LK CONSULT LIMITED

PART OF THE LK GROUP

WHITE LION INN
NEW ROAD
DILHORNE

DESK BASED
COAL MINING
RISK ASSESSMENT



Prepared for:

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Dilhorne
Staffordshire
ST10 2PQ

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Date: 24th December 2015
Ref: LKC 15 1470

LK Consult Ltd

Document Verification

Site Address	White Lion Inn, New Road, Dilhorne, ST10 2PQ		
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Prepared By	Ben Smith	**Signature**	
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It should be noted this report pertains solely to potential ground stability issues relating to potential shallow mining within the proposed planning boundary only.

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1 INTRODUCTION

1.1 Background

LK Consult (LKC) has been commissioned by Charlie Bassetts to provide a Desk Based Coal Mining Risk Assessment Report for the White Lion Inn, Dilhorne. The report is required in support of a planning application to extend the current building.

A Coal Mining Risk Assessment Report is required for a planning application within a designated 'Coal Mining Development High Risk Area'. 'Coal Mining Development High Risk Areas' are areas, based upon Coal Authority records, where the potential land instability and other safety risks associated with former coal mining activities are likely to be greatest. They include, for example, areas of known or suspected shallow coal mining, recorded mine entries and areas of former surface mining.

This assessment is based upon guidance provided by the Coal Authority[1] and comprises a review of available desk based information.

The scope of this Coal Mining Risk Assessment (as per Coal Authority guidance) is to:

- Present a desk-based review of all available information on the coal mining issues which are relevant to the application site.
- Use the above 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 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.

1.2 Site Details

A summary of site settings is presented in Table 1. Figure 1 indicates the site location. Figure 2 shows the current and proposed development.

Location	West of New Road, Dilhorne, ST10 2PQ. Centred at approximate National Grid Reference 396986E 343304N.
Area	Approximately 1.6 Hectares.
Topography	Approximately 212 metres above ordnance datum (AOD). The site appears to be approximately level while the surrounding area slopes down to the west.
Current Land Use	Site The site is currently used as the White Lion Inn with areas of tarmacadam car parking and grassed soft landscaping. Surrounding Area North: Rough grassland and residential housing. East: New Road and All Saints Church (including graveyard). South: Caverswall Road and residential housing. West: Rough grassland.
Proposed Development	Extension of the current building to accommodate dining and kitchen area.

Table 1: Summary of site details.

[1] Risk Based Approach to Development Management. Guidance for Developers. Version 3 2014.

2 REVIEW OF INFORMATION

LKC have obtained and reviewed information from the following sources, which is summarised in Section 2:

- Review of Published BGS Geological Mapping including:
  - Sheet 124 Ashbourne Solid and Drift, Published 1983, Scale 1:50,000.
  - Digital Mapping, Scale 1:50,000 (Appendix A).
- Coal Authority Mining Report (Appendix B).
- Coal Authority Development High Risk Area from WMS mapping[2] (Figure 3).
- Historical BGS boreholes within the site vicinity[3] (Appendix C).
- Publicly available historical mapping.

2.1 Geological Mapping

No artificial deposits are mapped across the site.

The superficial geology is mapped as Devensian Till (Diamicton).

The bedrock on site is mapped as the Hawksmoor Formation (interbedded sandstone and conglomerate), of the Sherwood Sandstone Group. The strata to the west is mapped as the Pennine Lower Coal Measures with a number of coal seams present. The Hawksmoor Formation lies unconformably above The Pennine Lower Coal Measures. Coal seams subcropping include 'Alecs' located 80m west and 'Mans' located 280m west. 'Dilhorne' is also expected to be below the Hawksmoor Formation to the east. A question mark is noted next to the Mans coal seam (on sheet mapping) suggesting some uncertainty.

The dip direction shown on sheet mapping varies considerably.

2.2 Coal Authority Mining Report

The Coal Authority Mining Report indicates:

- The property is in the likely zone of influence from workings in 1 seam of coal at 180m to 190m depth, and last worked in 1941. Any ground movements from these coal workings should have stopped by now.
- In addition the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past.
- The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity.
- There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

2.3 Coal Authority Development High Risk Area

The Coal Authority WMS data has been reviewed which include areas where the potential land instability and other safety risks associated with former coal mining activities are likely to be greatest.

The central and western area of the site (including the majority of the proposed extension area) lies within a Development High Risk Area, with the following features identified:

[2] http://mapapps2.bgs.ac.uk/ArcGIS/services/CoalAuthority/coalauthority_coalfield_consultation/MapServer/WMSServer?
[3] http://mapapps2.bgs.ac.uk/geoindex/home.html

- Probable Shallow Coal Mine Workings.

The eastern area lies outside the Development High Risk Area.

The Development High Risk Areas are shown to the east of the coal outcrops suggesting that the strata is dipping towards to east.

2.4 Historical BGS Logs

The following BGS logs are located to the east of the site where The Hawksmoor Formation is present above the Pennine Lower Coal Measures.

Ref: SJ94SE10[4], named as Foxfield Colliery No. 10 Borehole, NGR: 397380 343550, 430m NE of site:

- Bunter Sandstone to 33.5m.
- Stained Coal Measures (stained red and purple mudstone and chips of brown siltstone) to 36mbgl.

Ref: SJ94SE11[5], named as Foxfield Colliery No. 11 Borehole, NGR: 397470 343060, 535m SE of site:

- Bunter Sandstone to 65.5m.
- Stained Coal Measures (red brown clay with purple white and grey mottling, chips of purple mudstone) to 69.2mbgl.

The Bunter Sandstone is a previous name for the Sherwood Sandstone Group, which includes the Hawksmoor Formation.

2.5 Historical Mapping

Available historical mapping has not identified any significant features with respect to coal mining within influencing distance.

The public house has been present on site since the 19th Century and was formerly named The Colliers' Arms.

[4] http://scans.bgs.ac.uk/sobi_scans/boreholes/183968/images/10233886.html
[5] http://scans.bgs.ac.uk/sobi_scans/boreholes/183969/images/10233889.html

3 COAL MINING RISK ASSESSMENT

Table 2 below summarises the potential risks associated with coal mining legacy for the proposed development site, identified from the review of the information in Section 2.

