high risk area with regard to coal mining legacy</i> <i>The CAs interactive map viewer confirms that the site falls within an area of "probable shallow coal mine working".</i> <i>The CA define Probable Workings as underground workings for which no recorded plan exists but where IT IS LIKELY that workable coal at shallow depths HAS BEEN MINED before records were kept.</i> <i>Consequently the possible occurrence of shallow coal mine working beneath the development requires further consideration in this report.</i>
Outcrops		No	<i>No. The CAs interactive map viewer shows coal outcrop (identified by the CA as the Plodder Coal) 15.8m to the northeast of the site.</i>
Spine roadways at shallow depth		No	<i>None recorded</i>
Future underground mining		No	<i>None recorded</i>
License details (AOR)		No	<i>None recorded</i>
Section 46 notices		No	<i>None recorded</i>
Geology		No	<i>No faults, fissures or breaklines recorded</i>
Mine entries		No	<i>None recorded</i>
Court orders		No	<i>None recorded</i>
Worked out opencast sites		No	<i>None recorded.</i>
Coal mining related hazards		No	<i>None recorded</i>

Coal mining subsidence		No	<i>The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31 October 1994</i> <i>There is no current stop notice delaying the start of remedial works or repairs to the property</i> <i>The Coal Authority is not aware of any request having been made to carry out preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.</i>
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Note For those coal mining issues above identified as “yes” a more detailed discussion and assessment should be made of the risks, both individually and cumulatively, to the application site and the proposed development.

DETAILED DISCUSSION & ASSESSMENT RESPONSE

1. The Coal Authority’s interactive map viewer shows the site falls within a Development High Risk Area (DHRA) raising serious concern about ground instability arising from mine workings and hazardous mine gases as well as other potential coal legacy hazards.
2. The CA report in Appendix A states that the site is underlain by Probable unrecorded shallow workings
3. The CAs interactive map viewer shows the site falls within an area where there has been PROBABLE shallow coal mine working.
4. *The CA define Probable Workings as underground workings for which no recorded plan exists but where **IT IS LIKELY** that workable coal at shallow depths **HAS BEEN MINED** before records were kept.*
5. The location of the site is shown on the extract of BGS geology map Sheet 85 Manchester presented in Appendix B.
6. The tentative elevation of the site relative to the vertical geology column is shown on the map inset.
7. CA mining panel information in the vicinity of the site records dip and dip direction of 7.8 & 15.9 degs to dir. 210 & 207 degs or SSW respectively.
8. A dip arrow on the geological map an appreciable distance to the southwest of the site records a dip of 16 degs to SW/SSW
9. There are no BGS boreholes in the near vicinity of the site that might assist in shedding light on the coal mining geology beneath it.
10. Borehole log SD8NE 6 some 180m to the west of the site shows drift/clay to 3.66m depth. No coal seams are recorded in this borehole which extended to 78m depth at this locality. The borehole log is included as Appendix C.
11. Bedrock within the site would be expected to lie at similar, shallower or greater depth than Log 6.
12. The BGS geology map indicates that the site is underlain by an unknown thickness of glaciofluvial sheet deposits comprising sand and gravel.
13. Assuming that the Plodder Coal seam outcrop occurs some 15.8 to 20m to the northeast of the site and the seam dips under the property at 16 degrees then this coal seam would lie at a depth of 4.7m to 6m below the site.
14. However if the drift is deeper than 6m or dip was shallower (say 8 degs) this coal seam would be absent and there would be no mine working at very shallow depth in the Plodder Coal below the development.
15. Continuing the assumption that the coal outcrop is in fact the Plodder then the Higher Bent (HBt) coal seam would according the vertical geology column be expected to occur below the site at a depth of 33m. At this depth mine working in the HBt would be unlikely to impact surface stability within the development site.
16. Alternatively the BGS geology map suggests that the site may be located towards the base of a sandstone unit and therefore the nearby coal outcrop to the NE of the site might be the HBt rather than the Plodder. If this were so mine workings in the HBt may occur at 26m depth with mine workings in the LBt at 43m depth.
17. Alternatively given that according to the CA report the Arley Coal seam occurs at 135m depth below the site the vertical geology column suggests that the YB coal seam may occur at or close to surface or at very shallow depth below the site followed by the Hy seam at 25m depth and the Smith Coal at 75m depth.

