



EARTH ENVIRONMENTAL
& GEOTECHNICAL

Coal Mining Risk Assessment

Westminster Drive

Bury

December 2024

On behalf of

Failsworth Property

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business Centre
Houldsworth Street
Stockport
SK5 6DA

Tel : 01619756088

Email
headoffice@earthenvironmental.co.uk

www.earthenvironmental.co.uk

COAL MINING RISK ASSESSMENT

WESTMINSTER DRIVE

BURY

FOR

FAILSWORTH PROPERTY

Earth Environmental & Geotechnical Ltd
Houldsworth Mill Business & Arts Centre
Houldsworth Street
Stockport
SK5 6DA

www.earthenvironmental.co.uk

Tel 0161 9756088

Report No. A6355/24/CMRA

DECEMBER 2024

Report Title:	Westminster Drive, Bury: Coal Mining Risk Assessment	
Report Reference:	A6355/24/CMRA	
Client:	Failsworth Property	
Issue Date:	15th December 2024	
Drafted By:	Tom Pudifoot BSc (Hons)	
Reviewed By:	Lewis Waller MEarthSci (FGS)	<i>L. Waller</i>
Authorised By:	A Czarnecki BSc (Hons) FGS CGeol	<i>Adam Czarnecki</i>

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorisation being obtained from Earth Environmental & Geotechnical. Earth Environmental & Geotechnical accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons so using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of Earth Environmental & Geotechnical. It may contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

The findings and opinions provided in this document are given in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined within this document. The findings and opinions are relevant to the dates when the assessment was undertaken but should not necessarily be relied upon to represent conditions at a substantially later date.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed and which Earth Environmental & Geotechnical assumes to be reliable but have not been independently confirmed. Therefore, Earth Environmental & Geotechnical cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Earth Environmental & Geotechnical for the effects of any future changes to such guidelines and legislation.

The limitations of liability of Earth Environmental & Geotechnical for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Objective	1
	Sources of Information	1
2.0	SITE LOCATION AND DESCRIPTION.....	3
3.0	ASSESSMENT OF DATA.....	4
	Geological Information	4
	British Geological Survey Published Data Assessment.....	4
	Coal Authority Records	7
4.0	COAL MINING RISK ASSESSMENT	9
	Scope of Coal Mining Risk Assessment.....	9
	Data Limitations.....	9
	Coal Mining Risks.....	9
	Coal Mining Assessment Criteria	10
	Conclusions.....	10
	Proposed Mitigation Strategy	11

FIGURES

Figure 1	Proposed Development Plan
Figure 2	Site Location Plan
Figure 3	BGS Borehole Location Plan
Figure 4	Geology Map Extract (1:10560)
Figure 5	Geology Map Extract (1:50,000)
Figure 6	Coal Authority Map Extract

TABLES

Table 1	Summary of Coal Outcrops
---------	--------------------------

APPENDICES

Appendix 1	Coal Authority Consultants Mining Report
Appendix 2	Report Limitations

1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd have been commissioned by Failsworth Property (the Client), to undertake a Coal Mining Risk Assessment for a development on land south of Westminster Drive, Bury.
- 1.2 The proposed development involves the erection of 12no. garages in two identical blocks of six units each.
- 1.3 A planning application (7080) has been submitted to Bury Council.
- 1.4 A proposed development plan is shown in Figure 1 overleaf.

