Phase 1 Geoenvironmental Risk Assessment and
Phase 2 Ground Investigation

COTE LANE
THURGOLAND, BARNSLEY

for

Alfa Homes Ltd

Report Number 3819

May 2018

Michael D Joyce Associates LLP
Geotechnical and Geoenvironmental Consultants



Phase 1 Geoenvironmental Risk Assessment and Phase 2 Ground Investigation

COTE LANE
THURGOLAND, BARNSLEY

for

Alfa Homes Limited

Report Number 3819

May 2018



Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR UK

T +44(0)1924 360458 **E** mdja@geoenvironmental.co.uk **W** www.geoenvironmental.co.uk

Phase 1 Geoenvironmental Risk Assessment and Phase 2 Ground Investigation

COTE LANE, THURGOLAND, BARNSLEY

Contents

1. Introduction
2. The Site
3. Site History
4. Geology and Mining
5. Hydrogeology and Flooding
6. GroundSure Enviro-Insight and Geo-Insight Reports
7. Contaminated Land
8. Radon
9. The Investigation
10. Strata Profile
11. In-Situ and Laboratory Testing
12. Geoenvironmental Risk Assessment
13. Recommendations
Procedure Notes

Figures

Figure 1 General Site Location
Figure 2 Site Plan, Exploratory Borehole and Trial Pit Positions
Figure 3 Development Proposals
Figure 4 Conceptual Site Model

Appendices

Appendix 1 Trial Pit Records
Appendix 2 Geotechnical Laboratory Test Results
Appendix 3 Contamination Laboratory Test Results
Appendix 4 GroundSure Enviro-Insight and Geo-Insight Reports
Appendix 5 Historical Mapping
Appendix 6 Coal Authority Mining Report
Standard Appendices A and B

1 INTRODUCTION

1.1 On behalf of Alfa Homes Limited, a Phase I Geoenvironmental and Geotechnical Assessment (Desk Study) and a Phase II Intrusive Investigation have been carried out at Cote Lane in Thurgoland. It is proposed to develop the site with residential accommodation.

1.2 The purpose of the desk study was to review and assess published information on the site including geological, mining and hydrogeological data. It was also to review the past history of the site and its environmental setting.

1.3 The intrusive investigation has comprised window sampling with associated in-situ and laboratory testing. Recommendations are made for the safe and economic development of the site.

1.4 The study has not included checks on services on or adjacent to the site, and no structural or asbestos surveys have been carried out.

2 THE SITE

2.1 The site covers an area of approximately 1 hectare and is located on Cote Lane in Thurgoland, approximately 6km southwest of the centre of Barnsley, and 13km northeast of Sheffield. The Ordnance Survey National Grid Reference is 429200, 400600 and it lies at approximately 190m AOD on Cote Lane. Figure 1 shows the general site location, whilst figure 2 shows the site in more detail.

2.2 The site is a roughly rectangular shaped plot of open grassland. All four site boundaries are marked by mature trees and hedges, with wooden fences and hedges running along the South Western site boundary. Topographically, the site slopes down the North towards the South and slightly up from the West towards the East and then down towards the East from the centre of the site.

3 SITE HISTORY

3.1 The following archival Ordnance Survey maps have been examined to trace the past development of the site. These are reproduced in Appendix 5 with the current site boundary superimposed on them. The apparent displacement on the older maps is due to a change in Ordnance Survey co-ordinates.

Scale and Year of Publication			
6" to 1 mile	1855	1:2500	1893
	1891		1905
	1903		1931
	1932		1959
	1951		1980
	1965		1988
1:10,000	1987	1:1250	
	2002		
	2010		
	2014		

3.2 The earliest map to show the site in detail dates from 1893. It shows the site to be undeveloped agricultural land between Cote Lane in the west and Spring Wood to the east. A spring is shown to the southwest corner of the site, with Spring House just to the south.

3.3 The map of 1951 shows an Electricity Transmission line crossing the site in a roughly northwest to southeast direction. There are a few detached properties shown to the northwest, although the site itself is shown to have remained undeveloped.

3.4 Due to time and cost constraints, it has not been possible to consult with local history journals and newspapers. This can be carried out if requested, but is unlikely to provide any significant additional information.

3.5 It is not believed that the study site is of archaeological interest but it would be prudent to make enquiries with South Yorkshire Archaeology Service.