18. In all 3 of the foregoing scenarios the presence of mine workings at 25m to 37m depth below the site is unlikely to be problematic assuming bedrock is close to surface and the workings if present do not exceed 1.5m or 2m thickness.
19. Of concern however is the possible occurrence of very shallow coal mine working at 6m depth or so or perhaps several metres deeper if the coal outcrop shown nearby to the northeast of the site lies further east than anticipated.
20. A further scenario worthy of consideration is that the geological fault shown to lie immediately below the property on the BGS geology map or close to it has caused the coal to be "faulted-out" and therefore absent below the site or the coal has been rendered unminable by fault disturbance and fracturing. In both instances because of faulting mine workings could be absent at shallow depth beneath the property.
21. From the foregoing it is clear that there is in this instance considerable uncertainty about bedrock depth at the site and whether the property is underlain by minable coal and if so whether mine workings exist at shallow depth in this coal.
22. Because of this uncertainty drilling is required to confirm bedrock depth and the absence of shallow coal seams and mine workings below the development site.
23. Hazardous gases associated with coal seams and underground coal workings are unlikely to pose a significant risk to the development in this instance because firstly typically across the UK coalfields gas is rarely a problem, secondly with regard to this property there is no record of a site specific gas problem.
24. However because workings may exist in coal at very shallow or shallow depth below the site and a geological fault occurs immediately below the site or close by, it is our opinion that the gas risk should be raised from Low to Moderate until proven otherwise by drilling and gas monitoring.
25. No mine entries are recorded by the CA within an influencing distance of the development site.
26. The risk of additional or other mine entries occurring within the site is considered by us to be Very LOW but not negligible. If an additional mine entry/s are found during subsequent investigations of the site or during construction groundworks the appropriate remedial action can be taken then including notifying the Coal Authority.
27. **In light of the foregoing this CMRA desk study has shown that there are potentially significant coal mining stability and mine gas hazards to the proposed development.**
28. **Consequently further exploratory coal legacy drilling and gas monitoring and perhaps other mitigation measures may be required to properly assess the safety of this site and make it safe.**

4. MITIGATION STRATEGY PROPOSED

Notes This section is the key part of the Coal Mining Risk Assessment Report. It should explain how the coal mining issues have influenced the proposed layout and design of the development. The mitigation strategy will set out and illustrate with plans where necessary how the on-site issues identified in section 3 will be dealt with to ensure safety and stability of the development. This should include the assessment of mine gas and the necessary mitigation measures required as necessary. You may wish to refer to the Construction Industry Research and Information Association (CIRIA) publication Special Publication 32 "Construction over Abandoned Mine Workings"

Where the desk-based assessment cannot conclude with certainty the extent of the coal mining risks on the site; details of further proposed on-site intrusive investigation works should be set out.

However, it is of paramount importance that this does not simply evade the issue and therefore place the Local Planning Authority in a position where it cannot be satisfied that coal mining legacy could give rise to some doubt that planning permission could not be granted.

MITIGATION RESPONSE

1. To properly determine the coal mining risk at this site it is proposed to drill boreholes to target depths up to 30m (but not necessarily reaching 30m) to locate possible coal and ironstone mine workings beneath the development site.
2. Borehole depths will be subject to adjustment by the supervising Competent Person on-site and depending on the geological conditions encountered (namely depth to rockhead, seam thickness and

ratio of rock cover to seam thickness) found during drilling and therefore may be terminated less than 30m.

