

Appendix 11.3 Mining Risk Assessment Report

Wardell Armstrong (November 2015)

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Mining Risk Assessment Douglas West & Dalquhandy DP Renewable Energy Project, South Lanarkshire				
Sources of information: Coal Authority Mining Reports Ref. 51001030136001 (main site area) dated 04 November 2015; 51001030094001 (southern section of site) dated 04 November 2015 British Geological Survey geological 1:50,000 mapping – Sheet 23 Hamilton, borehole logs from BGS Geoindex database; BGS Douglas Coalfield Geological 3D model (2012) Published Ordnance Survey historical topographic mapping Coal Authority web-based Interactive Map (http://coal.decc.gov.uk/en/coal/cms/publications/data/map/map.aspx).				
Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
1. Are there any recorded coal mine entries within the site or within 20m of the site boundary?	<ul style="list-style-type: none"> Catastrophic collapse of mine entry leading to ground instability or voids at the ground surface. Settlement of the ground surface above/adjacent to the mine entry. Generation of crown holes at the ground surface. Mines gas emissions 	Yes: Two mine adits (CA refs. 280633-010 and 280633-014) are recorded outside, but within 20m of, the site boundary at its western extent.	Ground subsidence associated with the existing untreated mine entry/entries. Sudden collapse of mine entry/entries leading to voids or instability at the ground surface. Generation of crown holes at the ground surface.	The adits are located in the valley of the Polniel Water to the west of the site and have an azimuth in a westerly direction so do not impact on the development area. .
2. Is the proposed development in the likely zone of influence of past deep underground mining?	<ul style="list-style-type: none"> Ground subsidence. Ground instability. 	No	N/A	N/A
3. Is the proposed development in the likely zone of influence of any present underground mine workings?	<ul style="list-style-type: none"> Ground subsidence. Ground instability, loss of ground, generation of crown holes. 	No	N/A	N/A
4. Is the proposed development within the likely zone of influence of recorded underground workings at shallow depth (depths of less than 30m)?	<ul style="list-style-type: none"> Ground subsidence. Ground instability, loss of ground, generation of crown holes. 	Yes: There are recorded coal workings in 1 seam of coal at shallow to 30m depth, last worked in 1938, beneath the development area. This is recorded to cover a small area within the most westerly extent of the site.	Ground subsidence associated with past shallow underground mining and mine entries can result in severe localised ground instability and damage to the built environment, harm to human health, injury or death of site users, site employees, maintenance operatives or construction workers using the site.	Shallow Mine Workings: It is established best practice (CIRIA SP32) to determine whether shallow mine workings represent a potential risk of ground movement by way of a risk assessment and an appropriate ground investigation as necessary. Where a shallow mining risk is identified, this risk would normally be mitigated by execution of a suitable stabilisation programme, typically by drilling and pressure grouting of a regular spaced grid of boreholes over the proposed infrastructure footprint. A full Site Investigation will

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Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
				be undertaken prior to the commencement of operations to inform any mitigation measures as required, in accordance with established best practice.
5. Is there a possibility of unrecorded shallow mine workings and/or mine entries?	<ul style="list-style-type: none"> Ground subsidence. Ground instability, loss of ground, generation of crown holes. Catastrophic collapse of mine entry leading to ground instability or voids at the ground surface. Settlement of the ground surface above/adjacent to the mine entry. Mine gas emissions 	<p>Yes: Sections of the site are underlain by coal bearing strata of the Douglas Coalfield. As such there is the potential for coal seams with abandoned unrecorded workings to be present at shallow depth. The primarily affected areas cover the western and northern parts of the development area, which are underlain by the Limestone Coal Formation and the Upper Limestone/ Lawmuir Formations (although at a lower risk). The site has been subject to opencast coal extraction which will have removed the majority of abandoned shallow mine workings, however, there is a small risk that remnant workings may still be present.</p> <p>Unrecorded mine entries may also exist on or within influencing distance of the development area. It is likely that any mine entries that were encountered during the</p>	Ground subsidence associated with past shallow underground mining and mine entries can result in severe localised ground instability and damage to the built environment, harm to human health, injury or death of site users, site employees, maintenance operatives or construction workers using the site.	<p>Shallow Mine Workings: It is established best practice (CIRIA SP32) to determine whether shallow mine workings represent a potential risk of ground movement by way of a risk assessment and an appropriate ground investigation as necessary. Where a shallow mining risk is identified, this risk would normally be mitigated by execution of a suitable stabilisation programme, typically by drilling and pressure grouting of a regular spaced grid of boreholes over the proposed infrastructure footprint.</p> <p>Mine Entries: The existence of potentially unstable unrecorded mine entries within the site boundary cannot be completely discounted. Should any anomalous ground conditions be encountered during the course of the development works then specialist advice should be sought regarding further investigation and remedial works.</p>