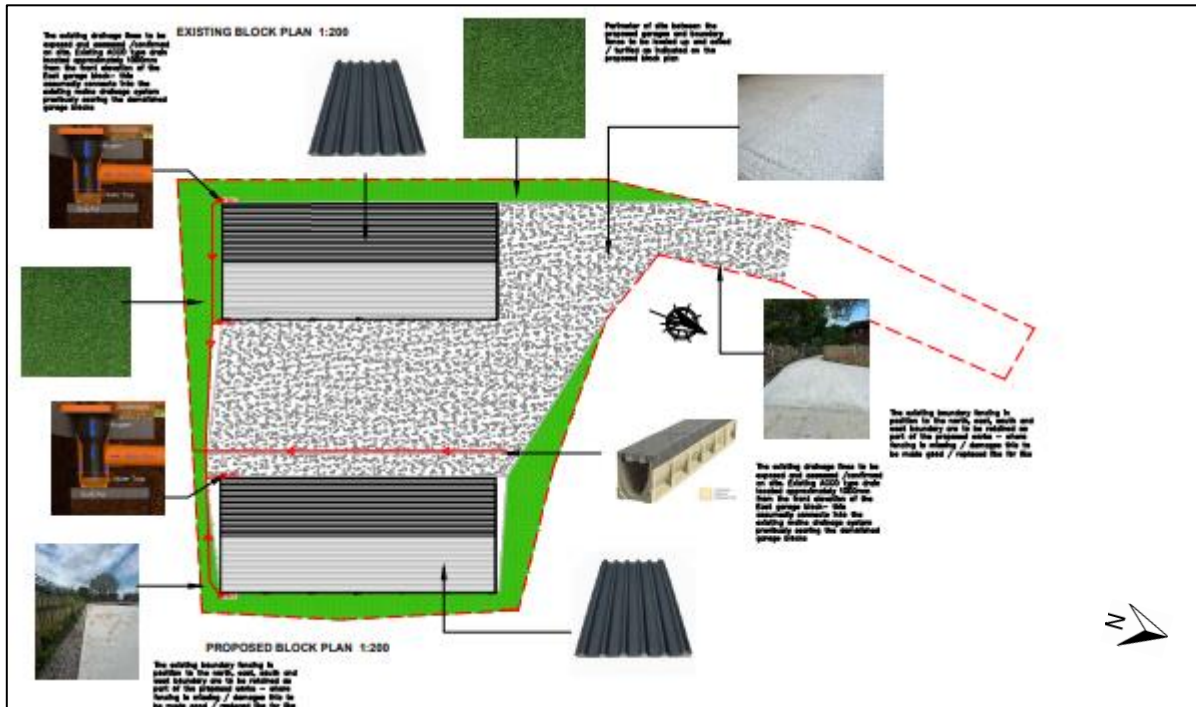
Objective

- 1.5 The purpose of the Coal Mining Risk Assessment is to collate available geological, mining, and historical data in order to assess the potential for the site to be affected by underground mining.
- 1.6 This report has been drafted in accordance with the Coal Authority (CA) Guidance Risk Based Approach to Development Management, Version 4, 2017.

Sources of Information

- 1.7 The Coal Mining Risk Assessment compiles a review of the following information sources:
 - Geological Survey of England and Wales, Sheet 85, Manchester, 1:50,000 edition 2010.
 - British Geological Survey, SD70NE, 1:10,560, edition 1975.
 - Coal Authority Interactive Map Viewer.
 - Coal Authority Mining Report.
 - British Geological Survey online borehole records.
 - Google Earth imagery.
 - Online Historical Ordnance Survey maps.
 - Site Investigations in Areas of Mining Subsidence, FG Bell, 1975.
 - The threat of abandoned mines on the stability of urban areas, Barry Clarke, IAE2006 Paper Number 379, The Geological Society of London, 2006.
 - The collapse of shallow coal mine workings, Durham theses, Durham University, Garrard, 1981.
 - Construction over abandoned mineworking's, CIRIA Special Publication 32, 2002.
 - Abandoned Mineworking's Manual, CIRIA 2019.
 - National Library of Scotland, British Geological Survey Scotland, <https://maps.nls.uk/>
 - Bury Metropolitan Borough Council Planning Portal.

Figure 1: Proposed Development Plan



2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located approximately 4.5km southwest of Bury Town Centre.
- 2.2 The site currently comprises a disused parcel of land, bound entirely by wooden fencing from the gardens of surrounding residential properties. Beyond these residential dwellings, Westminster Drive is directly to the north, Coronation Road to the east and Kilburn Road to the west.
- 2.3 The approximate National Grid Reference for the centre of the site is SD 77170 07866 (X: 377170, Y: 407866) with the site postcode being M26 3WD.
- 2.4 The site is generally flat lying.
- 2.5 A site location plan is shown below as Figure 2.