4 GEOLOGY AND MINING

4.1 Geology

4.1.1 Maps of the British Geological Survey (BGS), in particular 1:10,560 scale and 1:50,000 scale sheet 87 show the site to be underlain in partly by the Penistone Flags Sandstone, and partly by undifferentiated mudstones, siltstones and shales of the Carboniferous Pennine Lower Coal Measures.

4.2 Mining

4.2.1 A mining report has been obtained from the Coal Authority, and is reproduced in full in Appendix 6. It states that there has *been* no recorded mining beneath the site.

4.2.2 The report makes no mention of shallow workings being present or that shallow unrecorded workings might be present. The Coal Authority holds no record of any notice or subsidence claim having been made.

4.2.3 No shaft or adits are reported on, or within 20m of the site boundary. Although old unrecorded mine entries might be present on the site, these are considered unlikely. No past, present or future opencasts are reported within the vicinity of the site.

4.3 GroundSure Geo-Insight

4.3.1 A GroundSure Geo-Insight Report has been obtained for the site and is reproduced in Appendix 4. The report is based on the British Geological Survey (BGS) geological maps, GroundSure data and miscellaneous other geological sources.

4.3.2 None of the following are recorded beneath the site.

Geology
Artificial Ground / Made Ground present beneath the site
Records relating to permeability of artificial ground within the site
Superficial Ground / Drift Geology present beneath the site
Records relating to permeability of superficial geology within the site boundary
Records of Landslip within 500m of site boundary
Records relating to permeability of Landslips within the site boundary
Bedrock and Solid Geology beneath the site

Ground Workings
Historical Surface Ground Working Features from Small Scale Mapping
Historical Underground Working Features from Small Scale Mapping
Current Ground Workings

Mining, Extraction and Natural Cavities
Historical Mining
Johnson Poole and Bloomer Mining Area
Non-Coal Mining Cavities
Natural Cavities
Brine Extraction
Gypsym Extraction
Tin Mining
Clay Mining

Railways and Tunnels
Tunnels
Historical Railway and Tunnel Features
Historical Railways
Active Railways
Railway Projects

In respect of natural ground subsidence, the BGS reports the following risk ratings.

Hazard	Risk
Shrink-Swell Clay	Very Low
Landslide	Low
Ground Dissolution of Soluble Rocks	Negligible
Compressible Deposits	Negligible
Collapsible Deposits	Very Low
Running Sand	Negligible

4.3.3 A number of boreholes have been sunk in the vicinity of the site and their records could probably be obtained if necessary. However soil variability in the area would render them of limited use. In terms of determining the actual ground conditions on the site there would be no substitute for the intrusive ground investigation.

5 HYDROGEOLOGY AND FLOODING

Hydrogeology

5.1 The Coal Measures occur throughout the heavily industrialised areas of West and South Yorkshire. They comprise a thick sequence of faulted rocks characterised by the repeated sequence of mudstone, siltstone, sandstone, seatearth and coal.

5.2 The Coal Measures, though classed as a minor aquifer, may provide good borehole yields from sandstones and many industrial supplies rely on them. However, groundwater flow is extensively affected by the faulting and fissuring of the rocks, and also by the results of coal mining and associated dewatering activities. Due to the complex, and often poorly understood hydrogeology, it is impossible to subdivide the Coal Measures into aquifers and non-aquifers except on a very detailed level and the whole sequence must therefore be considered in general terms as an aquifer.

5.3 Since April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive.

5.4 The aquifer within the bedrock deposits is designated as Secondary A. This is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

5.5 Details provided by the Environment Agency in the GroundSure Enviro-Insight report, indicate there to be no licensed surface water or groundwater abstraction points within at least 1.2km of the site.

Flooding

5.6 The nearest watercourse which lies 14m to the east of the site, and a second which lies 35m to the west. However according to data supplied by the Environment Agency in the GroundSure Enviro-Insight report the site is not at risk from flooding.

5.7 The Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) database provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea.

5.8 RoFRaS data for the study site indicates the property or an area within 25m *has a Very Low (less than 1 in 1000)* chance of flooding in any given year.

6 GROUNDSURE ENVIRO-INSIGHT REPORT

6.1 A GroundSure Enviro-Insight Report has also been commissioned for this site. None of the following features are recorded within 250m of the site. Full details are given in Appendix 4.