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Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
		opencast coal operations at the site were treated at that time.		
6. Is there a record of mine gas emissions within the site boundary?	<ul style="list-style-type: none"> Mixtures of noxious of explosive gases reaching the ground surface via superficial deposits, faulted/broken strata or poorly filled mine entries and entering structures, confined spaces etc, when an explosive or asphyxiating hazard may be generated. 	No.	N/A	N/A
7. Is the proposed development in an area for which the Coal Authority is determining or has granted a licence to remove coal by underground methods?	<ul style="list-style-type: none"> Ground subsidence. Ground instability. 	No.	N/A	N/A
8. Are there known faults or other lines of weakness (eg. fissures) due to mining at the site?	<ul style="list-style-type: none"> Ground subsidence. Mixtures of noxious of explosive gases reaching the ground surface via faulted/broken strata and entering buildings, structures, confined spaces etc, when an explosive or asphyxiating hazard may be generated. Stepped rockhead profiles where there has been subsidence across faults, 	No.	N/A	N/A

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Issue	Hazard	Site Affected (Yes/No) (Detail – where appropriate)	Consequences (where appropriate)	Recommended Mitigation Measures (where appropriate)
	impacting settlement on proposed structures.			
9. Has the site been subject to remedial works by, or on behalf of, the Coal Authority under its surface hazard call out procedures?	<ul style="list-style-type: none"> Indication of past and potential future subsidence issues on site. 	No.	N/A	N/A
10. Is the proposed development within the boundary of a surface mining/opencast site from which minerals have been removed by surface mining/opencast methods?	<ul style="list-style-type: none"> Potential settlement of opencast backfill. Potential of a ground gas source and/or migration pathway 	Yes. The development area lies within part of the former Dalquhandy Opencast Coal Site (OCCS). A section of the development area has been excavated to c.90m depth maximum during the 1980's and 1990's but has been backfilled and restored since that time.	Although the backfill has been in place since the 1990's, the backfill was not placed in a controlled manner and there is a possibility that any infrastructure (such as wind turbines) could instigate and/or be subject to residual settlement.	The layout of the wind turbines has been revised to avoid the area of backfilled opencast excavation. Turbines may be located on the edge of the excavation, where depths of made up ground are relatively shallow, however, an appropriate foundation solution (such as piling) will be used to avoid potential settlement issues. A targeted ground investigation will be undertaken to identify the ground conditions at each turbine position such that an appropriate foundation solution can be adopted.
11. Is the proposed development within 200m of a surface mining/opencast site from which minerals are being removed?	<ul style="list-style-type: none"> Development constraints associated with environment/noise/dust 	No	N/A	N/A

Mining Risk Assessment
Douglas West & Dalquhandy DP Renewable Energy Project, South Lanarkshire

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Assessment of Cumulative Impact of Mining Issues:

This risk assessment has identified the principal mining related risks to the proposed development are the presence of recorded and potentially unrecorded shallow mine workings and the potential presence of unrecorded mine entries. It is recommended that an appropriate desk study and targeted ground investigation is undertaken to fully identify and quantify the risk of ground movement related to the shallow workings. Dependent upon whether a shallow mining risk is identified beneath the proposed development infrastructure, this risk would be mitigated by a suitable stabilisation programme, typically by drilling and pressure grouting.

Should any feature consistent with a mine entry be identified during construction, then it may be necessary to design and implement an appropriate programme of stabilisation. This would be carried out in accordance with guidance contained within CIRA SP32.

The layout of the proposed wind turbines has been revised to take account of the location of the backfilled excavation for the former Dalquhandy Opencast Coal Site, although turbines may be located on the edge of the excavation following ground investigations and with appropriate foundations to avoid potential ground settlement effects.