Figure 2: Site Location Plan



3.0 ASSESSMENT OF DATA

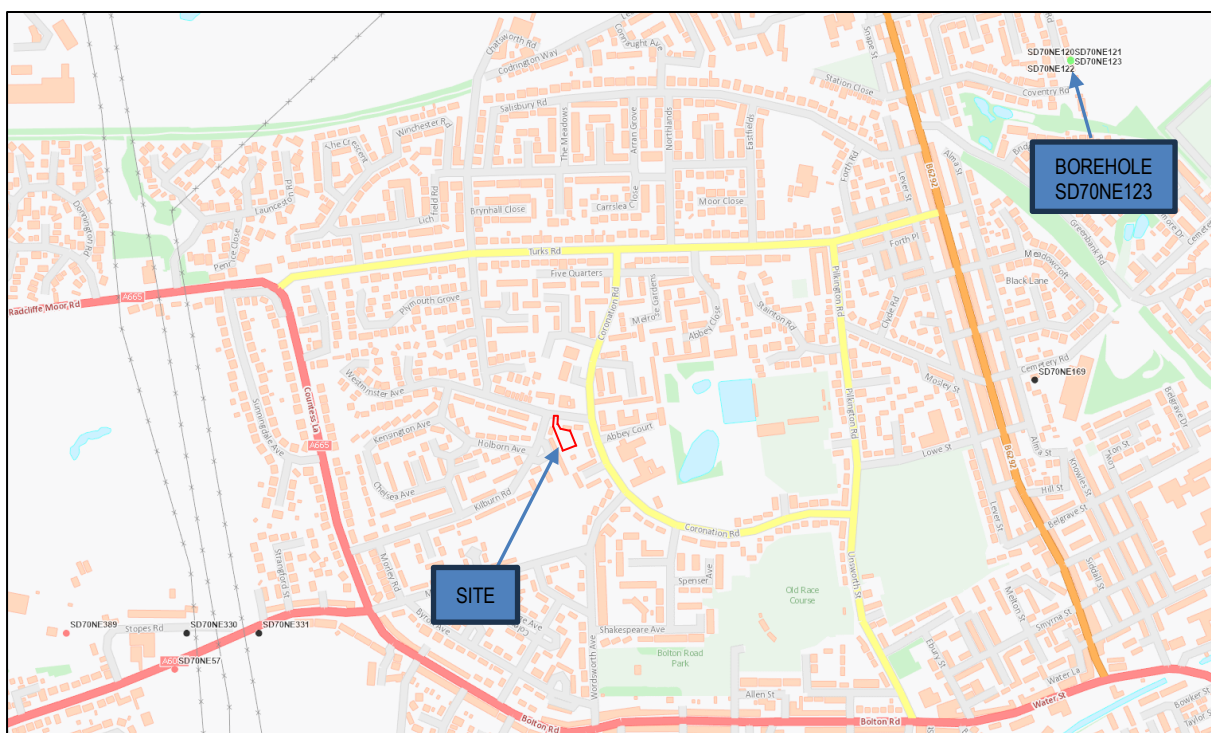
Geological Information

- 3.1 The geology of the site has been determined from geological maps for the area and examination of Coal Authority (CA) records.

British Geological Survey Published Data Assessment

- 3.2 The BGS states that the site area is not underlain by any artificial deposits.
- 3.3 The BGS states that site is underlain by Devensian Till, which is generally comprises clay, silt, and sand with or without boulders.
- 3.4 Two different bedrock geologies are recorded beneath the site. The Pennine Middle Coal Measures, which generally comprises interbedded mudstone, siltstone, sandstone, and coal seams, is recorded beneath the eastern half of the site. Whereas the Peel Hall Rock Formation, which generally comprises sandstone, is recorded beneath the western half of the site.
- 3.5 There are no BGS boreholes within 500m of the site boundary. The closest available borehole record is located approximately 1km northeast of the site. A borehole location plan is shown overleaf as Figure 3. The borehole lies within a similar geologic setting as the site, however, should not be taken as representative given how far away it located.
- 3.6 BGS borehole reference SD70NE123 was drilled to 30m bgl, no date is recorded. A rockhead was encountered at 10.00 mbgl, and coal was encountered at 14.40 mbgl with a thickness of 1.20m.