Environmental Permits, Incidents and Registers
Historic IPC Authorisations
Part A(1) and IPPC Authorised Activities
Red List Discharge Consents
List 1 Dangerous Substances Inventory sites
List 2 Dangerous Substances Inventory sites
Part A(2) and Part B Activities and Enforcements
Category 3 or 4 Radioactive Substances Authorisations
Licensed Discharge Consents
Water Industry Referrals
Planning Hazardous Substance Consents and Enforcements (within 500m)
COMAH and NIHHS sites
Environment Agency Recorded Pollution Incidents
Sites Determined as Contaminated Land under Part 2A EPA 1990

Landfill and Other Waste Sites
Environment Agency Registered Landfill Sites
Environment Agency Historic Landfill Sites
BGS/DoE Landfill Site Survey
Landfills in Local Authority and Historical Mapping Records
Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites
Environment Agency Licensed Waste Sites

Current Land Uses
Current Industrial Sites Data
Records of Petrol and Fuel Sites
National Grid Underground Electricity Cables
National Grid Gas Transmission Pipelines

Hydrogeology and Hydrology
Groundwater Abstraction Licences Surface Water Abstraction Licences Potable Water Abstraction Licences Source Protection Zones Source Protection Zones within Confined Aquifer Environment Agency information on river quality Groundwater Vulnerability and Soil Leaching Potential Environment Agency information on River quality River Network entries Surface Water Features

Flooding
Environment Agency Zone 2 floodplains Environment Agency Zone 3 floodplains Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Defences Areas benefiting from Flood Defences Areas used for Flood Storage BGS Groundwater Flooding susceptibility (within 50m) BGS confidence rating for the Groundwater Flooding susceptibility areas

Designated Environmentally Sensitive Sites
Sites of Special Scientific Interest (SSSI) National Nature Reserves (NNR) Special Areas of Conservation (SAC) Special Protection Areas (SPA) Ramsar Sites Ancient Woodlands Local Nature Reserves (LNR) World Heritage Sites Environmentally Sensitive Areas Outstanding Natural Beauty (AONB) National Parks Nitrate Sensitive Areas Nitrate Vulnerable Zones

6.2 The GroundSure Enviro-Insight Report is based upon known, published information and may not comprise a complete record of all features of relevance. An explanation of the datasets used is available on request.

7 CONTAMINATED LAND

7.1 There is no visibly contaminated material on the surface of the site, nor is there any distressed vegetation suggestive of significant or serious contamination.

8 RADON

8.1 According to the GroundSure Geo-Insight report the site lies in an area where less than 1% of homes are above the action level recommended by the Health Protection Agency. Radon protective measures are therefore not necessary according to the BGS data provided in the GroundSure report and as described in Building Research Publication BR 211.

9 THE INVESTIGATION

9.1 The investigation was designed to provide preliminary information on ground and groundwater conditions on the site, together with identifying potential areas of contamination. The investigation was undertaken in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001 and under the full-time supervision of a Fellow of the Geological Society from Michael D Joyce Associates LLP.

9.2 The ground investigation was carried out on 20th July 2017 and comprised trial pitting, and the positions are shown on figure 2.

9.3 The trial pitting consisted of excavating a number of trial holes using a mechanical mini-digger provided by the client. On completion, the excavations were backfilled with the arisings.

10 STRATA PROFILE

10.1 The full exploratory trial pit records are presented in Appendix 1. These give full strata descriptions based on visual examination and are in accordance with the requirements of BS EN ISO 14688-1:2002 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 1" BS EN ISO 14688-2:2004 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 2", and BS EN ISO 14689-1:2003 "Geotechnical Investigation and Testing – Identification and Classification of Rock – Part 1".

10.2 The trial pitting encountered between 100mm and 300mm of brown topsoil. This was underlain in most places by a firm light brown and grey silty clay. With depth, this graded into a highly weathered mudstone.

10.3 At between 0.9m and 1.8m depth, a brown moderately weathered clay and shaly mudstone was encountered. Due to the limited reach of the mini-digger, the trial pits terminated at around 1.8m to 2.0m depth.

10.4 There was also a 200mm thick band of intact coal at 1.1m depth in trial pit TP2, and at 0.8m depth in trial pit TP5.

10.5 Trial pit TP6 also encountered a band of sandstone below a thin covering of topsoil. This extended to 0.8m and overlay the mudstone encountered elsewhere on the site.

10.6 All the trial pit sides were stable and all were dry on completion.

10.7 There was no unusual colouration or odours to any of the soils encountered during the investigation and no obvious visual evidence of contamination, such as asbestos, was found during the investigation. This does not mean that asbestos containing materials or asbestos fibres are not present.