Prior to carrying out any works which may intersect, disturb or enter any coal seams, coal mine workings or mine entries (within the ownership of the Coal Authority), the written permission of the Coal Authority shall be obtained (www.coal.gov.uk/services/permissions/index.cfm).

N/A = Not Applicable

Prepared by



M G Downing, CEng MIMMM, Associate Director

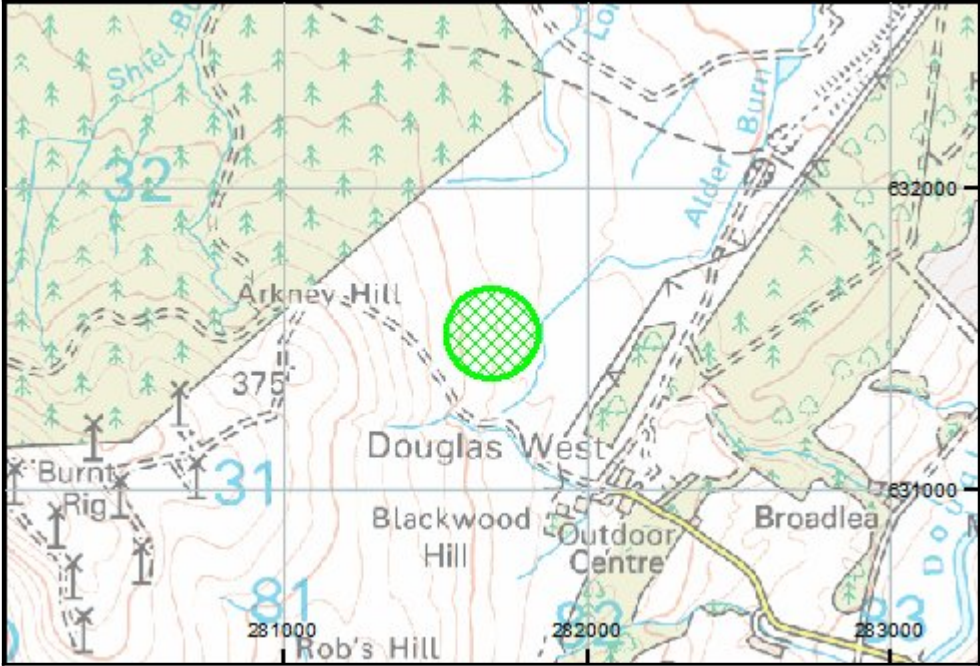
Approved by



C W Brown, CEng FIMMM CGeol, Consultant

Location map

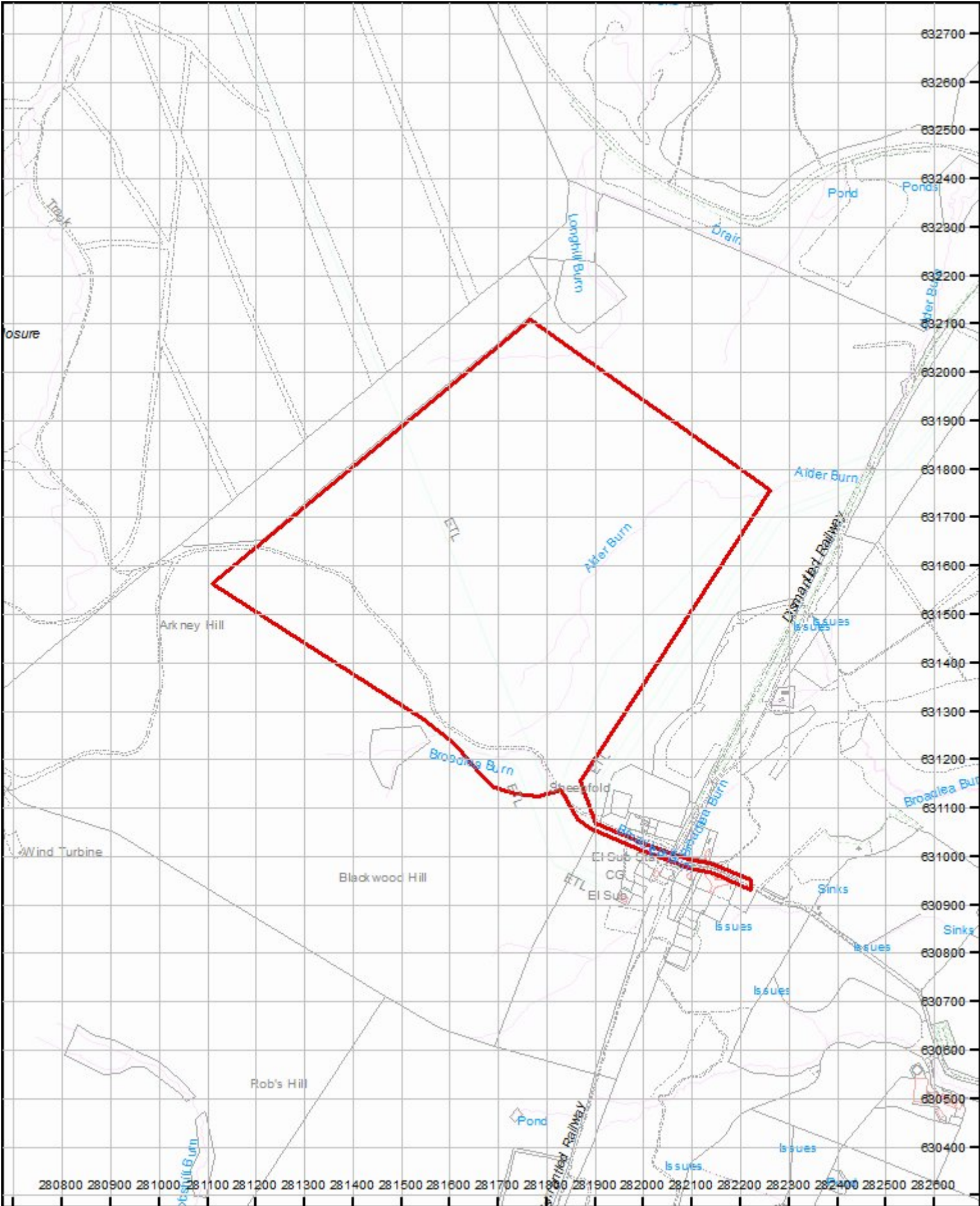

Approximate
position of
property



Enquiry boundary

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Key
Approximate position of enquiry
boundary shown





The Coal Authority

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**WARDELL ARMSTRONG LLP
THYNNE COURT
THYNNE STREET
WEST BROMWICH
WEST MIDLANDS
B70 6PH**

Our reference:	51001030094001
Your reference:	ED11836
Date of your enquiry:	04 November 2015
Date we received your enquiry:	04 November 2015
Date of issue:	04 November 2015

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

DOUGLAS WEST & DALQUHANDY DP RENEWABLE ENERGY PROJECT, DOUGLAS, SOUTH LANARKSHIRE,

This report is based on and limited to the records held by the Coal Authority, at the time we answer the search.

Coal mining

See comments below

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

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 31st October 1994.

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

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

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

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.

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Map images are being sent under separate cover



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DOUGLAS WEST & DALQUHANDY DP RENEWABLE ENERGY PROJECT, DOUGLAS, SOUTH LANARKSHIRE,

This report is based on and limited to the records held by the Coal Authority, at the time we answer the search.

Coal mining

See comments below

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 1 seam of coal at shallow to 30m depth, and last worked in 1938.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there are 2 mine entries, the approximate positions of which are shown on the attached plan.

There is no record of what steps, if any, have been taken to treat the mine entries.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

For an additional fee, the Coal Authority will provide a supplementary Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry (entries) referred to in this report. It will give details based on information in the Coal Authority's possession, together with an opinion on the likelihood of mining subsidence damage arising from ground movement as a consequence of the existence of the mine entry/entries. It will also give details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining.

Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie. for development sites and new build).

For further advice on how to order this additional information visit www.groundstability.com or telephone 0345 7626 848.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

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 31st October 1994.

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

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is in an area for which a notice of entitlement to withdraw support was published in 1965.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

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

Comments on Coal Authority information

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0345 762 6848.

If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637225. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Additional Remarks

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