3. A minimum of two boreholes is required in the vicinity of the new building.
4. The main purpose of the borehole investigation is to confirm the possible presence shallow coal seams beneath the site and if present to establish whether these seams contain mine workings.
5. If mine shafts are found during the intrusive site exploration works or during the subsequent construction groundworks the appropriate remedial action can be taken then. In addition the CA should be notified.
6. If mine workings are clearly confirmed to be absent, or beyond an influencing depth of the surface development it is unlikely that ground treatment/stabilisation by injection grouting or special foundation design measures will be required in respect of coal mining legacy.
7. The requirement for gas protection measures and the level of gas protection will be determined by a risk assessment based on a source - pathway - receptor model. This will depend on the gas concentrations found during coal legacy drilling together with the configuration of the site geology - particularly the nature and thickness of the drift/soil cover and the presence (or potential) for fissures or other pathways to exist.
8. A **Coal Authority Permit** must be obtained prior to the commencement of drilling at this site.
9. A risk assessment has been carried out in the section below (**The Coal Authority Permit**) for the exploratory site drilling works. In accordance with the RA drilling must be carried out using **small volume water injection flush** as this carries Low or Negligible risk of causing explosion or creating, releasing or causing hazardous gases to move upwards into nearby occupied housing and buildings. Gas monitoring must be carried out during drilling and boreholes must be sealed at the end of drilling.
10. The drilling flush used at this site MUST be that that stated in this CMRA - namely WATER and no other.
11. The drilling contractor/site manager should be warned that the CA operate permit compliance checks on drill sites and that a change in drilling fluid may be a breach of contract and may be liable to prosecution.
12. A 2nd specialist report will required on the findings of the coal drilling investigation finalising the scope of the mitigation measures needed (if any) to safeguard the development from coal mining related ground instability and hazardous gases.
13. **On the basis of the work to date, we are of the opinion that the mining stability risks posed by the strata beneath this site from coal mining legacy can be mitigated by routinely adopted measures and should not preclude the planning permission being registered.**

The Coal Authority Permit

***Note** The report should state whether enquiries have been made or will be made; whether a permit application has been submitted or if a permit has already been obtained from the Coal Authority for the mitigation and/or further site investigation works.*

RESPONSE

A Coal Authority Permit needs to be obtained for further intrusive exploratory drilling works (as recommended above) which will disturb or enter any coal seams or coal mine workings present beneath the site.

Drilling Risk Assessment

In order to obtain a permit a coal drilling risk assessment has been carried out in accordance with Section 6 of CA publication: *"Guidance on Managing the Risk of Hazardous Gases when Drilling, or Piling near Coal"* which deals with the risks posed by various drill flushing mediums and different drilling Scenarios or Situations.

Situation Assessed: The site has been assessed to fall within **"Unworked coal or coal workings; High or UNKNOWN risk of hazardous gases being created/ generated; Occupied property within risk area"**. Therefore it is concluded that an Undetermined/Unknown hazardous gas risk exists at this site. In accordance with Table 6.2.7 Water Flush falls within Low risk while Air, Mist and Foam flush all fall within High & High to Medium risk categories respectively. In this situation water flush is by far the safest drilling medium available and should **ONLY** be used.

6.2.7 Table of Risks for Different Drilling Scenarios

Situation	Air flush	Mist flush	Foam flush	Water flush	Mud flush	Additional controls
- Unworked coal or coal workings - High or unknown risk of hazardous gases being present / created - Occupied property within risk area	HIGH	HIGH / MED'M	HIGH / MED'M	LOW	LOW	- Monitoring at rig and other open holes. - Seal boreholes as soon as possible.

Air, Mist and Foam flush are much less safe than water or mud.

Outcome: For safer drilling small volume water injection drill flush is should ONLY be used. The stipulation in this instance of water flush only for exploratory drilling accords with the CA's own internally managed and licensed safe exploratory coal drilling protocol.

Drill Flush to be used when drilling: Permit application must state WATER only, as mud though safe is too messy.

Other precautions: Gas monitoring to be carried out during drilling. Boreholes to be sealed as soon as possible.

5. CONCLUSION

Notes The Coal Authority would expect the Coal Mining Risk Assessment Report to conclude with a brief summary of risks and the remedial measures required for the proposed development site. The report should demonstrate a clear strategy for addressing the coal mining legacy and how the requirements of national planning policy with regard to development on unstable land have been addressed.

