

EARTH ENVIRONMENTAL
& GEOTECHNICAL

Coal Mining Risk Assessment

1 Douglas Crescent

Bonnyrigg

Midlothian

February 2024

On behalf of

Esk Homes Ltd

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

1 DOUGLAS CRESCENT

BONNYRIGG

MIDLOTHIAN

FOR

ESK HOMES LTD

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

www.earthenvironmental.co.uk

Tel 0161 9756088

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Drafted By:	M Coleman		
Reviewed By:	A Czarnecki BSc (Hons) FGS, CGeol		
Authorised By:	A Czarnecki BSc (Hons) FGS, CGeol		

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1.0 INTRODUCTION

Appointment

- 1.1 Earth Environmental & Geotechnical Ltd has been commissioned by Lothian Built Environmental Services on behalf of Esk Homes Ltd (the Client) to undertake a Coal Mining Risk Assessment at The Orchard Centre, 1 Douglas Crescent, Bonnyrigg, Midlothian.
- 1.2 It is understood that the Client intends to convert an existing structure and construct six 1no. bed flats with associated car spacing pedestrian access and landscaping.
- 1.3 A communal bin store and communal garden have also been proposed.
- 1.4 Vehicle access will be gained from Douglas Crescent and/or Lothian Street, Bonnyrigg.
- 1.5 A proposed development plan has been provided and is shown as Figure 1.

Figure 1: Proposed Development Plan



Objective

- 1.6 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.
- 1.7 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

- 1.8 The Coal Mining Risk Assessment compiles a review of the following information sources:
 - British Geological Survey of Great Britain , Mdllothian Sheet NT36NW, 1/10,000 series 1966 edition.
 - British Geological Survey of Scotland , Edinburgh Sheet 32E, 1/50,000 series 2003 edition.
 - 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, IAEG2006 Paper Number 379, The Geological Society of London, 2006.
 - The collapse of shallow coal mine workings, Durham theses, Durham University, Garrard, 1981.
 - Mdllothian Council planning portal.
 - British Geological Survey, "GeoIndex," [Online]. Available: <http://mapapps2.bgs.ac.uk/geoindex/home.html>.
 - The collapse of shallow coal mine workings, Durham theses, Durham University, Garrard, 1981.
 - National Library of Scotland, British Geological Survey Scotland, <https://maps.nls.uk/>
 - British Geological Survey, Scottish coal seam names and correlations, Open Report OR/18/027, 2918
 - Scottish Mining Website, A Glossary of Scotch Mining Terms, <http://www.scottishmining.co.uk/Indexes/Barrowman.html>

2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located on the corner of Douglas Crescent and Lothian Street, Bonnyrigg, Midlothian, EH19 2DF. The site is situated approximately 80 m north west of Bonnyrigg Rose Football Club.
- 2.2 The approximate National Grid Reference for the centre of the site is NT 30985 65251 (X:330985 Y: 665251).
- 2.3 The site is a rectangular shaped parcel of land which comprises of an existing structure (The Orchard Centre) and soft landscaped areas. The maximum dimensions of the site are 24 m east to west and 25m north to south.
- 2.4 The Orchard Centre is a resource centre which provides community-based support across Midlothian, the building also includes a cafe.
- 2.5 The west of the site is adjacent to Douglas Crescent, the south of the site is adjacent to Lothian Street.
- 2.6 The northern and eastern boundaries are adjacent to residential dwellings which are demarcated by a wooden fence.
- 2.7 The general surrounding area comprises of residential dwellings within an urban setting. Bonnyrigg Rose Football Club is 80m southeast of the southern boundary of the site.
- 2.8 A 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.

