



COAL MINING RISK ASSESSMENT

LAND TO THE NORTH OF WEST
BENHAR ROAD,
BROWNHILL FARM,
SHOTTS,
NORTH LANARKSHIRE
SCOTLAND

Prepared for:

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Date:

19th May 2022



EnviroSolution Ltd Document Verification

Site Address	Land to the north of West Benhar Road, Brownhill Farm, Shotts, North Lanarkshire, Scotland		
Report Title	Coal Mining Risk Assessment		
Job Number	CL101	Document Ref.	CL101
Date Issued	19 th May 2022	Report Version	1
Prepared by	Tom Craig MSc, BSc (Hons), FGS	Signature	
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1 Introduction

1.1 Site Location and Description

The site is located on the northern side of West Benhar Road, Shotts, North Lanarkshire, Scotland. The National Grid Reference for the approximate site centre is GR: 288140 662580. The closest relevant post code is ML7 5TG.

The site location is shown in Appendix A. The plot is rectangular in shape and covers an area of approximately 1,200m². The site is currently a vacant plot within a large open field.

The site lies at a mean elevation of approximately 234m aOD. The surrounding area slopes gently towards the southeast.

The site is accessed via a gate along West Benhar Road. The site is bounded by open agricultural land on all sides.

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



1.2 Development Proposal

It is understood that the development plans include the construction of a detached residential dwelling and garage.

A copy of the proposed layout is shown in Appendix A.

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:

- CON29M Mining Report dated 16th May 2022 (Ref: 51003134517001 Appendix B);
- BGS Geotindex geological map;
- BGS Geological Survey of Scotland 1:50,000 Sheet 31E Falkirk;
- Coal Authority Interactive Website;
- Historical Ordnance Survey maps.

2 Environmental Setting

2.1 Historic Coal Mining Activity

The development site and surrounding area have 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
1859	1:10,560	<ul style="list-style-type: none"> - The site is undeveloped. - Coal pit located 730m northwest of the site.
1897	1:10,560	<ul style="list-style-type: none"> - Brownhill Colliery Pit No. 17 located 310m southeast of the site. - Airshaft 660m north of the site. - Benhar Colliery Pit No. 18 located 810m northeast of the site. - Benhar Colliery Pit No. 2 located 1.2km east of the site.
1910	1:10,560	<ul style="list-style-type: none"> - Benhar Collieries dismantled. - Hassockrigg Colliery 920m northwest of the site. - Fortrigg Colliery 850m northwest of the site.

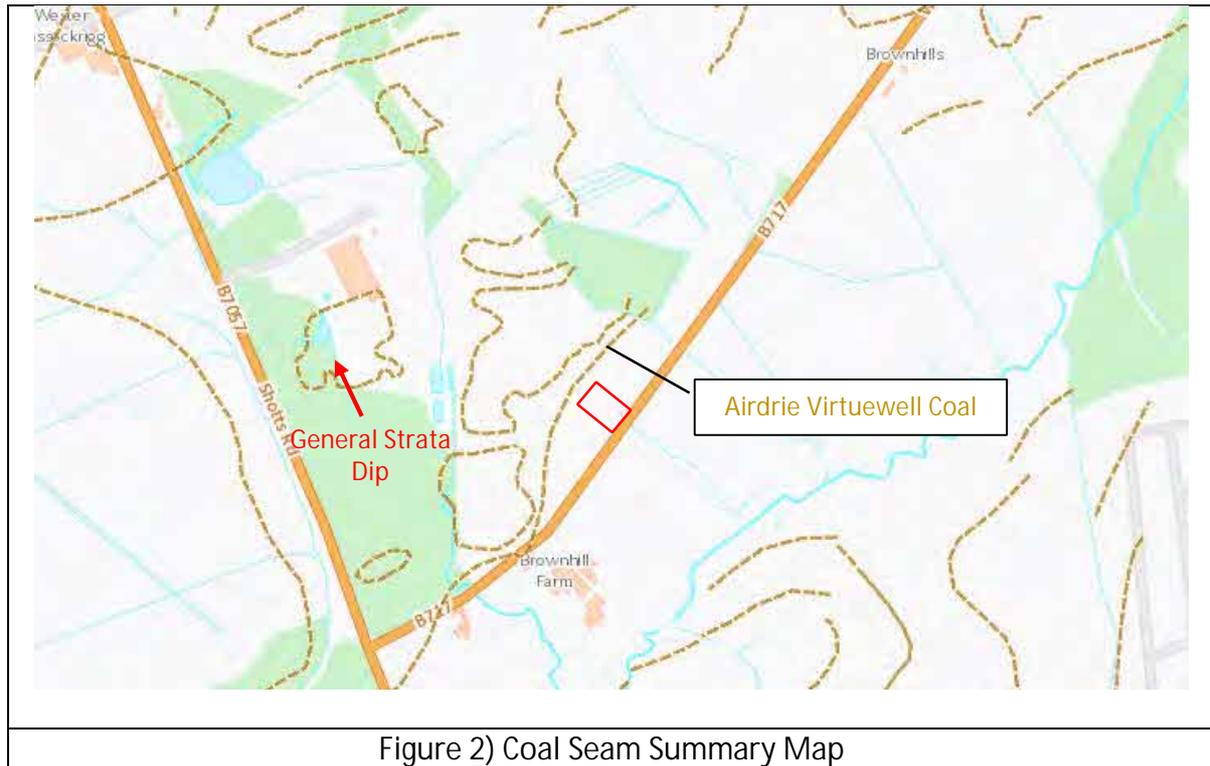
2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 31E Falkirk) show areas to the north of the site to be underlain by worked ground relating to coal workings. Coal Authority records show that the opencast works are more extensive and have intersected the site boundary.

The maps show the site overlies superficial diamicton deposits, which are of Quaternary age. Diamicton generally consists of unsorted clays, silts, sands and gravels.

The underlying bedrock geology is of the Scottish Lower Coal Measures Formation which is of Carboniferous age. The Scottish Lower Coal Measures Formation generally consists of interbedded grey to black mudstones and siltstones and fine to medium grained grey sandstones with common coal seams. According to the BGS, the bedrock has a shallow dip of about 1° to the west/ north-west. See Appendix D.

The nearest geological fault is located 160m northeast of the site.



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 Identification and Assessment of Site-Specific Coal Mining Risks

The table below summarises the potential risks associated with 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 F) has identified that the site lies within a Development High Risk Area associated with extensive opencast workings that have taken place in the area.

The report obtained from the Coal Authority (Consultants Mining Report, reference 51003134517001, dated 16th May 2022) revealed the property is in a surface area that is affected by recorded underground mining in 4 no. seams of coal at depths of between 71m and 131m bgl. The mine workings were last worked in 1956.

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 is considered that the mine workings do not present a risk of surface instability.

The Coal Authority report states that the site is not in an area where they believe there is the potential for shallow unrecorded workings.

The Coal Authority report states that they are not aware of any recorded mine entries located within a 100m radius of the development site boundary. Notwithstanding this, it is recognised that there may be mine entries in the vicinity that have not been recorded, although opencast workings will have likely exposed and removed any during their operations.

The Coal Authority report states that they are aware of extensive opencast coal mining sites within the immediate surrounding area. The Coal Authority report shows that the site lies within the boundary of one opencast site. The boundaries of the opencast workings are shown in Figure 3.