Coal Mining Issue	Yes	No	Risk Assessment
Underground coal mining (recorded at shallow depths)		X	Not applicable.
Underground coal mining (probable at shallow depths)	✓		Further assessment required.
Mine entries (shafts / adits) within 20m of the site boundary		X	Not applicable.
Coal mining geology (fissures)		X	Not applicable.
Record of past mine gas emissions		X	Not applicable.
Recorded coal mining surface hazard		X	Not applicable.
Surface mining (opencast workings)		X	Not applicable.

Table 2: Potential Coal Mining Risks.

Underground Coal Workings

A probable risk from underground coal mining at shallow depths has been identified. This is expected to be associated with the Alecs coal seam subcropping (at rockhead) approximately 80m west of the site and is expected to dip below the site. Deeper coal seams are also anticipated, including the Mans coal seam. These coal seams may have been historically worked, which could pose a potential ground stability risk.

The dip angle is not known therefore the depth of these coal seams below the site is unknown. Furthermore the depth of The Hawksmoor Formation (sandstone) mapped above the coal measures is unknown. To the east, the strata is recorded at 33.5-65.5mbgl.

In order to confirm the ground instability risks posed from probable shallow coal workings, intrusive investigation work is recommended.

4 CONCLUSIONS AND RECOMMENDATIONS

Summary

Based upon the available information, LKC conclude that there is a risk from probable shallow coal mining below the central and western areas of the site, including the majority of the proposed extension area. This is assumed to be associated with coal seams subcropping to the west which are expected to dip at shallow depths below the site. If these seams have been worked, there could be a risk of ground instability.

Site Investigation Recommendations

Considering the available information and guidance given in CIRIA SP32[6], LKC consider that an intrusive investigation should be undertaken to confirm the depth and nature of the strata below the site, the depth to coal seams and to confirm if underground shallow workings have occurred below the site. This should be undertaken using rotary open-hole drilling.

Investigation work should be carried out in line with CIRIA SP32 and Coal Authority guidance.

It is also recommended that the risk of ground gas to the proposed development is also considered and investigated. This should include gas monitoring during drilling and post investigation work.

A Coal Authority Permit[7] is required for intrusive activities which will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits).

Mitigation Measures

If shallow voids or workings are encountered and they are considered to present an instability risk to the proposed development then mitigation options may include inter alia:

- Relocation of the extension to any 'safe areas' of the site;
- Stabilisation of any workings beneath the proposed buildings;
- Use of a reinforced raft foundation sat on a granular blanket;
- Use of piled foundations taken to below the level of workings; or,
- Use of flexible foundations.

Measures to protect against the ingress of mine gas could typically include a vented sub-floor and gas protection measures. This should be assessed further depending on prevailing ground conditions.

Conclusions and Safe Development

At this stage the possibility for shallow workings can only be ascertained from site investigation; however, LKC consider that the site could be safely developed with regards to shallow mining subject to an appropriate site investigation and, if required, appropriate mitigation measures which may include some of those measures as detailed above.

Therefore LKC consider the study site should be capable of being made safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

[6] CIRIA (1984). "Construction over abandoned Mine Workings". SP32
[7] https://www.gov.uk/get-a-permit-to-deal-with-a-coal-mine-on-your-property

FIGURES



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Figure 1: Location Plan, White Lion Inn, New Road, Dilhorne

Drawn: December 2015 Scale: 1:25,000 @ A4 (see scale bar)

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Figure 2: Current and Proposed Plan, White Lion Inn, New Road, Dilhorne

Drawn: December 2015 Scale: 1:500 @ A4 (see scale bar)

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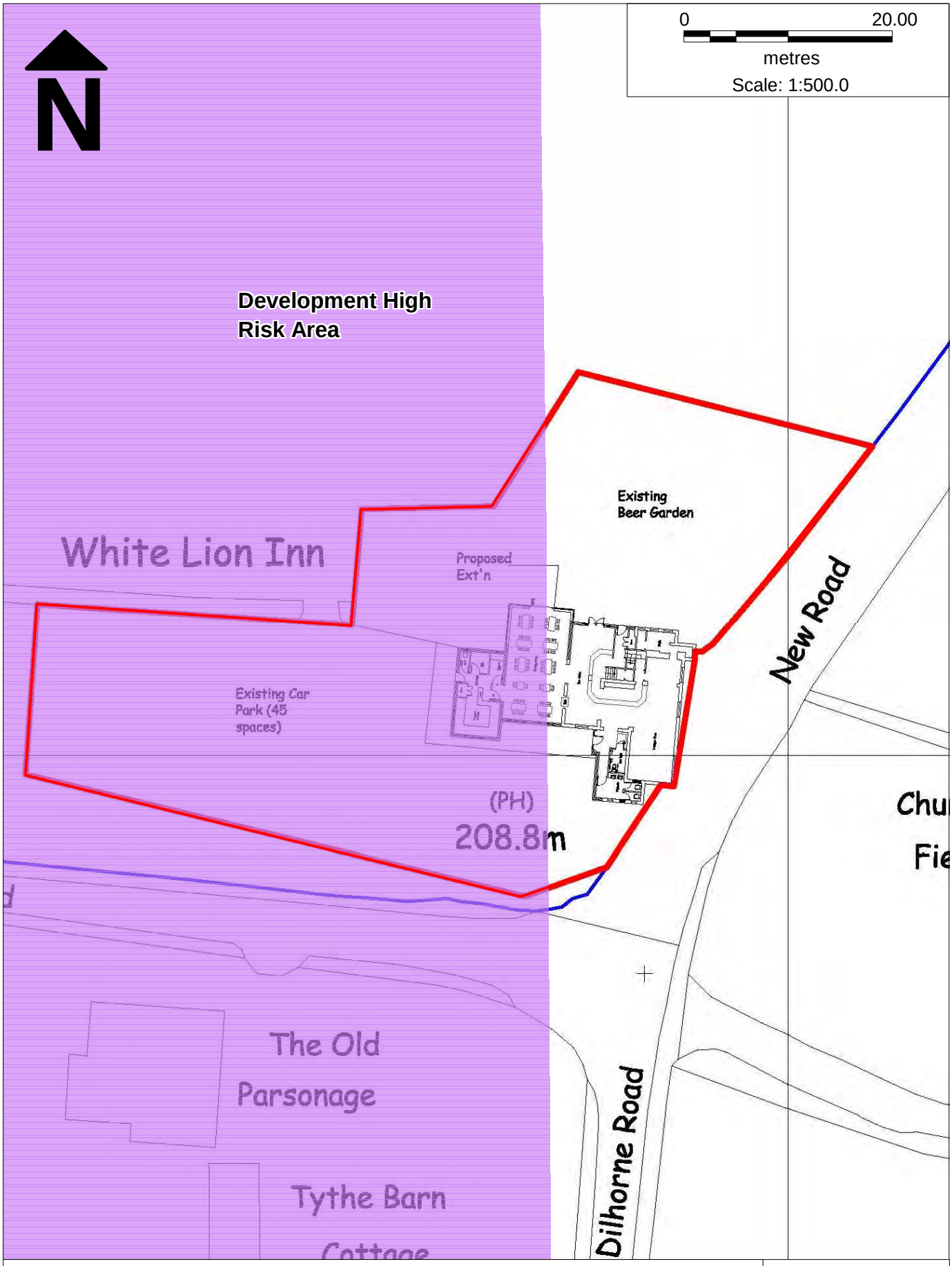