Figure 3: BGS Borehole Location Plan



- 3.7 An extract from the most recently published geological map (1:10,000 scale map) showing the approximate site location and key local geological features is presented in Figure 4.
- 3.8 An extract from the most recently published geological map (1:50,000) showing the approximate site location and key local geological features is presented in Figure 5. Local strata dip 22 degrees to the southwest.
- 3.9 An unnamed coal seam outcrops at rockhead below the site.

Figure 4 Geology Map Extract (1:10,000)

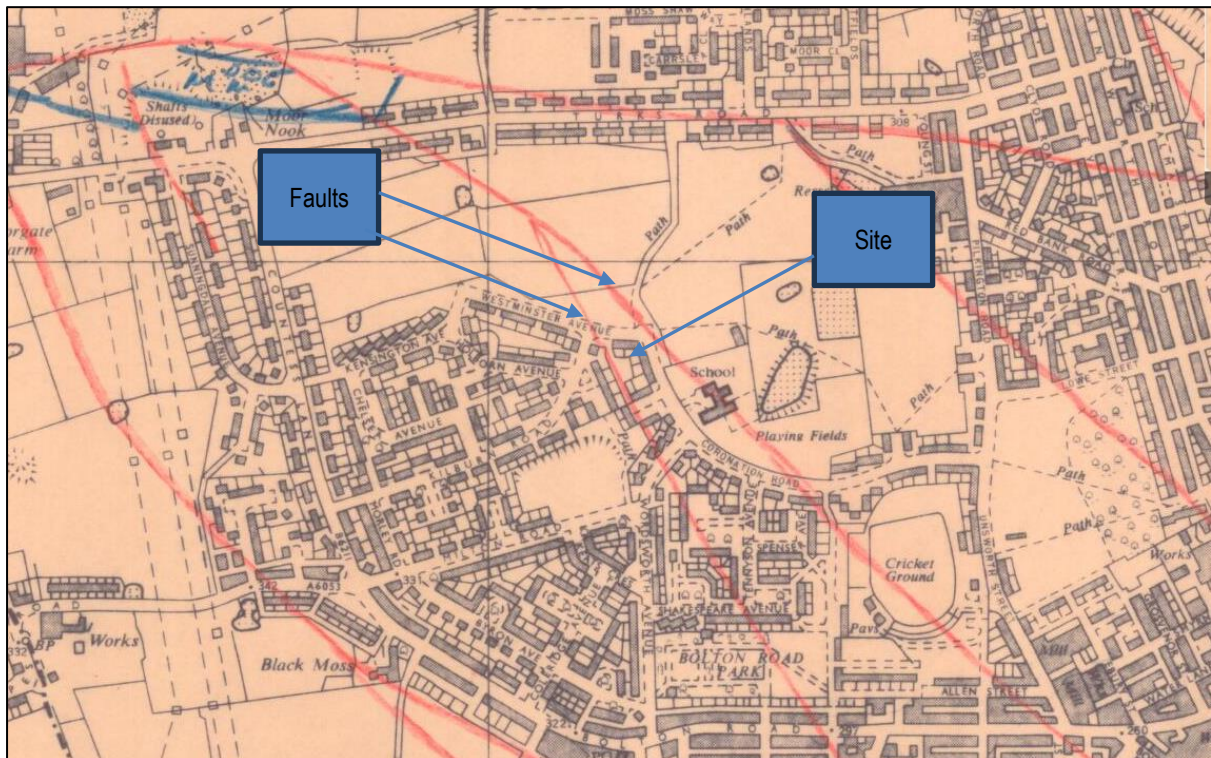
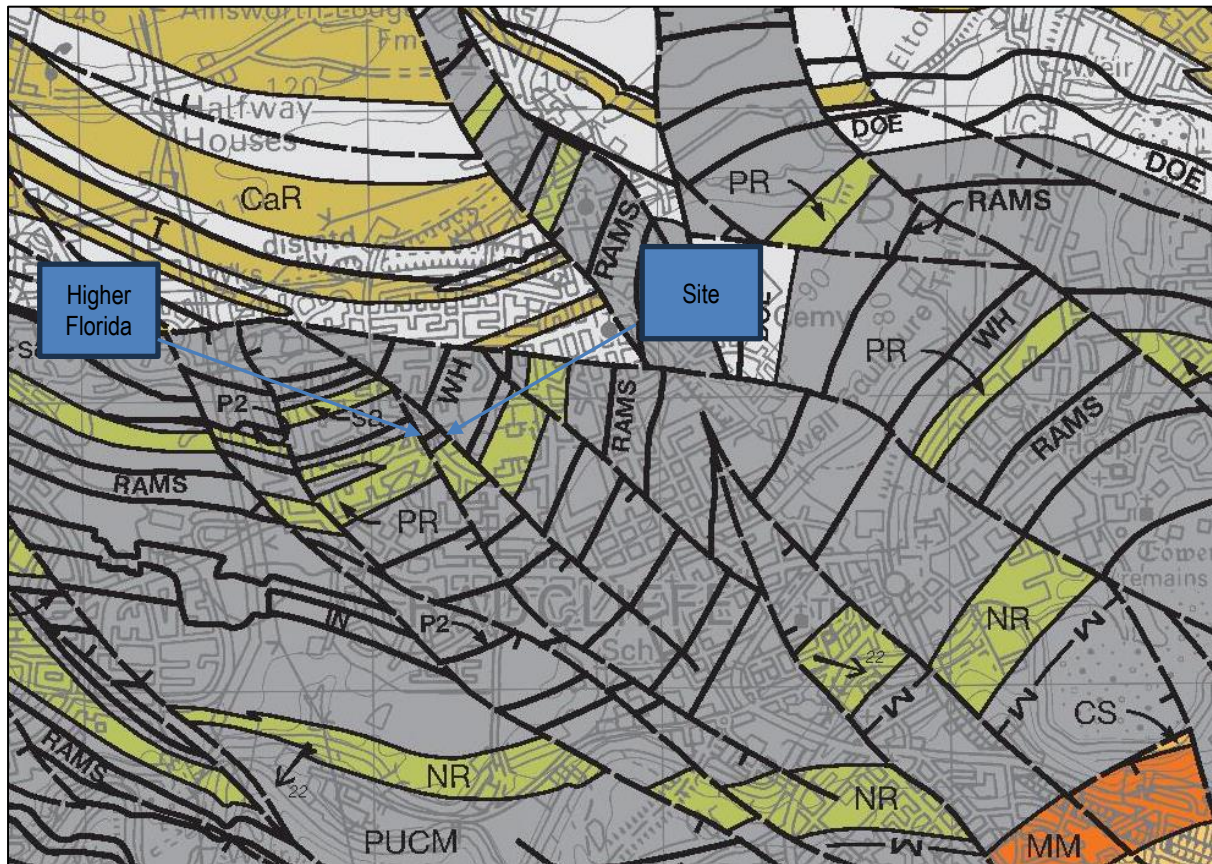


Figure 5 Geology Map Extract (1:50,000)



TF	TOP FURNACE COAL
RAMS	RAMS (BOTTOM FURNACE) COAL
PR	Pemberton (Bardsley, Peel Hall) Rock (0-55 m)
St	STUBBS COAL
P5	PEMBERTON FIVE FOOT (HARD, WINDMILL) COAL
HR	Huncliffe Rock (0-40 m)
WH	WHITE (FOXHOLES) COAL
P2	PEMBERTON TWO FOOT (CANNEL) COAL
P4	PEMBERTON FOUR FOOT (TOWN LANE, BLACK) COAL
PMCM	