Risks from opencast workings differ from abandoned mine workings and/or entries; where the latter risks relate to potential time independent instability at ground surface. The geotechnical risks from opencast workings relate to potential differential settlement of new foundations caused by variations in the thickness, type and compaction of the backfill materials. In this case the coal beneath West Benhar Road was not mined, and it is therefore possible (likely) that a highwall is present beneath the site.

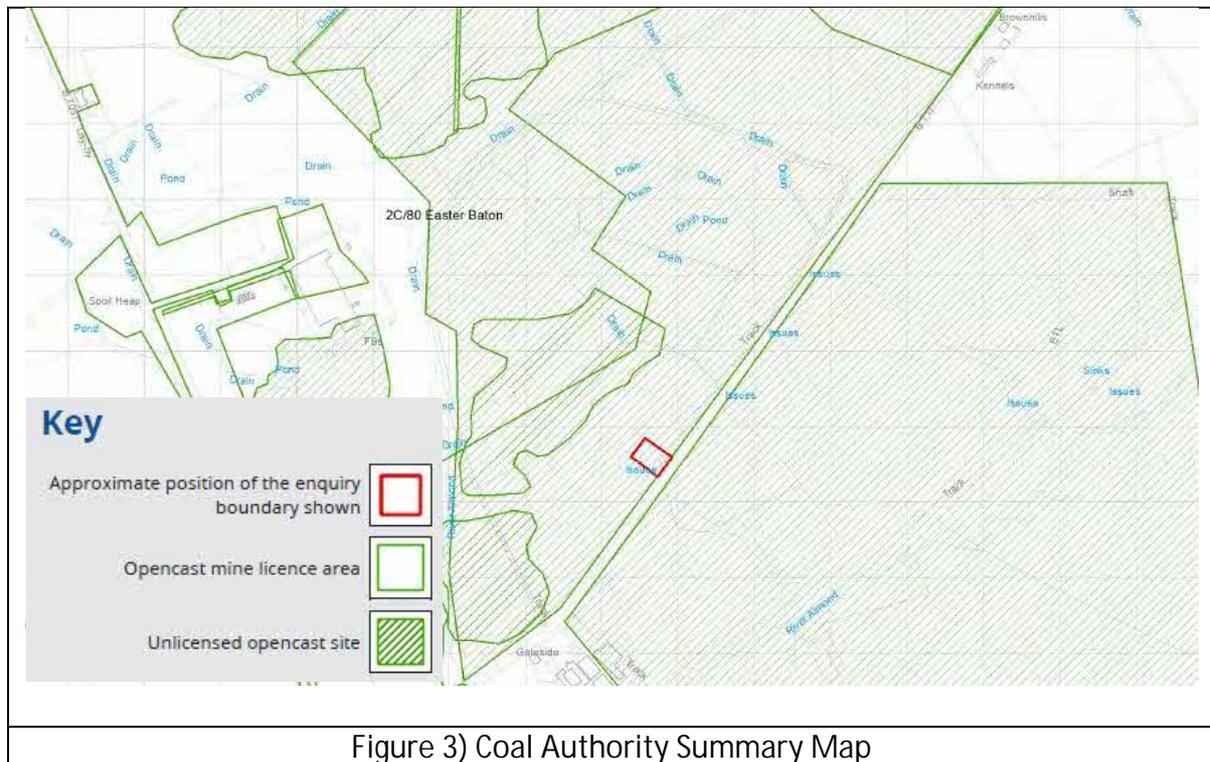


Figure 3) Coal Authority Summary Map

4 Proposed Mitigation Strategy

It is recommended that a conventional geotechnical ground investigation is undertaken at the site to determine the extent, thickness and nature of potential opencast waste beneath the site. This type of investigation will not require a Coal Authority permit.

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.

5 Conclusions

The Coal Mining Risk Assessment for the site at West Benhar Road in North Lanarkshire has concluded that the risk associated with coal mining related issues are very low based on information from the Coal Authority and geological interpretation.

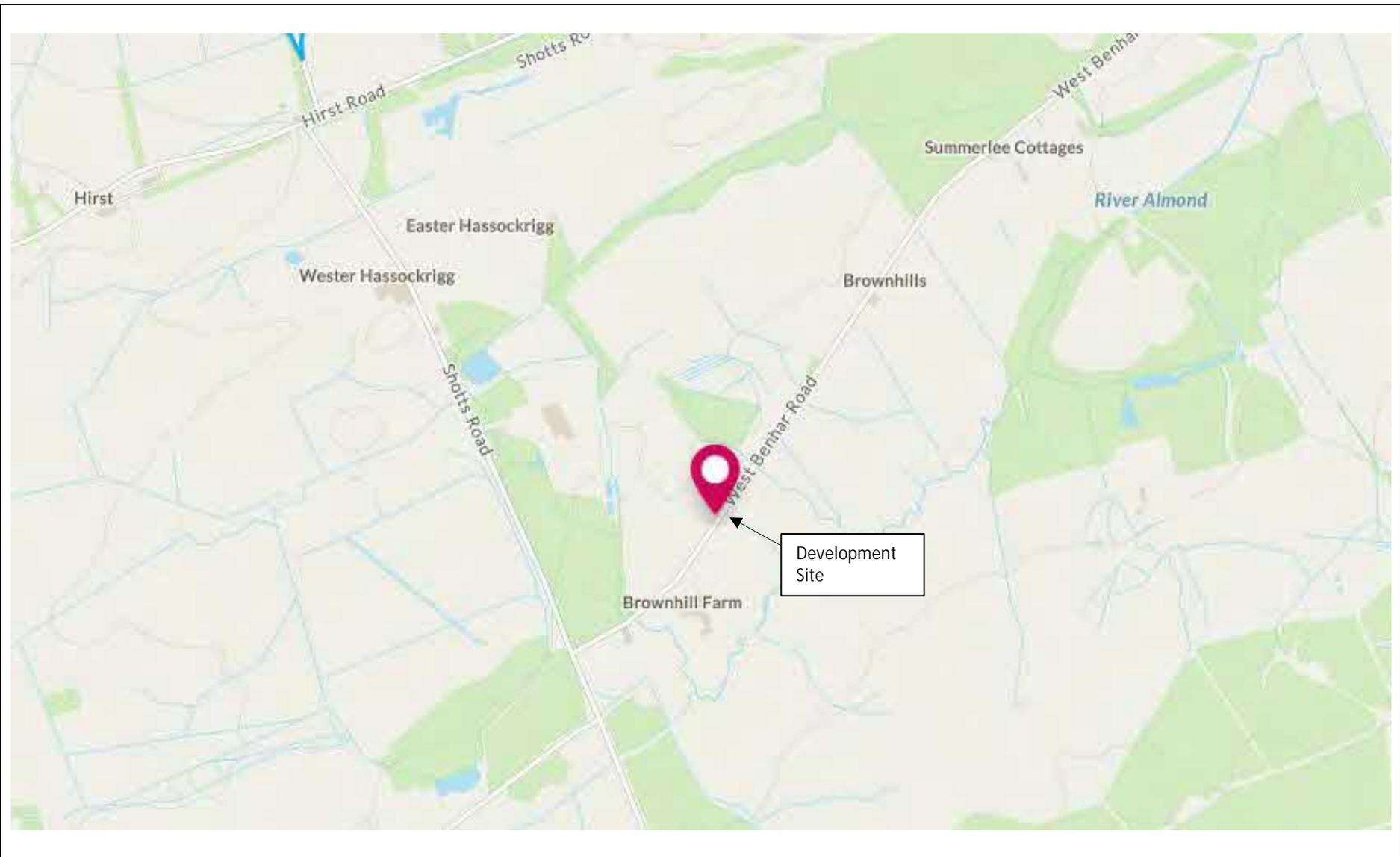
It is considered that the surface ground stability risks associated with the legacy of backfilled opencast pits can be dealt with via conventional geotechnical ground investigation and/or the implementation of a suitable foundation solution. This may include the use of a reinforced raft or ground improvement.