Figure 3: Development High Risk Areas, White Lion Inn, New Road, Dilhorne

Drawn: December 2015 Scale: 1:500 @ A4 (see scale bar)

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APPENDIX A

BGS DIGITAL GEOLOGICAL MAPPING

Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WMGR	Infilled Ground	Artificial Deposit	Cenozoic - Cenozoic
	MGR	Made Ground (Undivided)	Artificial Deposit	Holocene - Holocene
	SLIP	Landslide Deposit	Unknown/Unclassified Entry	Quaternary - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	TILLD	Till, Devensian	Diamicton	Devensian - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Devensian - Devensian
	HEAD	Head	Clay, Silt, Sand and Gravel	Quaternary - Quaternary
	HEAD	Head	Clay, Silt, Sand and Gravel	Quaternary - Quaternary
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Quaternary - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TPSF	Tarporley Siltstone Formation	Siltstone, Mudstone and Sandstone	Anisian - Olenekian
	TPSF	Tarporley Siltstone Formation	Siltstone, Mudstone and Sandstone	Anisian - Olenekian
	HAW	Hawksmoor Formation	Sandstone and Conglomerate, Interbedded	Early Triassic - Early Triassic
	MMG	Mercia Mudstone Group	Mudstone	Rhaetian - Early Triassic
	HUL	Hulme Member	Conglomerate	Early Triassic - Early Triassic
	HAW	Hawksmoor Formation	Mudstone	Early Triassic - Early Triassic
	FRE	Freehay Member	Sandstone and Conglomerate, Interbedded	Early Triassic - Early Triassic
	HUN	Huntley Formation	Sandstone and Conglomerate, Interbedded	Early Triassic - Late Permian
	PMCM	Pennine Middle Coal Measures Formation	Mudstone, Siltstone and Sandstone	Bolsovian - Duckmantian
	PLCM	Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Langsettian - Langsettian
	PLCM	Pennine Lower Coal Measures Formation	Sandstone	Langsettian - Langsettian
	WH	Woodhead Hill Rock	Sandstone	Langsettian - Langsettian
	RR	Rough Rock	Sandstone	Yeadonian - Yeadonian
	CHG	Chatsworth Grit	Sandstone	Marsdenian - Marsdenian
	KVS	Kniveden Sandstones	Sandstone	Kinderscoutian - Kinderscoutian
	CDS	Cheddleton Sandstones	Sandstone	Kinderscoutian - Alportian
	MORRI	Morridge Formation	Mudstone, Siltstone and Sandstone	Marsdenian - Pendleian
	MG	Millstone Grit Group [See also Migr]	Mudstone, Siltstone and Sandstone	Namurian - Namurian
		Rock Segments		
		Faults		

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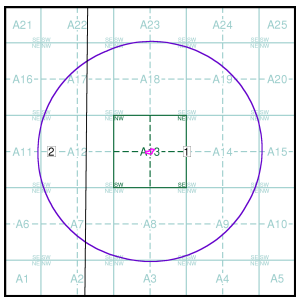
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	**1**	**Map ID:**	**2**
Map Sheet No:	**124**	**Map Sheet No:**	**123**
Map Name:	**Ashbourne**	**Map Name:**	**Stoke-on-Trent**
Map Date:	**1983**	**Map Date:**	**1994**
Bedrock Geology:	**Available**	**Bedrock Geology:**	**Available**
Superficial Geology:	**Available**	**Superficial Geology:**	**Available**
Artificial Geology:	**Available**	**Artificial Geology:**	**Available**
Faults:	**Not Supplied**	**Faults:**	**Not Supplied**
Landslip:	**Available**	**Landslip:**	**Available**
Rock Segments:	**Not Supplied**	**Rock Segments:**	**Not Supplied**