OUR RESPONSE

The Coal Authority have identified this site as falling within a Development High Risk Area (DHRA) where there is potentially a serious risk to surface development from mining related ground instability and hazardous mine gases arising from past coal mining legacy.

The site is identified by the Coal Authority as one where there is PROBABLE shallow coal mine working.

The CA define Probable Workings as underground workings for which no recorded plan exists but where **IT IS LIKELY** that workable coal at shallow depths **HAS BEEN MINED** before records were kept.

This CMRA has indicated that 1 coal seam containing mine workings at very shallow depth may occur beneath the development site.

Therefore potentially coal mining legacy poses significant risk to surface stability in the proposed development area requiring further assessment.

Because of this exploratory drilling is required to establish the depth of the coal seam beneath the site and whether this seam contains mine workings and hazardous mine gases.

The boreholes will also establish bedrock depth below the property this being an important factor in evaluating the impact of mine working depth on surface stability.

Gas monitoring must be carried out during drilling.

Notwithstanding, on the basis of the work to date, we are of the opinion that the coal mining legacy risks posed by this site can be mitigated by routinely adopted engineering/design measures (as outlined in our mitigation proposal above) and therefore should not preclude the planning permission being registered.

In order to finalise what (if any) mitigation measures are required it will be necessary to carry out further intrusive borehole investigations into the geological sequence to establish this sequence beneath this site and particularly the presence or absence of coal and workings in coal and hazardous ground gases.

The sinking of exploratory boreholes will be required at the site to do this.

A safe method of sinking boreholes which will reduce the risk to drill operators and the public has been proposed. A Coal Authority Permit will be required before drilling takes place. This must state that only water flush will be used for drilling.

Depending on the outcome of the additional coal mining legacy investigation it may be necessary to stabilise these seams/workings using routine drilling and grouting techniques and/or adopt special foundations design measures and perhaps install gas protection measures.

In conclusion we see no reason why Planning Permission should not be granted in the interim and that these works form a condition on the planning approval.

Appendices:

- A. CA Report ref 51001593281001 dated 22nd August 2017.
- B. Extract of BGS bedrock geology map Sheet 85 Manchester at 1:50000 scale
- C. BGS Borehole log SD80NE 6.

Other historical OS maps, borehole logs, site images and photographs have not been included because it was considered that they did not provide significant useful additional information.

APPENDIX A
COAL AUTHORITY REPORT



The Coal
Authority

Resolving the **impacts** of mining

Non-Residential Coal Mining Consultants Report



147 JUBILEE ROAD, MIDDLETON, ROCHDALE, M24 2LY

Date of enquiry:	22 August 2017
Date enquiry received:	22 August 2017
Issue date:	22 August 2017
Our reference:	51001593281001
Your reference:	G17356

Non-Residential Coal Mining Consultants 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

GEOINVESTIGATE

Enquiry address

147 JUBILEE ROAD, MIDDLETON, ROCHDALE, M24 2LY

How to contact us

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

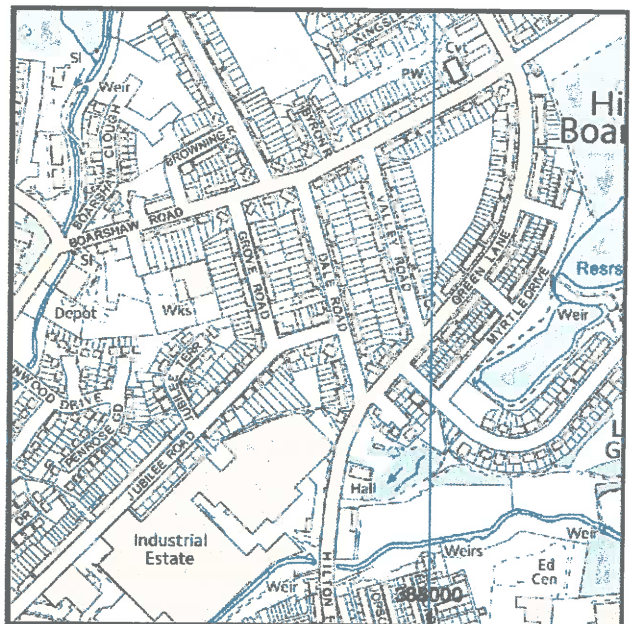
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



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Detailed findings

Past underground coal mining

Colliery	Seam	Mineral	Panel	Depth (m)	Direction to working	Disposition	Extraction thickness (cm)	Year
unnamed	ARLEY	Coal	3W5I	136	N	0.1	150	1874

Probable unrecorded shallow workings

Yes.