As always, in a coal mining area there is a risk of encountering unrecorded mine entries. This should be mitigated by vigilance during groundworks and any unexpected sub-surface structure should be reported and fully investigated.

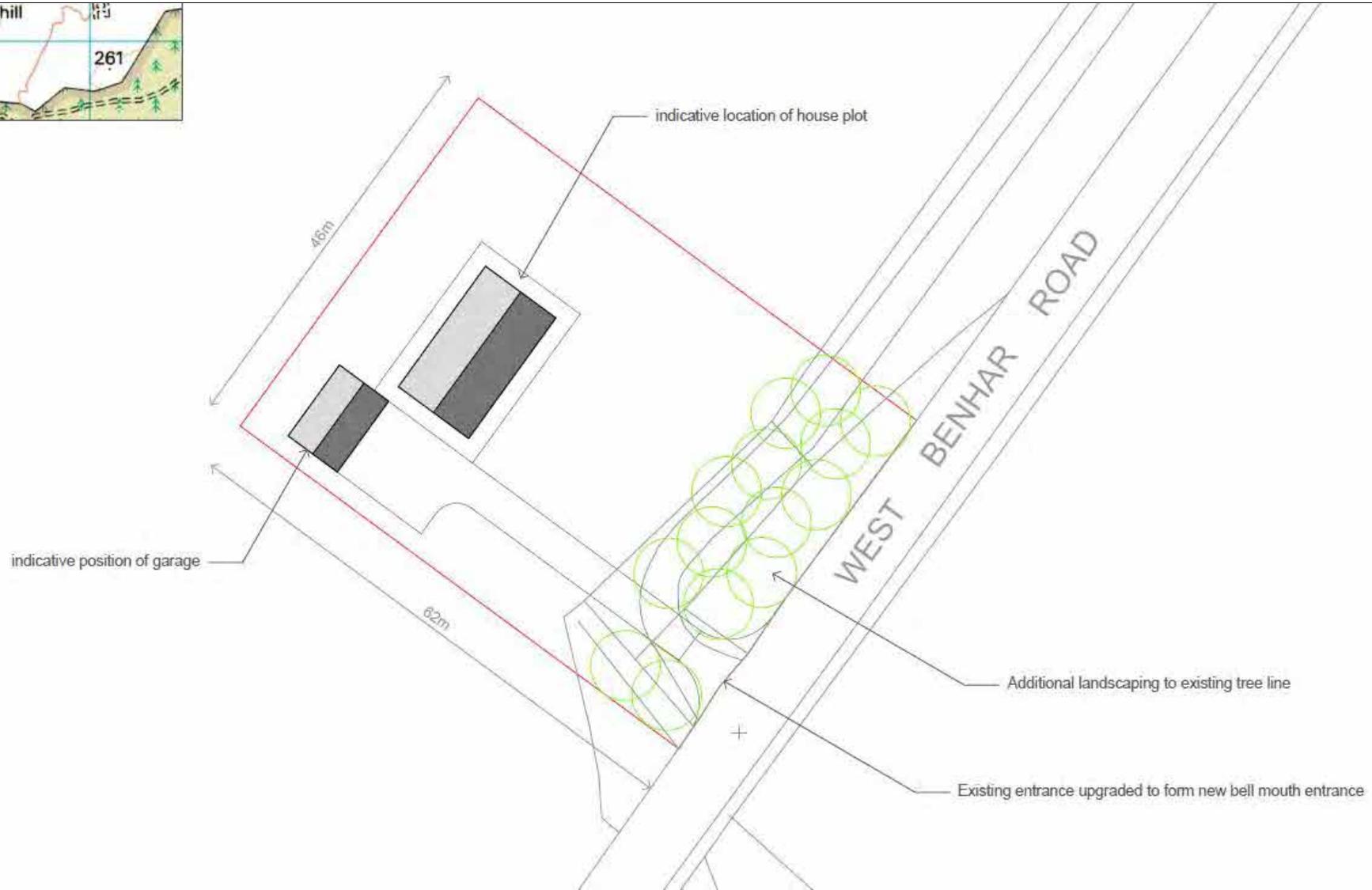
6 References

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







Appendix B – Coal Authority Report



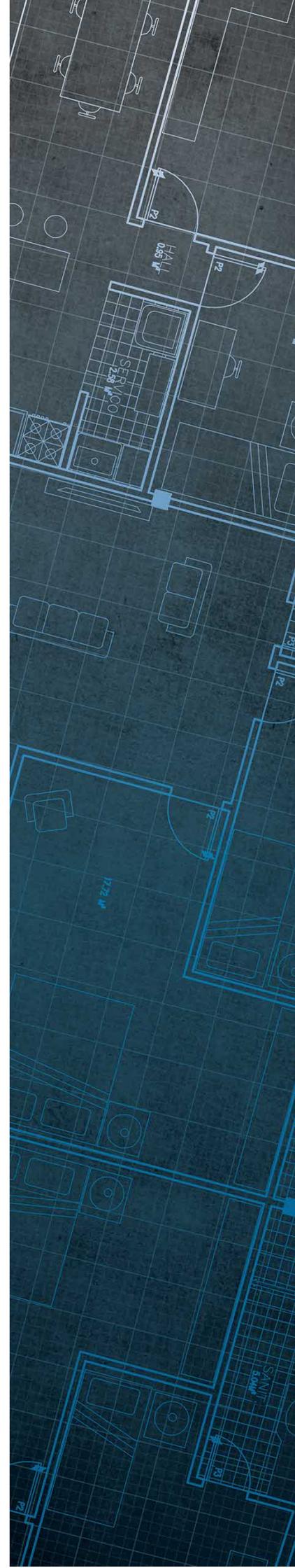
The Coal
Authority

Consultants Coal Mining Report

Brownhill Farm
West Benhar Road
Eastfield
Harthill
North Lanarkshire
ML7 5TG

Date of enquiry: 16 May 2022
Date enquiry received: 16 May 2022
Issue date: 16 May 2022

Our reference: 51003134517001
Your reference: Brownhill Farm



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

Brownhill Farm
West Benhar Road
Eastfield
Harthill
North Lanarkshire
ML7 5TG

How to contact us

0345 762 6848 (UK)
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200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