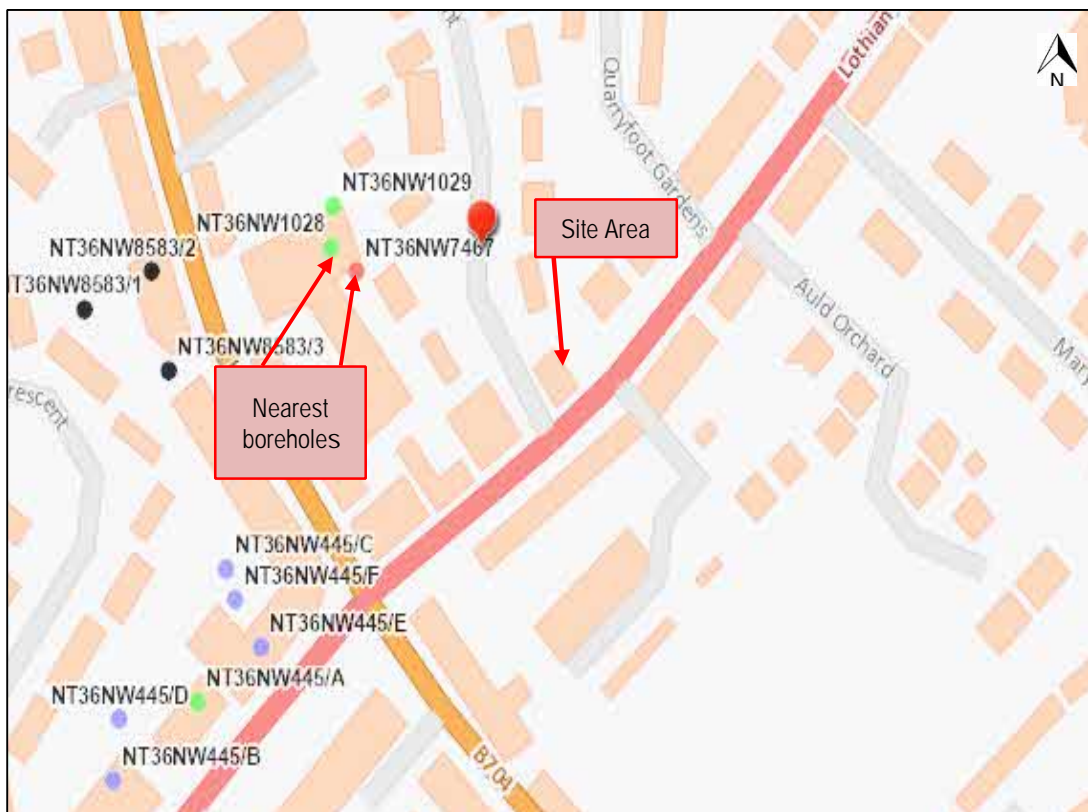
British Geological Survey Published Data Assessment

3.2 The BGS states there are superficial underlying the site consisting of Devensian Till, commonly known as Boulder Clay.

3.3 The solid geology beneath the site is shown to be the Scottish Lower Coal Measures Formation, comprising sedimentary rock cycles, coal measures type.

3.4 There is several BGS borehole record within 250m of the site. The closest available borehole log, that allows for further assessment of the local geology or shallow coal mining regime, is located 85 m northwest of the site (Figure 3).

Figure 3: BGS Boreholes



3.5 BGS borehole records (NT36NW1028 and NT36NW7467) shows sandy clay underlain by a sandstone rockhead at 1.65m bgl. A coal seam and fireclay were recorded at 5m- 6.7m bgl and 11.75m bgl.

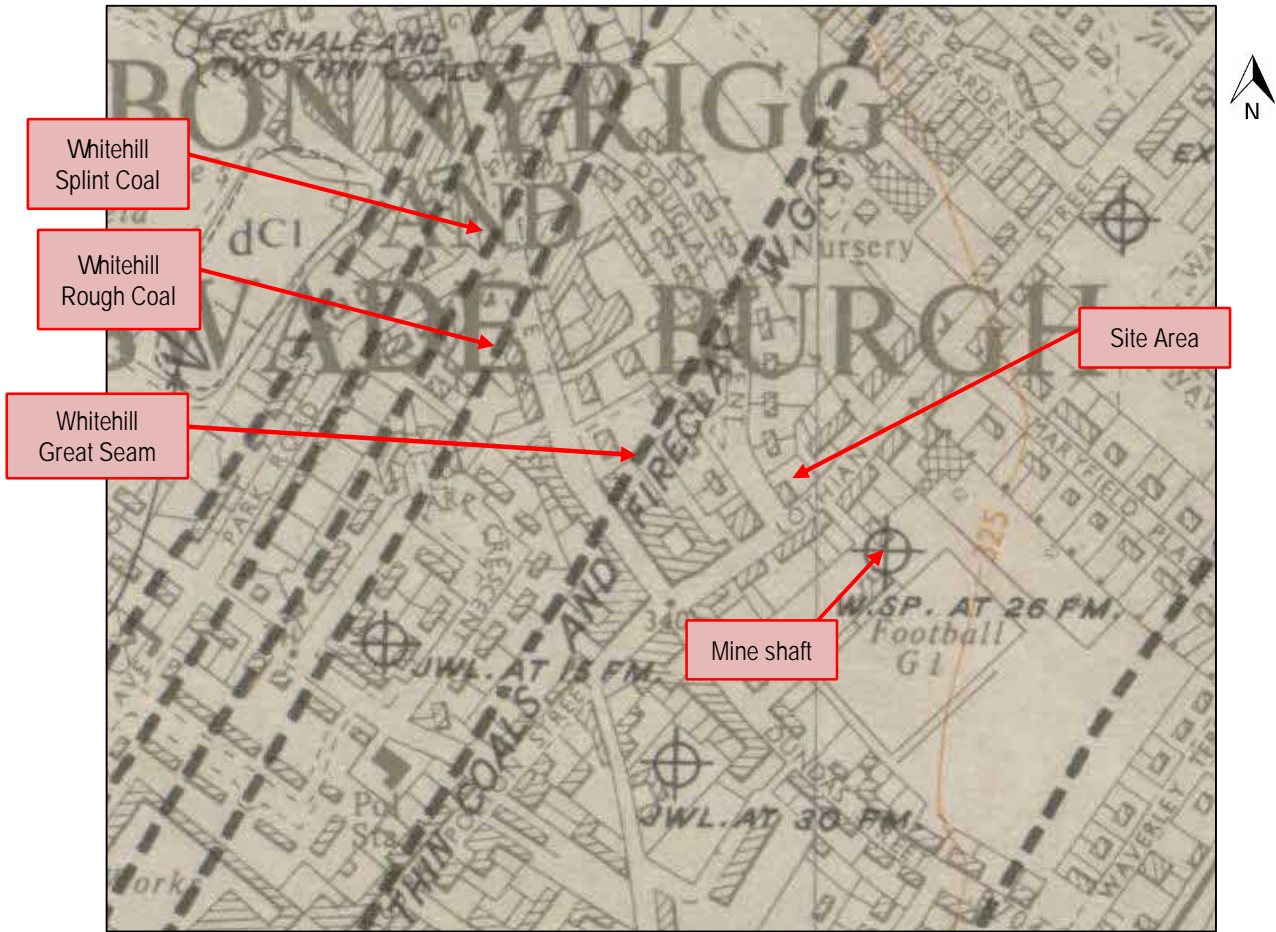
3.6 An extract from the most recently published geological map (1:10,000) showing the approximate site location and key local geological features are presented in Figure 4.