Outcrops

Seam name	Mineral	Thin indicator	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
PLODDER	Coal	False	15.8	74	124

Spine roadways at shallow depth

None recorded.

Future underground mining

None recorded.

Licence details (AOR)

None recorded.

Section 46 notices

None recorded.

Geology

No faults, fissures or breaklines recorded.

Mine entries

None recorded.

Court orders

None recorded.

Worked out opencast sites

None recorded.

Coal mining related hazards

None recorded.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31 October 1994.

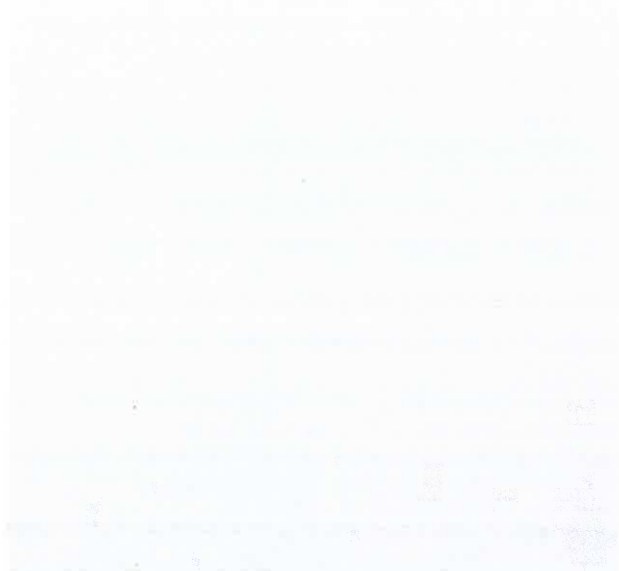
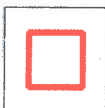
There is no current Stop Notice delaying the start of remedial works or repairs to the property.

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.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