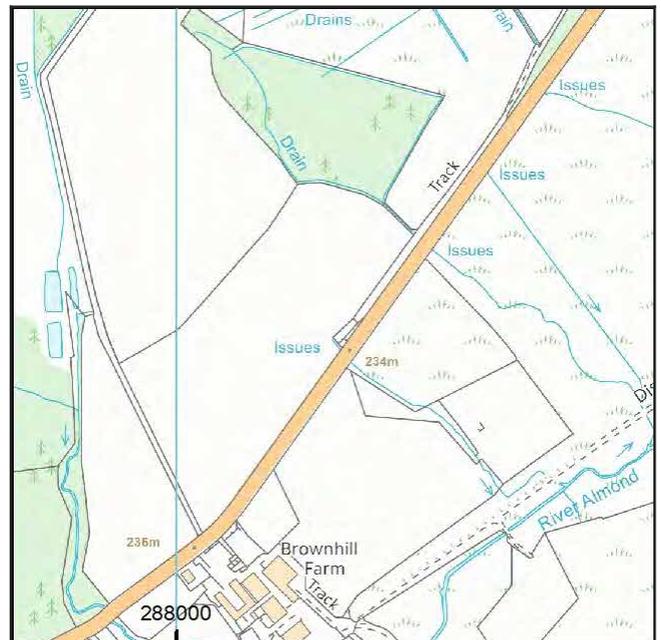
www.groundstability.com

 @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
CALDERHEAD	UPPER DRUMGRAY	Coal	6PUA	71	Beneath Property	0.3	West	71	1926
CADDERHEAD	MID DRUMGRAY	Coal	6PUL	82	Beneath Property	0.8	West	89	1944
unnamed	LOWER DRUMGRAY	Coal	6PUP	98	Beneath Property	0.6	North	61	1940
HASSOCKRIGG	MILL	Coal	6PV0	131	Beneath Property	0.4	North-West	58	1956
HASSOCKRIGG	MILL	Coal	6PUZ	131	South-East	2.6	South-East	58	1956

Probable unrecorded shallow workings

None.

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:

S3463	16842	S413
3764	S3493	S290
S412	S2100	

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

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

Please refer to the “Summary of findings” map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 –Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

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

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

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 –Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 –Further information

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

Development advice

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

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

Section 5 –Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial –mitigating the impact of existing pollution or Preventative –preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

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

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

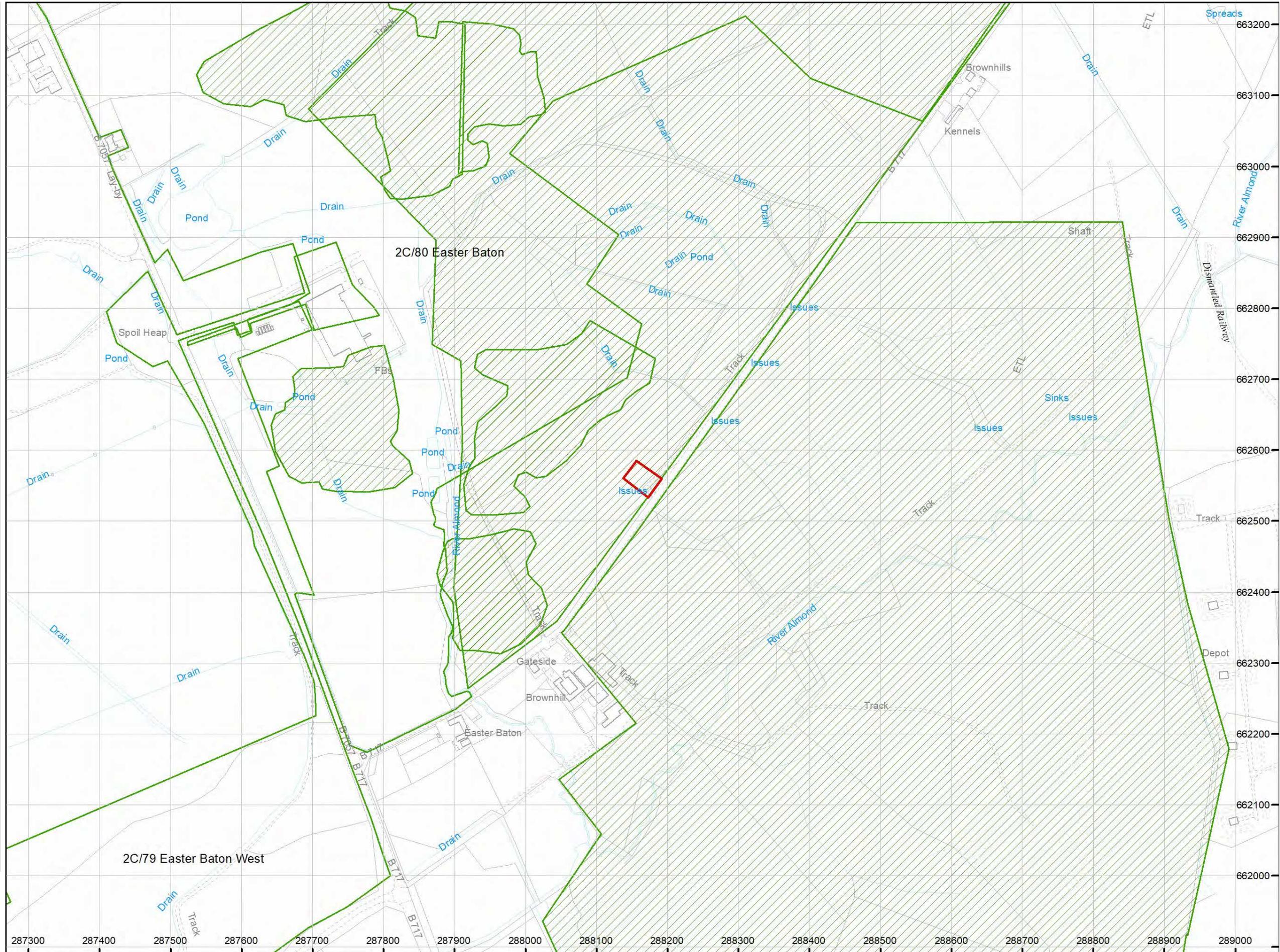
Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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