Geology 1:50,000 Maps - Slice A

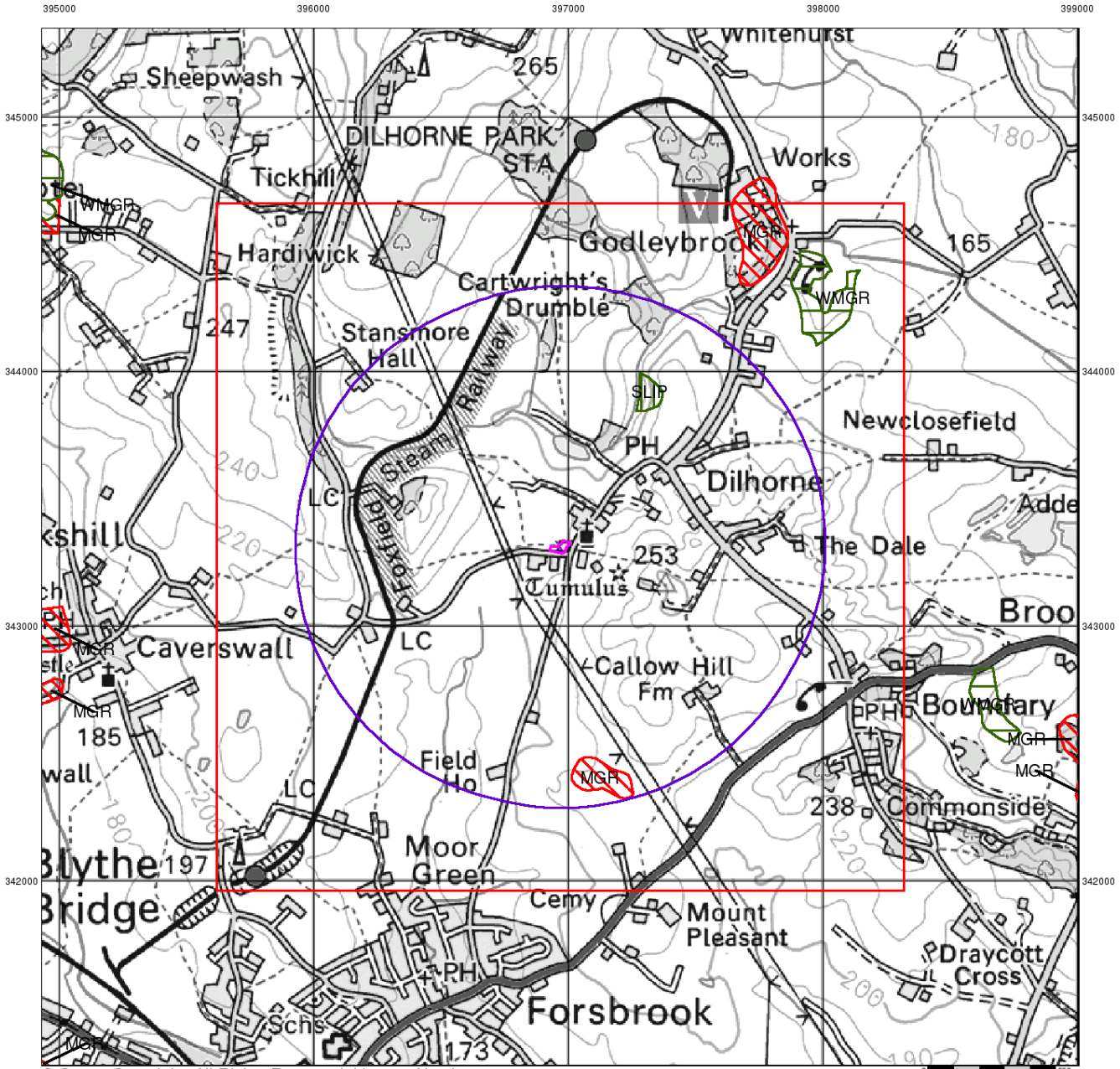


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Customer Reference:	LKC 15 1470
National Grid Reference:	396970, 343310
Slice:	A
Site Area (Ha):	0.21
Search Buffer (m):	1000

Site Details:

White Lion Inn, New Road, Dilhorne, Stoke-on-Trent, ST10 2PQ



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Artificial Ground and Landslip

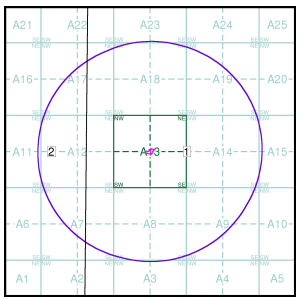
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



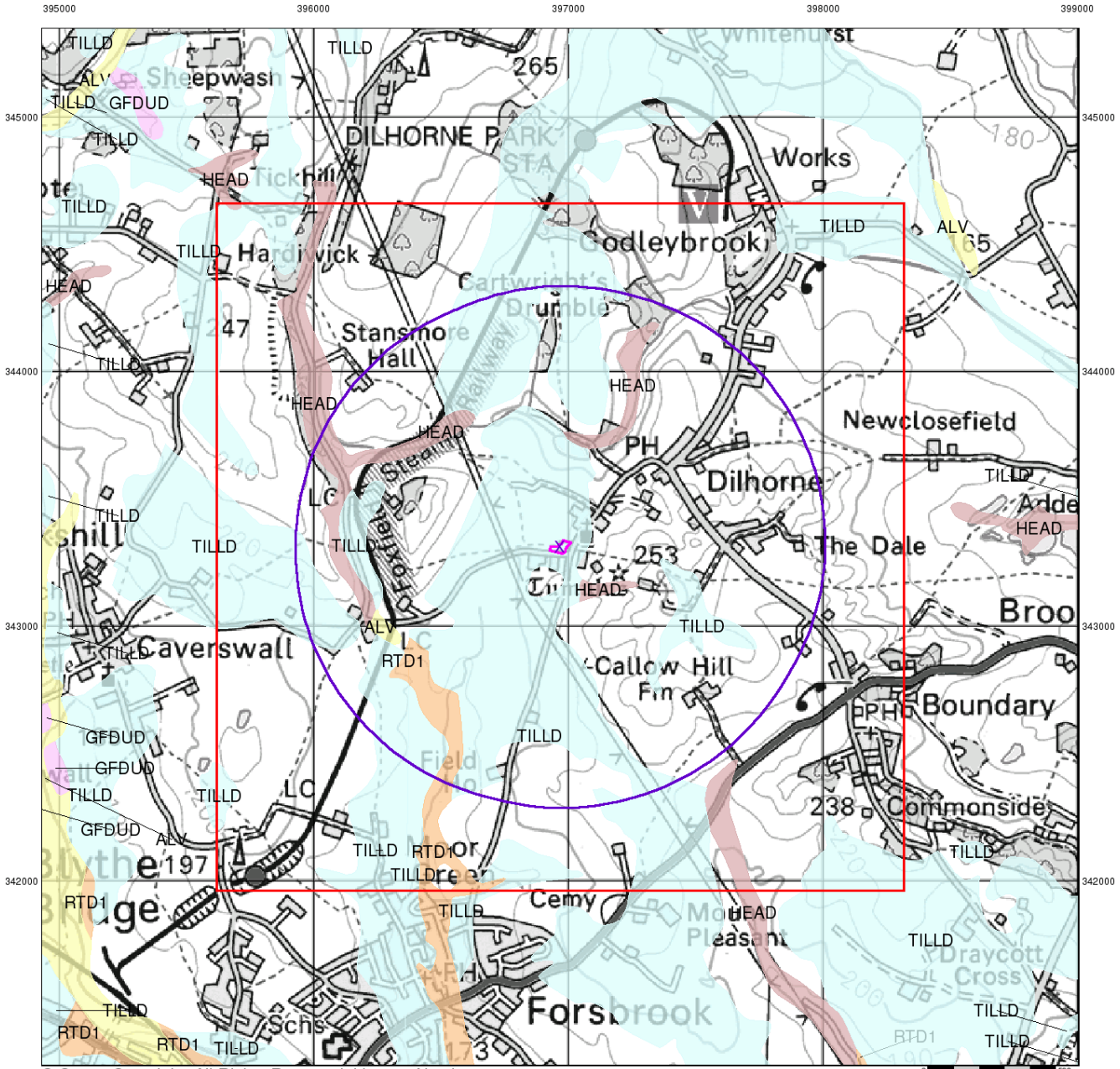
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Slice:	A
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Site Details:

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Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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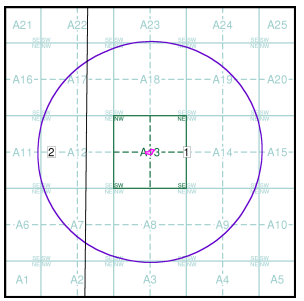
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



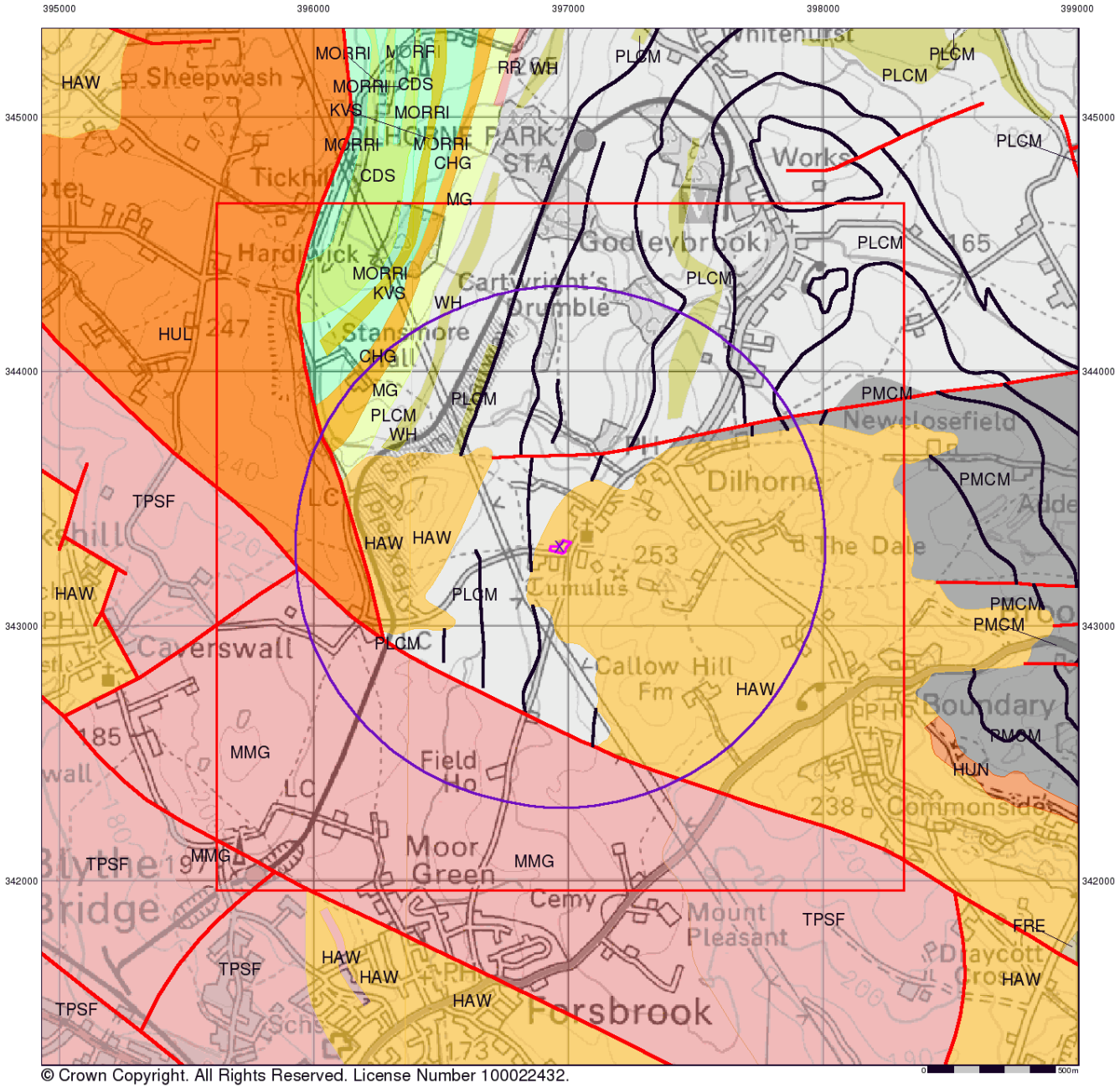
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Bedrock and Faults

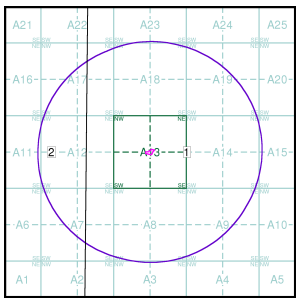
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