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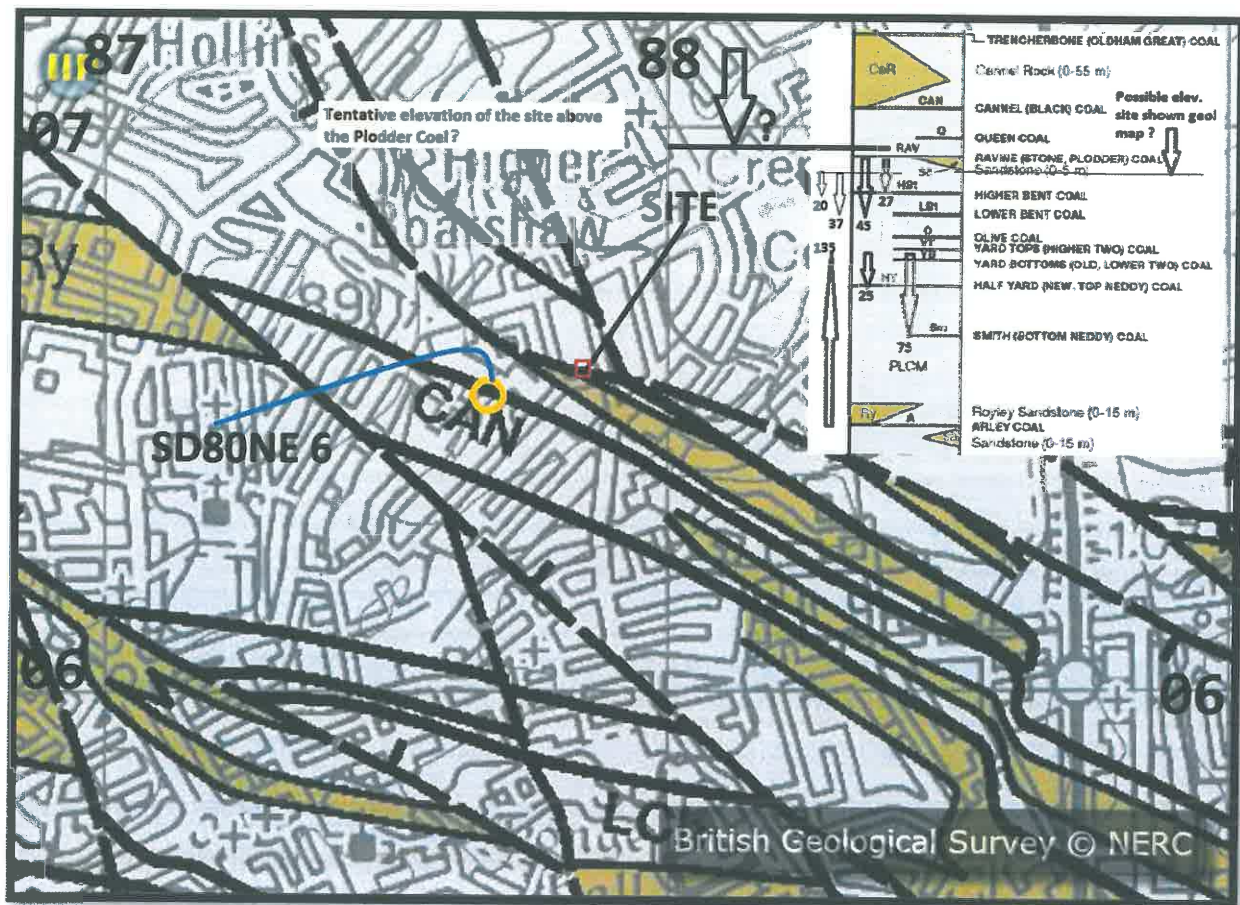
Ordnance Survey Licence number: 100020315

VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	22 August 2017
Issued to	GEOINVESTIGATE TERRY DICKEN INDUSTRIAL ESTATE TERRY DICKEN INDUSTRIAL ESTATE, ELLERBECK WAY STOKESLEY NORTH YORKSHIRE TS9 7AE
Property search for	147 JUBILEE ROAD MIDDLETON ROCHDALE M24 2LY
Reference number	51001593281001
Date of issue	22 August 2017
Cost	£101.70
VAT @ 20%	£20.34
Total received	£122.04
VAT registration	598 5850 68

APPENDIX B

EXTRACT OF GEOLOGY MAP



APPENDIX C

BGS LOG SD80NE 6

(2000) W. 2004-2111-2.000 2004 2004 G.A.
 SECTION OF Borehole SD 80NE 6
 as Ribblehampton Co.
S. of Borehampton, Middleton
 Maps: One-inch 94 Six-inch Q4NE5 County Lancashire
 Height above O.D. 6300 Latitude _____ Longitude _____
 Communicated by James W. Hutton Date of Sinking 1909
 Made by _____ Dip of Strata _____

	Thickness	Depth from Surface	T/M	D/M
Blue clay	12 -	12 -		3.65
Blue shale	1 -	13 -		3.96
Rock	1 -	14 -		4.26
Grey shale	22 -	36 -		10.97
Hard brown stone	11 -	47 -		14.32
Grey shale	11 -	58 -		17.67
Rock	3 -	61 -		18.57
Grey shale	22 -	83 -		25.29
Blue shale	10 -	93 -		28.36
Black sand ? L1 Pent Point	68 -	161 -		49.97
Grey rock	62 -	223 -		67.97
Hard grey rock.	2 6	229 6		68.23
Brown sand	2 6	235 6		69.49
Blue shale	5 -	240 -		71.01
Grey shale	2 6	246 6		71.78
Grey rock	2 6	252 6		72.23
Grey shale	2 6	258 6		72.49
Grey rock	2 6	264 6		73.76
Grey shale	2 6	270 6		74.52
Grey rock	11 6	281 6		78.02