- 3.7 The geological map shows the Whitehill Great Seam (Coal) outcropping approximately 60m northwest of the site.
- 3.8 The direction of dip of local strata is 10 degrees (from the horizontal) to the south/south east.
- 3.9 Based on a dip angle of ten degrees and rockhead at 2m, the coal seam is postulated to lie approximately 12.5 m below the site.

Coal Authority Records

- 3.10 Reference to the Coal Authority Online Interactive viewer (extract shown as Figure 5) shows the site to be located within a Development High Risk area .
- 3.11 A Coal Authority Mining Report has been acquired for the site. This indicates that there has been past underground mining beneath the site. The shallowest worked coal seam beneath the site was the Fifteen-Foot Coal seam, which was last mined in 1860 , at a depth of 35 m.
- 3.12 The report states that there are also probable unrecorded shallow workings beneath the site.
- 3.13 However, the Coal Authority reports suggests that there are no local outcrops.
- 3.14 There are 2 mine shaft entries recorded within 100m of the site, shaft 331665 -023 which has been infilled and shaft 331665-023 which has not been treated.
- 3.15 There are no records of licensed and unlicensed opencast mining within 500m of the site.
- 3.16 There are no faults, fissures or break lines are recorded on site.
- 3.17 There are no records of claims regarding coal mining subsidence within 50m of the site boundary.
- 3.18 There are no records of any managed tips or remediated sites within 500m of the site.
- 3.19 No records of mine gas have been recorded within 500m of the site boundary.