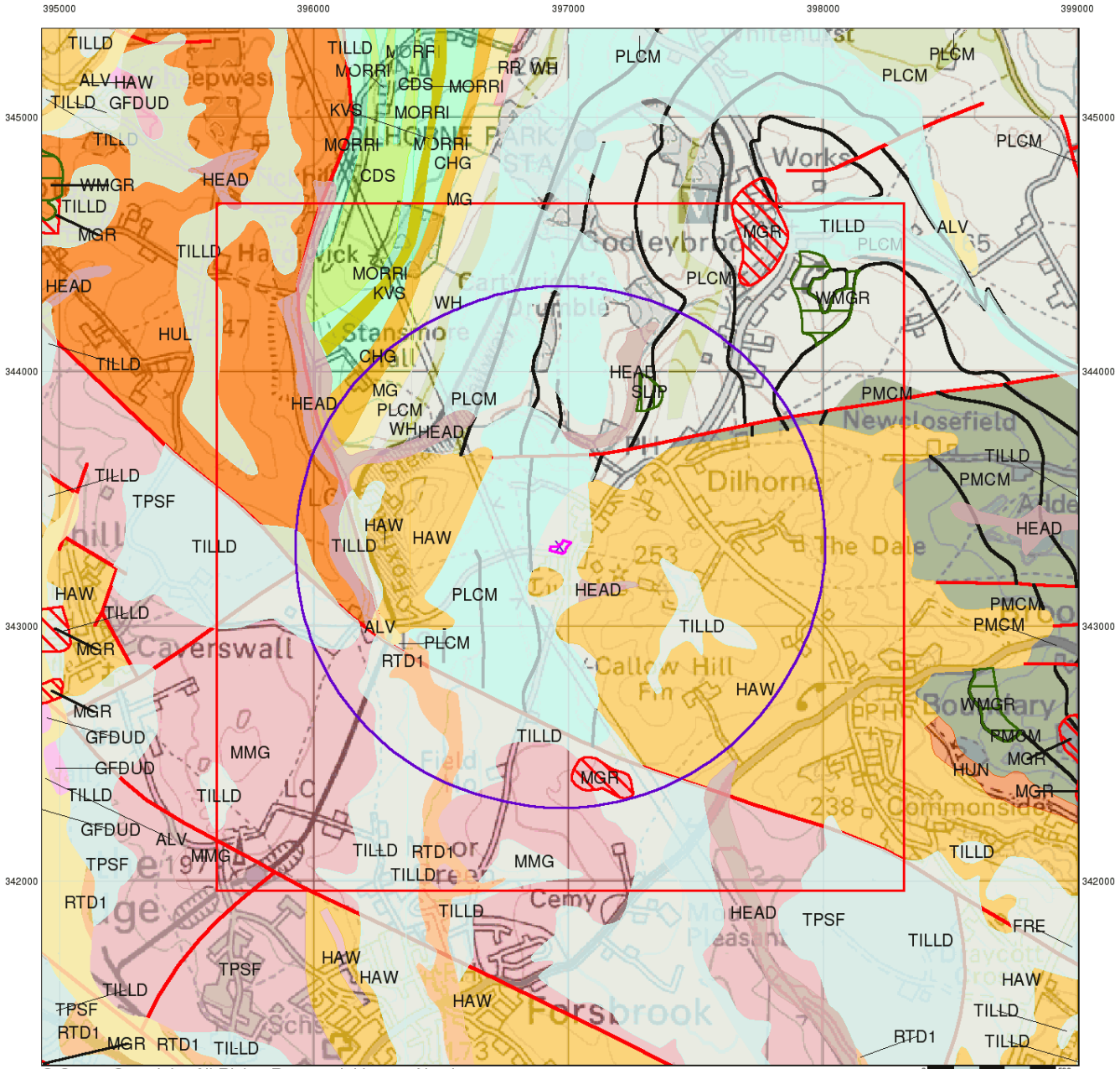
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Dilhorne
Newchapel
Cheadle
Caverswall
Callow Hill
Commonside
Forsbrook
The Dale
Newcastle
Works
Cemy
Pleasant
Boundary
Stansmore Hall
Hardwick
Woodleybrook
Whitehouse
Hollinhurst
Hollinhurst Park
Whitemoor
Whitemoor Fm
Callow Hill Fm
Dilhorne Park
Dilhorne Fm
Hardwick Fm
Stansmore Hall Fm
Woodleybrook Fm
Whitemoor Fm
Whitehouse Fm
Hollinhurst Fm
Hollinhurst Park Fm
Cartwright's Fm
Forsbrook Fm
Commonside Fm
Pleasant Fm
Boundary Fm
Works Fm
Newchapel Fm
Newcastle Fm
Cheadle Fm
Caverswall Fm
Dilhorne Fm
The Dale Fm
Callow Hill Fm
Commonside Fm
Forsbrook

APPENDIX B

COAL AUTHORITY MINING REPORT

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

LANDMARK INFORMATION GROUP LIMITED
SOWTON INDUSTRIAL ESTATE
ABBEY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY

Our reference:	**51001055763001**
Your reference:	**76960519_2|**
Date of your enquiry:	**14 December 2015**
Date we received your enquiry:	**14 December 2015**
Date of issue:	**14 December 2015**

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

Non-Residential Coal Authority Mining Report

WHITE LION INN, NEW ROAD, DILHORNE, STOKE-ON-TRENT, STAFFORDSHIRE,

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

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 180m to 190m depth, and last worked in 1941.

Any ground movement from these coal workings should have stopped by now.

In addition the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered prior to any site works or future development activity. Your attention is drawn to the Comments on Coal Authority Information section of the report.

Present

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

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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.

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

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 in an area for which a notice of entitlement to withdraw support was published in 1946.

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.