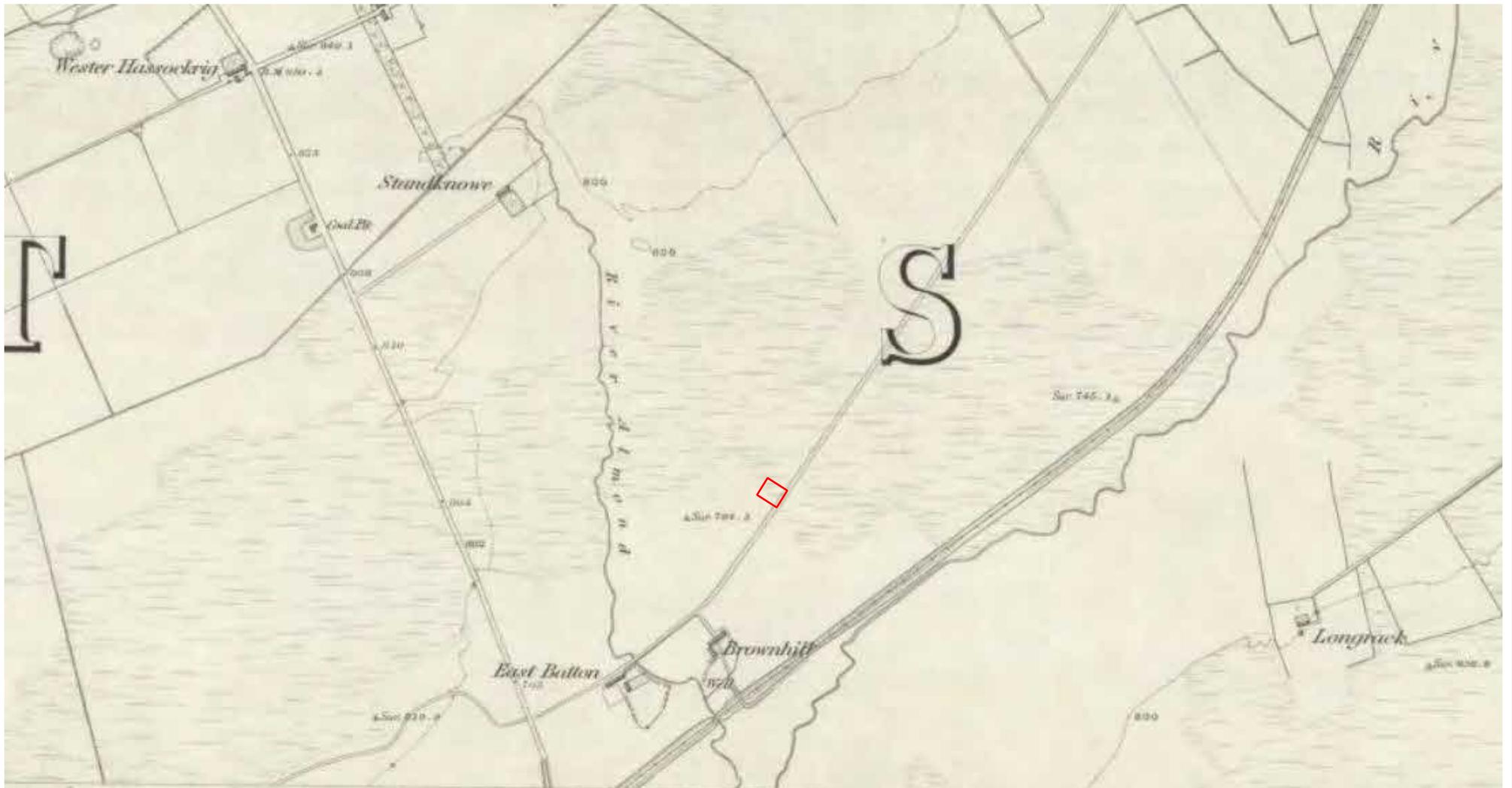
Key

- Approximate position of the enquiry boundary shown
- Opencast mine licence area
- Unlicensed opencast site



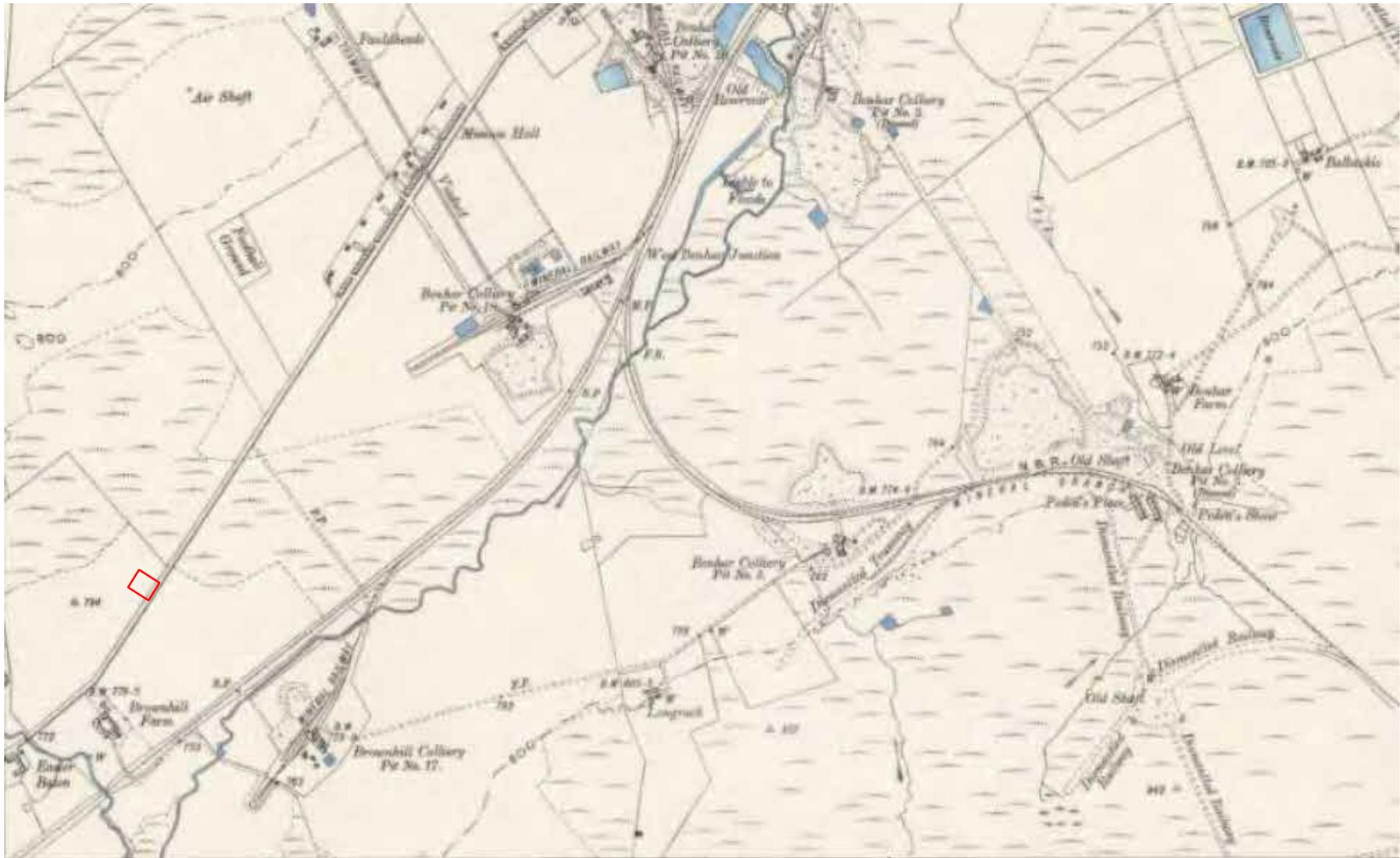
How to contact us
 0345 762 6848 (UK)
 +44 (0)1623 637 000 (International)
 www.groundstability.com