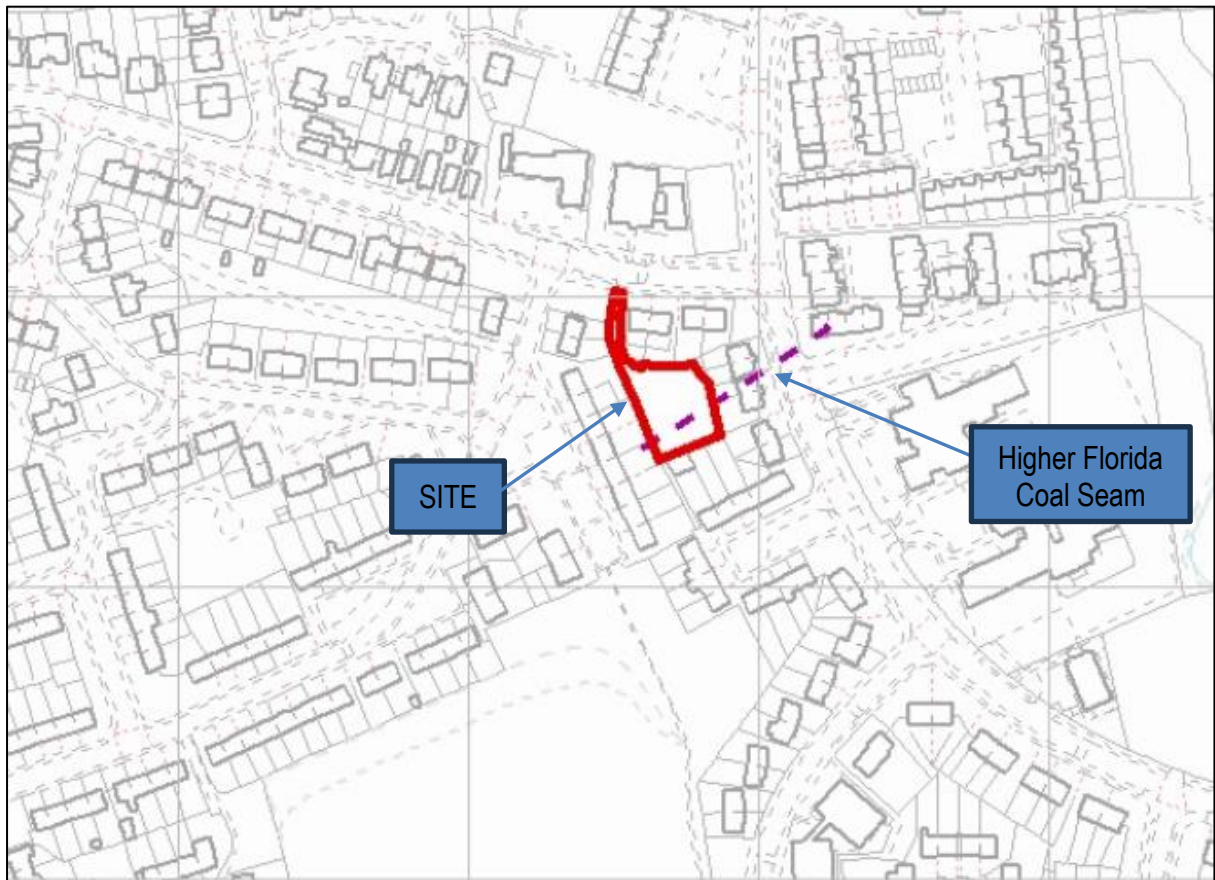
Coal Authority Records

- 3.10 Reference to the Coal Authority Online Interactive viewer shows the site to be located within a Development High Risk Area and within an area of probable shallow mine workings.
- 3.11 A Coal Authority Mining Report has been acquired for the site and reveals that there are no records of past underground mining, beneath the site.
- 3.12 The report states that there are probable unrecorded shallow workings.
- 3.13 There are no records of spine roadways at shallow depths within the site.
- 3.14 There are no mine entries within 100m of the site boundary.
- 3.15 There are no records of geological faults, fissures or breaklines on the site.
- 3.16 There is 1no. coal outcrop recorded on site or adjacent to the site and summarised in Table 1 below.
- 3.17 There are no records of opencast mines with 500m of the site boundary.
- 3.18 There are no Coal Authority managed tips recorded within 500m of the site boundary.
- 3.19 There have been no previous site investigations recorded within 50m of the site boundary.
- 3.20 There are no remediated sites within 50m of the site.
- 3.21 There are no records of coal mining subsidence within 50m of the site boundary.
- 3.22 There are no records of mine gas or mine water treatment schemes within 500m of the site.

Table 1: Summary of Coal Outcrops

Seam Name	Seam Workable	Distance to Outcrop (m)	Direction to Outcrop	Bearing of Outcrop
Higher Florida	Yes	Within	N/A	238

Figure 6: Coal Authority Map Extract



4.0 COAL MINING RISK ASSESSMENT

Scope of Coal Mining Risk Assessment

- 4.1 Objectives of the coal mining risk assessment are to provide a desk-based assessment of available geological and mining information relating to the site (and wider area) and to use this information so as to identify risks present to the development from the legacy of mining.
- 4.2 As part of the risk assessment, potential mitigation measures (if required) should be considered, including any necessary remedial works.
- 4.3 The outcome of the risk assessment should demonstrate to the Local Authority that the proposed development is or can be made safe (and stable) to meet the requirements of the National Planning Policy Framework (NPPF).

Data Limitations

- 4.4 It should be appreciated that it did not become a legal requirement to deposit coal mining abandonment plans until the 1870's and that this requirement was not rigorously enforced for some time after. Many shallow coal seams were worked prior to the introduction of first edition Ordnance Survey Maps and information on these workings is often not available. Therefore, if coal seams were accessible then there is the potential that they could have been worked by formal or informal means.