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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

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.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

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 and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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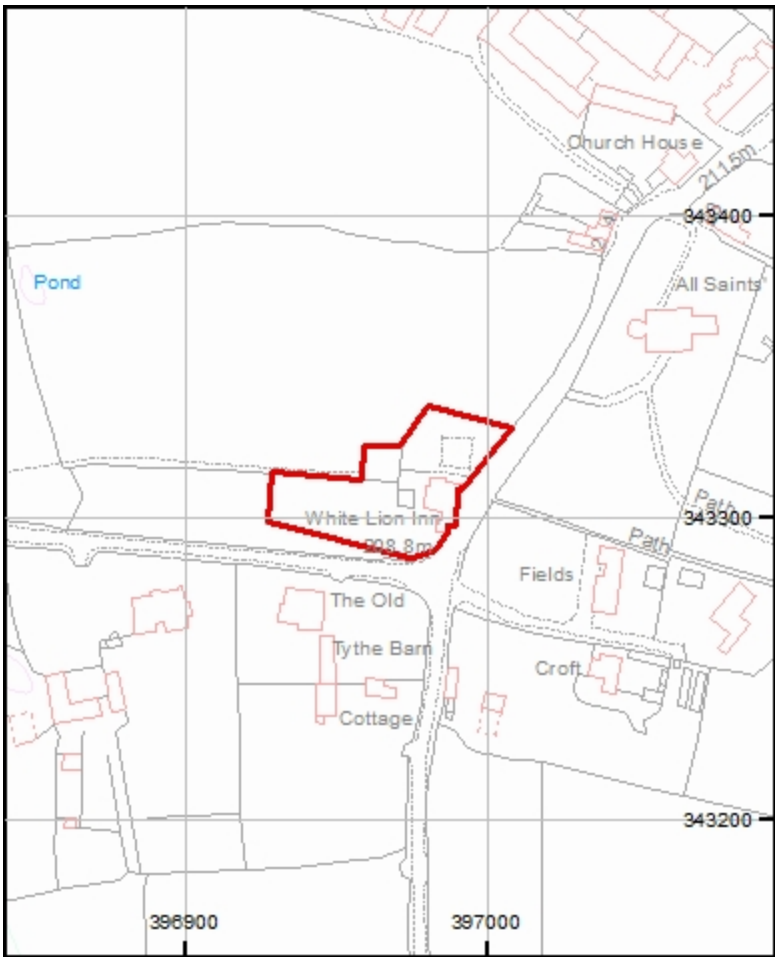
Location map

Approximate position of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey

APPENDIX C

HISTORICAL BGS BOREHOLES

SECTION OF FOXFIELD NO.10 BOREHOLE

PURPOSE PROVING BASE OF BUNTER

EXACT SITE NAT. GRID REF.
E. 397 380
N. 343 578

LEVEL AT WHICH bore COMMENCED RELATIVE TO MINING DATUM 10 732-28

DATE OF SINKING OR BORING JULY 1962

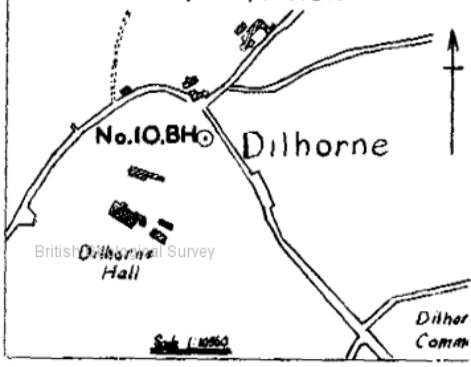
SINKER OR BORER N.C.B.

(County, Sheet and Qtr.)

SJ.94. S.E. /10

(Nat. Grid, Sheet and Qtr.)

Attach tracing from a map or sketch map if possible



GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS FEET	THICKNESS IN.	DEPTH (ft) FEET	DEPTH IN.
BUNTER	Coarse red-brown sandstone	5	-	1.52 5	-
	Coarse red-brown sandstone occasional quartz pebbles	35	-	12-19 40	-
	Coarse red-brown sandstone	40	-	24-38 80	-
	Pale brown sandstone	10	-	27-43 90	-
	Coarse red brown sandstone	28	-	33-53 110	-
Stained Coal MEASURES	Stained red and purple mudstone and chips of brown siltstone	8		35-47 118	-

N.B. This borehole was drilled by the percussive method, all samples were chipping samples.

Base of Bunter at 118ft

Water first met at 106ft

Rest water level 91ft (on 9th July 1962, during a dry period)

Borehole sealed with cement 11th July, 1962.

GEOLOGICAL SECTION
NORTH STAFFS
AUGUST 1962.

British Geological Survey

1T-OM

FOXFIELD No:10. BORE. 1962

N.G.R. E 397 380. N 343 578. **S.L.** 10732·28'

PRINCIPAL HORIZONS		LOG		Dip. Dev: Oil. Gas. Water.	Electric Log.	Coring.	Casing left in hole.
			Red-brown.				
	50						
			Pale brown.	R.W.L.			
	100		Red brown.				
BUNTER C MEASURES	110		Red and purple staining.				

Total depth 118'

Borehole sealed with cement.

Geological Section.
North Staffs.
Aug: 1962.

SECTION OF FOXFIELD NO.11 BOREHOLE.

PURPOSE PROVING BASE OF BUNTER

EXACT SITE Nat. Grid Ref.
E. 397 462
N. 343 046

LEVEL AT WHICH bore COMMENCED RELATIVE TO MINING DATUM 10 816.19

DATE OF SINKING OR BORING JULY-AUGUST 1962

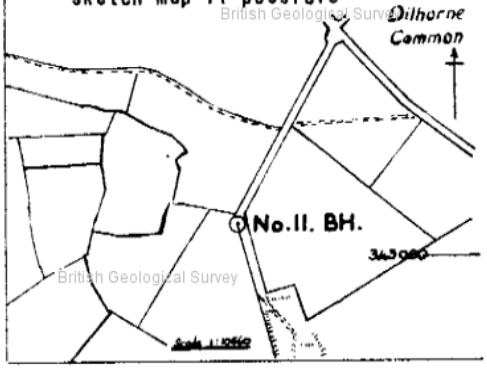
SINKER OR BORER N.C.B.

(County, Sheet and Qtr.)

SJ.94. SE. 15

(Nat. Grid, Sheet and Qtr.)