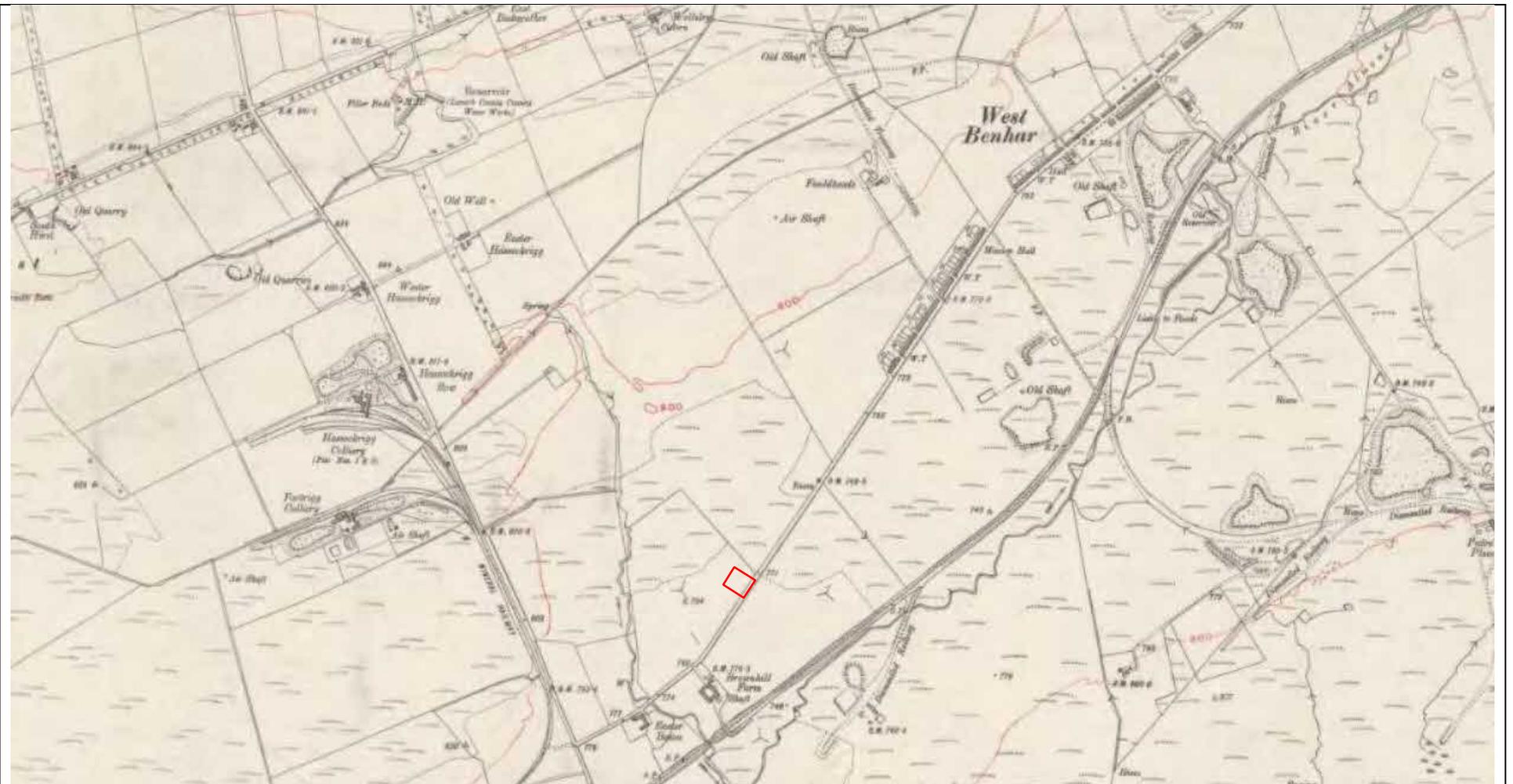
Appendix C – Historic Maps



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Date: 1859
Scale 1:10,560



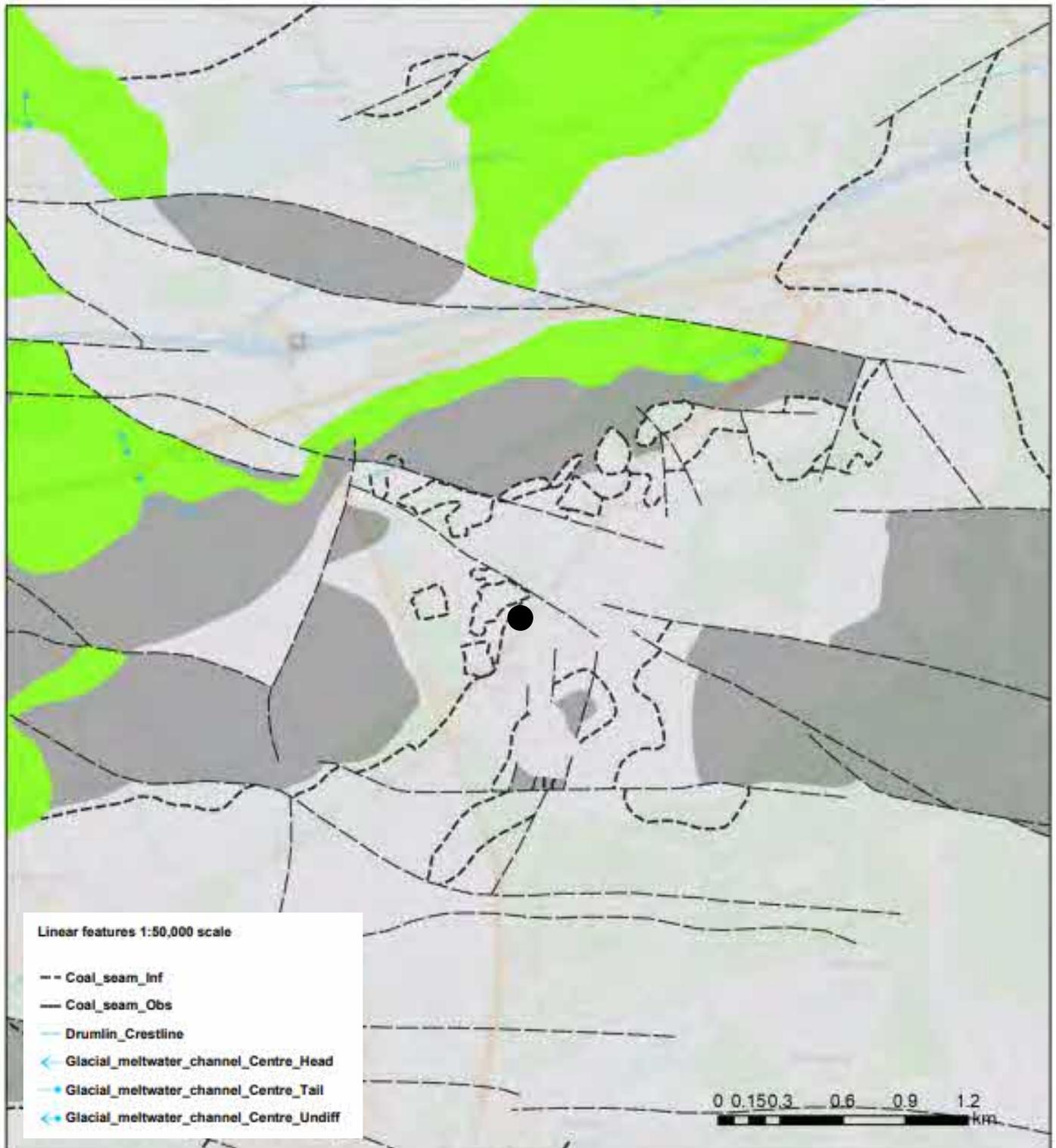


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Date: 1910
Scale 1:10,560

Appendix D – Geological Maps

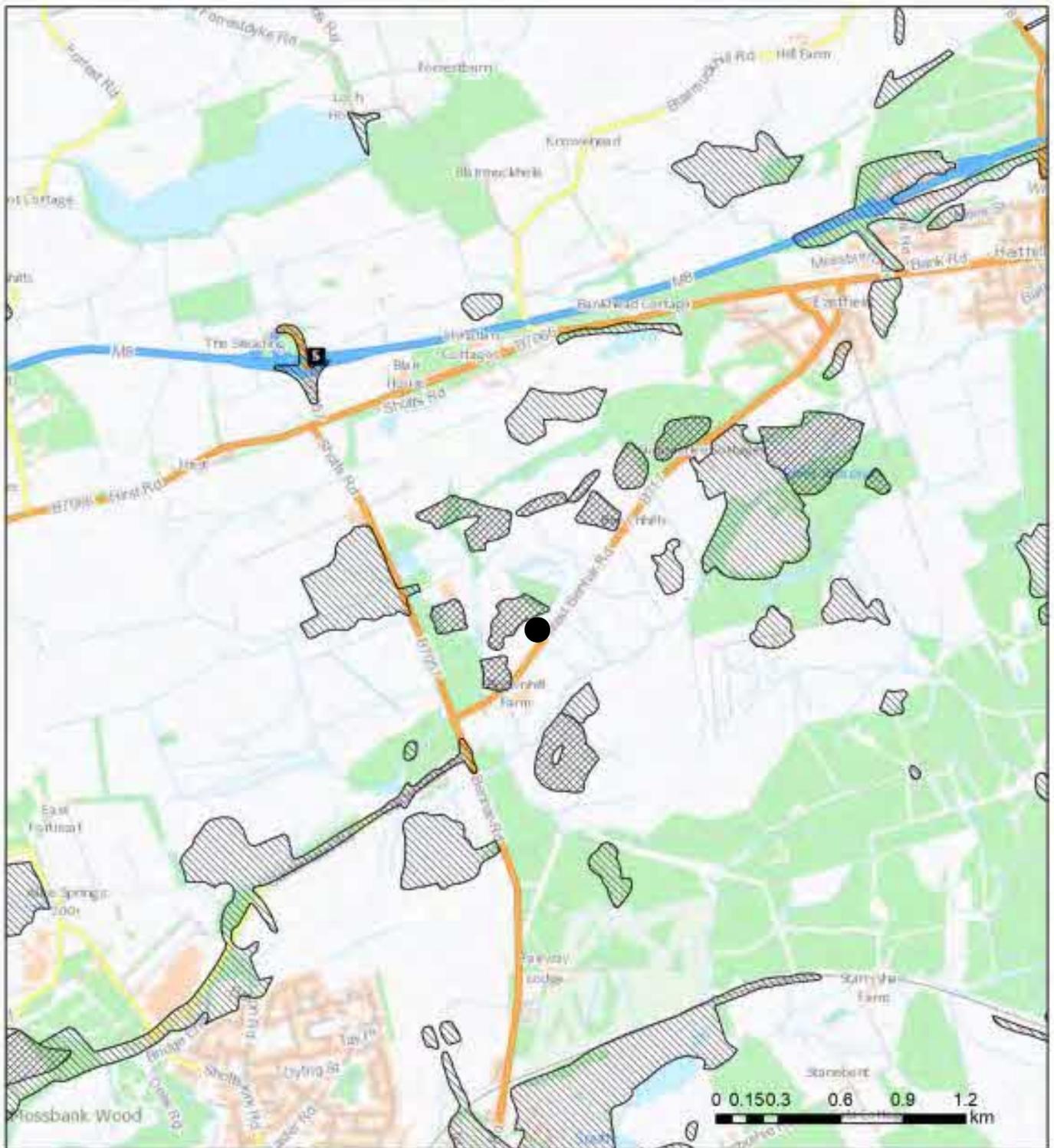
Bedrock Geology



Bedrock geology 1:50,000 scale

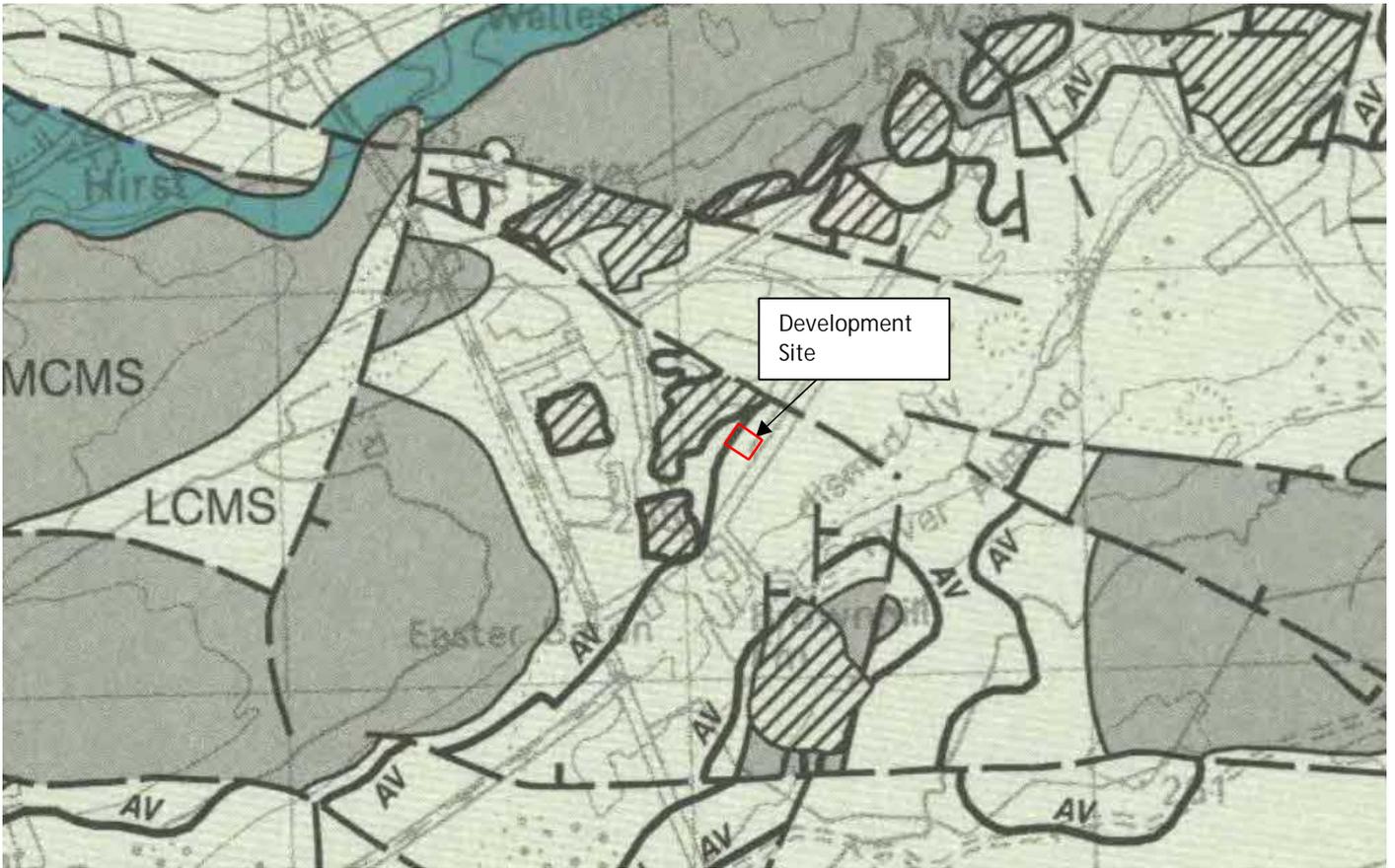


Artificial Geology



Artificial ground 1:50,000 scale

-  **MADE GROUND (UNDIVIDED) - ARTIFICIAL DEPOSIT**
-  **INFILLED GROUND - ARTIFICIAL DEPOSIT**



ABBC	AIRDRIE BLACKBAND COAL
VB	VANDERBECKE (QUEENSLIE) MARINE BAND
AV	AIRDRIE VIRTUEWELL COAL
LGS	LADYGRANGE COAL
LCMS	KILTONGUE MUSSELBAND COAL (CARRON TWO FOOT)
KILC	KILTONGUE COAL (CROW)
UDC	UPPER DRUMGRAY COAL (CARRON MAIN)
MDC	MID DRUMGRAY COAL (MIDDLE SPLINT)
LDC	LOWER DRUMGRAY COAL (UPPER COXROD)
SGA	SHOTTS GAS COAL (LOWER COXROD)
MILL	MILL COAL

Appendix E – BGS Borehole Logs

NS86SE262

(68/5505) Wt 73541/06 3000 1/54 M. & St., Ltd. G 68

SECTION OF Hassockrigg No. 1 (Diamond) Bore (1954) from Mill Goal to

Colinburn Level

NS 86 SE

$\frac{1}{2}$
104
262

NS 8809 6259

Surface Level

O.D.