- 4.5 It is also possible that if unrecorded workings are present then unrecorded mine entries may be present.

Coal Mining Risks

- 4.6 The risks associated with coal mining are as follows:
 - Collapse of relict workings beneath buildings causing damage to the building fabric and infrastructure.
 - Migration of mine gases from old mine workings and mine entries resulting in accumulation of flammable and asphyxiating gases in confined areas.
 - Consolidation of relict workings and overlying strata causing structural defects in building fabric and infrastructure.
 - Failure of mine entries causing loss of ground beneath building and external areas.
 - Spontaneous combustion of old mine workings.

Coal Mining Assessment Criteria

- 4.7 Shallow workings related ground subsidence events may manifest as localised crown hole collapses at the surface (which are related to workings roof failures), or can be associated with more extensive ground movements, typically associated with pillar collapse, floor heave, or a combination of roof and pillar failure.
- 4.8 As there is limited evidence for structural damage caused by pillar failure compared with that resulting from roof collapses, the focus of engineering assessments of the potential for instability at the ground surface has focussed on roof collapses as the more likely mechanism of failure.
- 4.9 The limit height on void migration for roof collapses, where no appreciable surface subsidence can result is termed 'acceptable cover.' The calculation of the amount of acceptable cover is determined by the worked thickness of the seam (t) and the amount of overlying rock cover (h) (and potentially overconsolidated Glacial Till cover – see below).
- 4.10 The acceptable cover criterion is generally referred to as ht.
- 4.11 The worked thickness of a coal seam (t) is often taken as being whichever is the greater of the following: 1.50m (the typical height of a mining roadway), or the coal seam thickness.
- 4.12 It is noted that a thickness greater than that of the coal seam may have been extracted during mining – for example to remove a weak underlying seat earth horizon (for use as fireclay and/or to aid access through the mine).
- 4.13 According to CIRIA C758D, from the examination of mines within CMS, the height of collapse migration might exceptionally extend to 10t the height of the original extraction.
- 4.14 As a result of this, the 10t criterion has been adopted by the industry as providing reasonable assurance against surface subsidence from roof collapses in old pillar and stall mines.
- 4.15 However, there are documented cases (albeit rare) where migrations in excess of 20t have been observed.
- 4.16 CIRIA C758D lists a number of circumstances where the acceptable cover criterion may need to be increased from 10t. These include:

Where the strata dip is >20 degrees

Where there are strong groundwater flows within workings and/or where there are rising or falling groundwater levels.

Where multi-seam extractions have taken place

Conclusions

- 4.17 The Coal Authority consider the site area to lie within a Coal Authority Development High Risk Area and an area of probable shallow unrecorded workings.
- 4.18 The report and geological maps indicate that the site, is underlain by the Higher Florida Coal Seam at rockhead.

- 4.19 The BGS Boreholes within the area do not provide sufficient information about the depth of rockhead to suggested if sufficient cover of glacial till is present.

Proposed Mitigation Strategy

- 4.20 Due to the presence of coal outcrops, and probable shallow workings at the site, a site investigation to further investigate the coal mining regime and risk is required.
- 4.21 The site investigation will require a permit from the Coal Authority, together with the development of a risk and method statement.
- 4.22 This report should allow for planning permission to be granted with relevant conditions in relation to the site investigation and any possible remedial measures.

APPENDIX 1

COAL AUTHORITY CONSULTANTS MINING REPORT

APPENDIX 2

REPORT LIMITATIONS

REPORT LIMITATIONS

This contract was completed by Earth Environmental & Geotechnical Ltd on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with all reasonable skill, and care, bearing in mind the project objectives, the agreed scope of works, the prevailing site conditions, the budget, and staff resources allocated to the project.

Other than that, expressly contained in the above paragraph, Earth Environmental & Geotechnical Ltd provides no other representation or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Earth Environmental & Geotechnical Ltd.

If a third party relies on this report, it does so wholly at its own and sole risk and Earth Environmental & Geotechnical Ltd disclaims any liability to such parties.

It is Earth Environmental & Geotechnical Ltd understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was an important factor in determining the scope and level of the services. Should the purpose for which the report is used, or the proposed use of the site change, this report will no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without Earth Environmental & Geotechnical Ltd review and advice shall be at the client's sole and own risk.

The report was written in 2024 and should be read in light of any subsequent changes in legislation, statutory requirements, and industry best practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of Earth Environmental & Geotechnical Ltd. In the absence of such written advice of Earth Environmental & Geotechnical Ltd, reliance on the report in the future shall be at the client's own and sole risk. Should Earth Environmental & Geotechnical Ltd be requested to review the report in the future, Earth Environmental & Geotechnical Ltd shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between Earth Environmental & Geotechnical Ltd and the client.

The observations and conclusions described in this report are based solely upon the services that were provided pursuant to the agreement between the client and Earth Environmental & Geotechnical Ltd. Earth Environmental & Geotechnical Ltd has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report.

Earth Environmental & Geotechnical Ltd is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, Earth Environmental & Geotechnical Ltd did not seek to evaluate the presence on or off the site of electromagnetic fields, lead paint, radon gas or other radioactive materials.

The services are based upon Earth Environmental & Geotechnical Ltd observations of existing physical conditions at the site gained from a walkover survey of the site together with Earth Environmental & Geotechnical Ltd interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst Earth Environmental & Geotechnical Ltd have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified.

No responsibility can be accepted for errors within third party items presented in this report. Further Earth Environmental & Geotechnical Ltd was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Earth Environmental & Geotechnical Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to Earth Environmental & Geotechnical Ltd and including the doing of any independent investigation of the information provided to Earth Environmental & Geotechnical Ltd save as otherwise provided in the terms of the contract between the client and Earth Environmental & Geotechnical Ltd.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and Earth Environmental & Geotechnical Ltd] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.