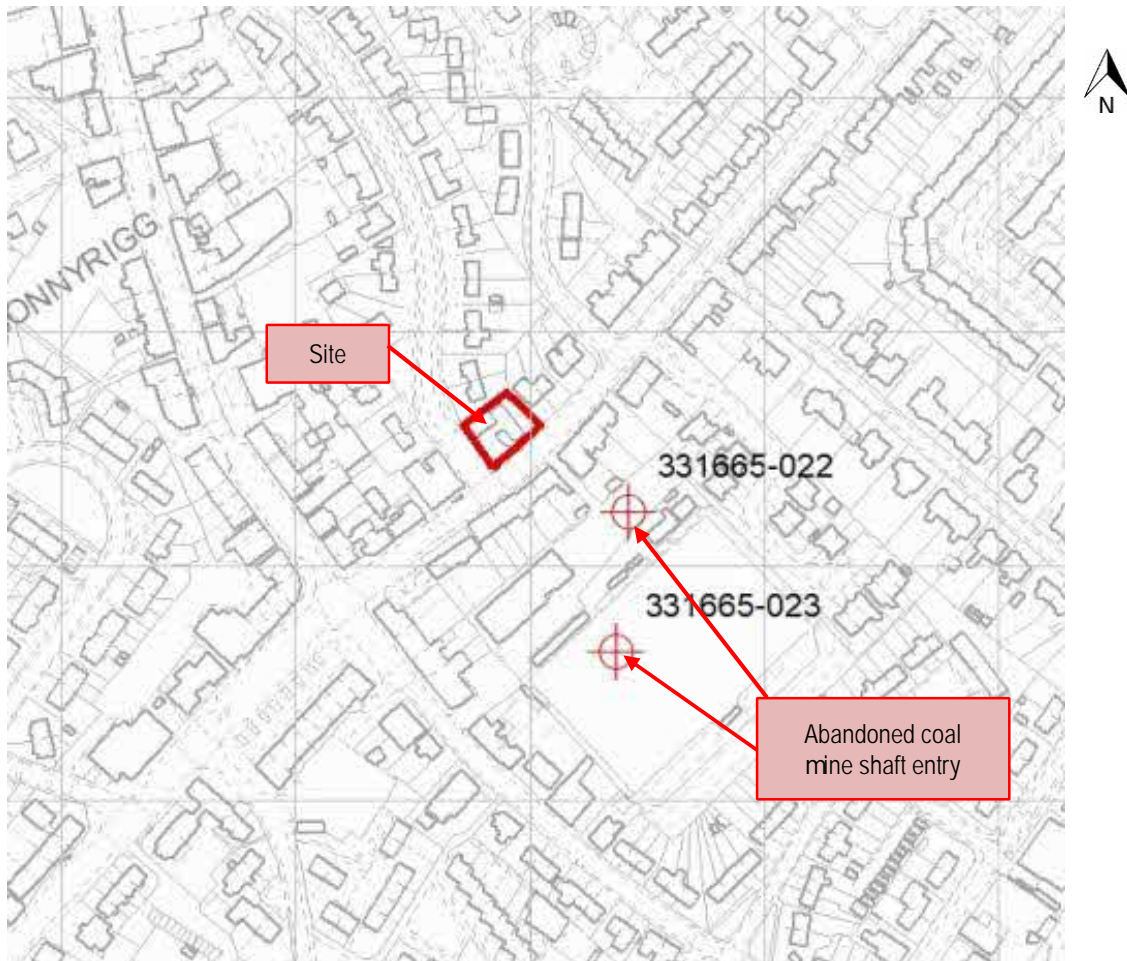
Figure 4: BGS Geology Map Extract 1:10,000



QUEENSLIE MARINE BAND	M Q.M.B. M	
LITTLE SPLINT COAL 30 IN.	LT.SP.=DAL.UP.	DALKEITH UPPER COAL
COWPITS FIVE FOOT COAL 42 IN.	CP.5 FT.=DAL.UN.	DALKEITH UNDER COAL
QUARRY COAL 18 IN.		
GLASS COAL 19-72 IN.	W.G.S.	WHITEHILL GREAT SEAM COAL
SALTERS COAL (in l.) 30 IN.	SAL.=W.R.	WHITEHILL ROUGH COAL
NINE FOOT COAL (in l.) 36-72 IN.	9 FT.=W.SP.	WHITEHILL SPLINT COAL
PINKIE THREE FOOT COAL (in l.) 33 IN.	PK.3 FT.=PK.	PARROT ROUGH COAL
SIX FOOT COAL 30-60 IN.	6 FT.=JWL	JEWEL COAL OF WHITEHILL
PINKIE FOUR FOOT COAL (in l.) 36 IN.	PK. 4 FT.	
SEVEN FOOT COAL (in l.) 60 IN.	7 FT.	} MELVILLE GROUP (M.V.G.) Variable thickness

In the north-west corner of the area the PINKIE THREE FOOT and the SIX FOOT coals combine to form the FIFTEEN FOOT COAL (15 FT.).

Figure 5: Coal Authority Interactive 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 Framework (NPF4).

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.

Conclusions

- 4.7 It is understood that the Client intends the conversion of an existing structure and the erection of 6 no. 1 bed flats with associated car spacing, pedestrian access and landscaping. A communal bin store and communal garden have also been proposed.
- 4.8 Reference to the Coal Authority Online Interactive viewer shows the site to be located within a Development High Risk area.
- 4.9 The Coal Authority also report indicates that the site is located within an area of probable shallow coal mine workings beneath the site.
- 4.10 Furthermore, Coal Authority indicates that there has been past underground mining beneath the site. The shallowest worked coal seam beneath the site was the Fifteen-Foot Coal seam, which was last mined in 1860, at a depth of 35 m.

Proposed Mitigation Strategy

- 4.11 Information suggests there could be a risk of historical shallow workings being present beneath the development area.
- 4.12 As a result, a site investigation is required in order to further assess local geology and coal mining regime.
- 4.13 The drilling of boreholes will require a permit from the Coal Authority with the development of a risk assessment and method statement.
- 4.14 This report should allow for planning permission to be granted with conditions imposed in relation to the site investigation.

APPENDIX 1

COAL AUTHORITY CONSULTANTS MINING REPORT

APPENDIX 2

REPORT LIMITATIONS

REPORT LIMITATIONS

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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.

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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.