Communicated _____ by _____

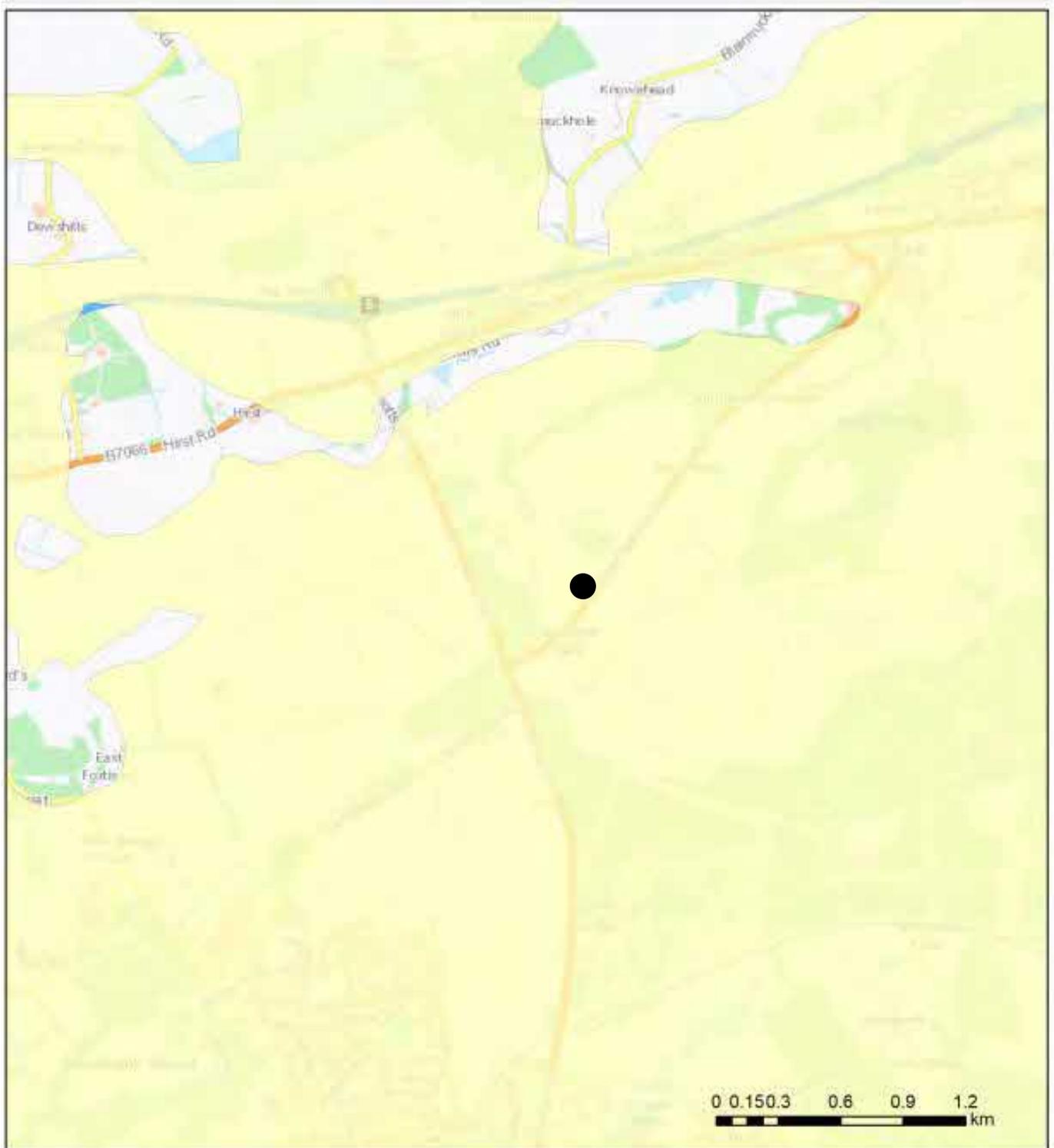
Date of boring or sinking 1.2.54 - 2.3.54 Borer P. Stark & Sons, Cleland

One-inch Map 31 Six-inch Map (County and Half-Quarter Sheet) LANARK IX S.E.

	Thickness.			Depth from Surface.		
	Fathoms.	feet.	ins.	Fathoms.	feet.	ins.
Coaly fireclay	-	-	4	-	-	4
Fireclay	-	1	3	-	1	7
Fakes & sandstone	-	2	11	-	4	6
Fireclay	-	1	11	1	-	5
Sandstone	-	-	9	1	1	2
COAL	-	-	10	1	2	-
Coaly fireclay	-	-	2	1	2	2
Sandy fireclay	-	3	2	1	5	4
Fakes & Sandstone	3	4	7	5	3	11
Blaes & Ironstone ribs	-	4	-	6	1	11
COAL	-	-	3	6	2	2
Coaly fakes	-	-	4	6	2	6
COAL	-	-	7	6	3	1
Coaly fireclay	-	-	5	6	3	6
COAL	-	-	6	6	4	-
Coaly fireclay	-	-	3	6	4	3
Fireclay	-	-	4	6	4	7
Sandstone & fakes	-	4	10	7	3	5
Blaes & ironstone ribs	-	2	7	8	-	-
COAL	-	-	5	8	-	5
Coaly fireclay	-	-	1	8	-	6
COAL	-	-	8	8	1	2
Coaly fireclay	-	-	3	8	1	5
Sandy fireclay	-	2	1	8	3	6
Ironstone rib	-	-	5	8	3	11
Sandstone	4	1	2	12	5	1
Sandy fcl. w. coal strains	-	-	1	12	5	2
Carry forward	12	5	2			

		Thickness.			Depth from Surface.		
		Fathoms.	feet.	ins.	Fathoms.	feet.	ins.
British Geological Survey	British Geological Survey Brought forward	12	5	2	12	5	2
	COAL	-	1	1	13	-	3
	Irony fireclay } Armadale	-	-	2	13	-	3½
	COAL } Main	-	-	6½	13	-	10
	Fireclay	-	1	1	13	1	11
	Fakes & sandstone	2	2	-	15	3	11
	Faky blaes	1	2	9	17	-	8
	Blaes with mussell shells	-	1	8	17	2	4
British Geological Survey	Faky blaes	-	1	6	17	3	10
	Ironstone rib	-	-	2	17	4	-
	Blaes	-	3	2	18	1	2
	Fireclay	1	4	11	20	-	1
	Fakes w. sst. ribs	-	3	8	20	3	9
	Sandy fireclay	-	2	7	21	-	4
	Fakes & sandstone	1	2	1	22	2	5
	Sandstone w. hard ribs	2	-	8	24	3	1
	Blaes & balls	1	-	4	25	3	5
British Geological Survey	Fireclay	-	1	1	25	4	6
	COAL (Colinburn)	-	2	2	26	-	8
	Fireclay	-	-	6	26	1	2
	Sandstone w. faky partings	-	5	9	27	-	11
	Total depth	<u>27</u>	<u>-</u>	<u>11</u>			
British Geological Survey	British Geological Survey						
British Geological Survey	British Geological Survey						

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

Appendix G – Coal Mining Summary Map