Attach tracing from a map or sketch map if possible



GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS FEET	THICKNESS IN.	DEPTH m FEET	DEPTH IN.
	N.B. This borehole was drilled by the percussive method, all samples were chipping samples.				
	Brown fine grained marly sandstone, occasional pebbles	5	-	1.52 5	-
	Red brown fine grained sandstone, occasional pebbles	10	-	4.57 15	-
	Red brown sandstone	20	-	10.67 35	-
	Red brown sandstone, occasional pebbles	10	-	13.72 45	-
	Red brown sandstone, abundant pebbles	5	-	15.24 50	-
BUNTER	Red brown sandstone, occasional pebbles	35	-	25.91 85	-
	Pale brown coarse sandstone, abundant quartz pebbels	5	-	27.43 90	-
	Red brown sandstone, occasional pebbles	15	-	32.00 105	-
	Red brown sandstone, abundant quartz pebbles	5	-	33.53 110	-
	Red brown sandstone, occasional pebbles	75	-	56.39 185	-
	Pale brown coarse sandstone, abundant quartz pebbles	30	-	65.53 215	-
Stained Coal MEASURES	Red brown clay with purple white and grey mottling, chips of purple mudstone	10	-	69.19 227	-
	Base of Bunter at 215ft.				
	Water first met at 190ft				
	Rest water level 182ft				
	(on 25th August 1962).				
	Borehole sealed with cement				

GEOLOGICAL SECTION
NORTH STAFFS.
AUGUST, 1962.

British Geological Survey

FOXFIELD No.11. BORE 1962

N.G.R. E. 397 462 N. 343 046 S.L. 1081 6·19'

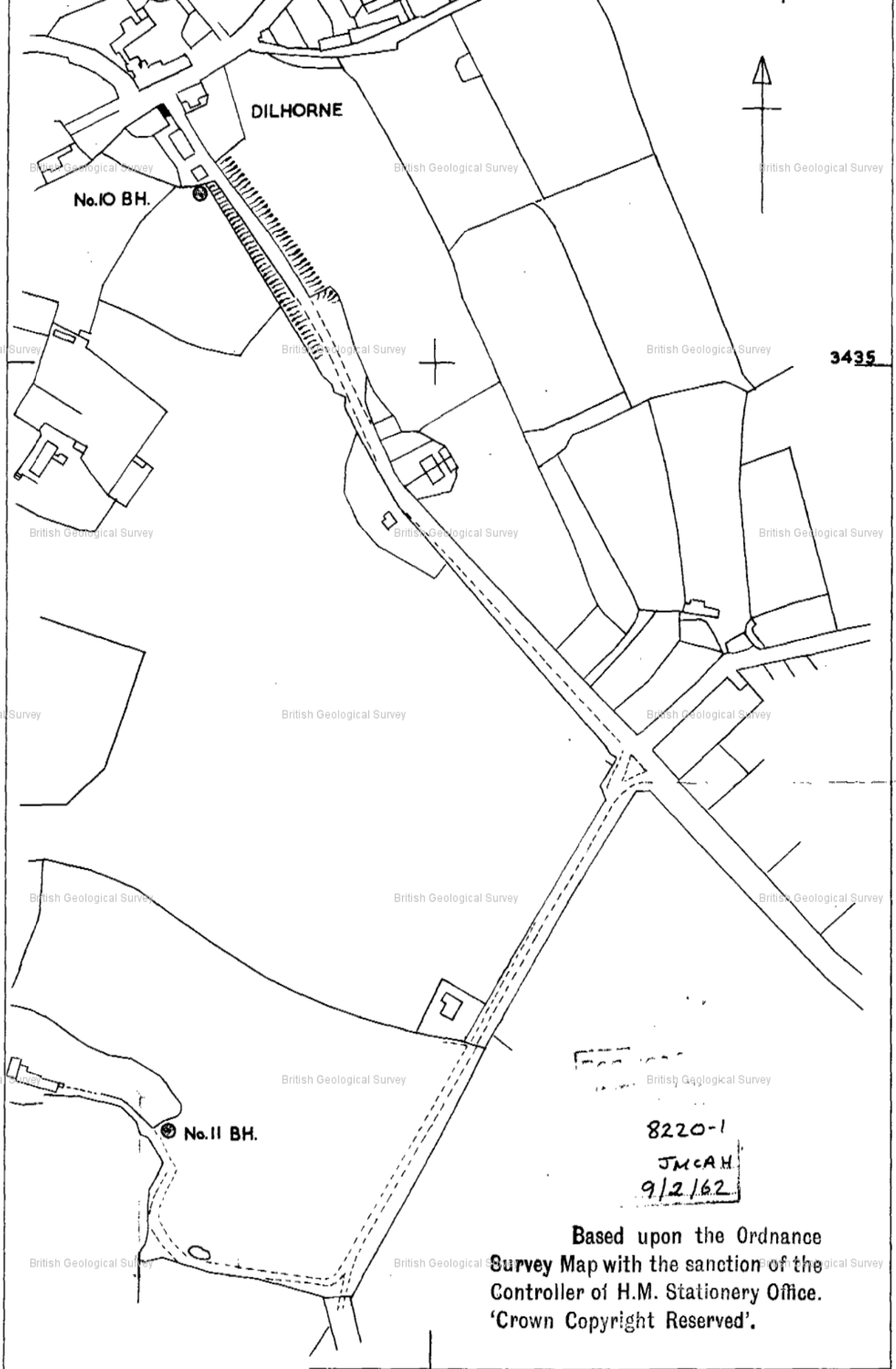
PRINCIPAL HORIZONS	LOG		Dip Dev: Oil. Gas. Water	Electric Log	Coring	Casing left in hole.
		Brown				
		Red-brown.				
50						
		Pale-brown.				
100		Red-brown.				
150						
			R.W.L.			
200		Pale-brown				
BUNTER C. MEASURES 215		Red and purple staining.				

Total depth 225'

Borehole sealed with cement.

Geological Section.
North Staffs:
Aug: 1962.

British Geological Survey



8220-1
JMcAH
9/2/62

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NATIONAL COAL BOARD
WEST MIDLANDS DIVISION No.1 NORTH STAFFS: AREA

FOXFIELD COLLIERY

SITES OF PROPOSED Nos. 10 & 11 BOREHOLES

DRAWN BY		SCALE	AREA PLANNING OFF
TRACED BY		1/2500	

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