10.8 It should be noted that lateral and vertical changes can occur between exploratory points and care is needed when extrapolation is used.

11 IN-SITU AND LABORATORY TESTING

11.1 In-Situ Gas Monitoring

11.1.1 Methane is the dominant constituent of landfill gas, and can form an explosive mixture in air at concentrations of between 5% and 15%. Thus 5% methane in air is known as the Lower Explosive Limit (LEL). Concentrations less than this do not normally ignite. Carbon dioxide can also be a potential problem, especially where it occurs in concentrations greater than 1.5%.

11.1.2 In-situ gas tests were carried out in probe holes made in the sides of the trial pits. Testing was with a portable meter, which measures the methane content as its percentage volume in air. The corresponding oxygen and carbon dioxide concentrations are also measured.

11.1.3 No methane, carbon monoxide or hydrogen sulphide gases were detected in any of the boreholes. Carbon dioxide ranged from zero% to 0.3% by volume.

11.2 Geotechnical Laboratory Testing

The soil testing was carried out to BS1377:1990 Methods of Test for Soils for Civil Engineering Purposes. Testing was carried out by Envirolab of Cheshire and Geo-Site and Testing Services Limited (GSTL) of Llanelli to UKAS accredited procedures. The full results are presented in Appendix 2.

11.2.1 Plasticity Test

Atterberg Limits Classification tests was carried out on four natural samples of the clay derived from the weathered mudstone bedrock.

Trial Pit No.	Depth (m)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
TP1	1.00	21	37	24	13
TP3	0.40	14	36	17	19
TP4	0.90	26	58	27	31
TP6	1.00	13	30	16	14

The clays are of low to high plasticity. They can be expected to exhibit low to medium swelling and shrinkage properties, and are also potentially frost susceptible.

11.2.2 Sulphate and Acidity Tests

Chemical tests were carried out on representative samples of the sub-soils in order to determine their water soluble content and acidity.

Trial Pit No.	Depth (m)	Water Soluble Sulphate Content (g/l)	pH
Natural Clay			
TP1	1.00	0.02	6.9
TP3	0.40	0.01	7.4
TP4	0.90	0.02	6.9
TP6	1.00	0.01	7.5
Topsoil			
TP1	0.10	0.01	7.5
TP2	0.10	<0.01	7.1
TP4	0.15	0.01	6.7
TP5	0.10	<0.01	6.7
TP6	0.05	0.04	6.7
TP7	0.05	<0.01	6.9
TP8	0.10	<0.01	6.8

Geotechnical and contamination testing recorded negligible water soluble sulphate contents and near neutral pH values.

11.3 Contamination Testing

Rationale

11.3.1 The investigation and sampling was under the full time direction of *a* Fellow of the Geological Society. All the recovered soil samples were screened on site for any visual or olfactory evidence of contamination including the presence of VOCs. Samples were selected from the trial pits on the basis of those which were most likely to be contaminated and those which gave the most appropriate indication of the spread of any contaminants. The samples were stored in both glass and plastic containers and

kept in cooled conditions. Testing was carried out by Envirolab of Cheshire to UKAS accredited procedures in accordance with MCERTS performance standards.

11.3.2 The aim of this was to make a preliminarily assessment of the level of any contamination on the site in order to determine if there was any significant risk associated with contaminants in respect of both human health and the environment, including controlled waters.

11.3.3 Standard Appendix B attached to this report discusses the methodology for the assessment of contamination and should be read in conjunction with the comments overleaf.

11.3.4 The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

11.3.5 The Environment Agency has issued a number of Soil Guideline Values (SGVs) which, whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments.

11.3.6 The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of

laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

11.3.7 To date selective SGVs have been issued for the following land-uses as follows;

- Residential with and without plant uptake (SGVres)
- Allotments
- Commercial/Industrial (SGVcomm)

11.3.8 DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

11.3.9 In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.
- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

11.3.10 It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

11.3.11 In April 2012, Defra published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

11.3.12 Since the regime was first introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not, contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

11.3.13 To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does

not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

11.3.14 One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

11.3.15 The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

11.3.16 The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.

(c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway

through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

11.3.17 The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

3.27 It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.

3.28 Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organisations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.

3.29 GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

11.3.18 The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

11.3.19 The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

11.3.20 The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance with bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land".*

11.4.21 A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

11.4.22 C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

11.4.23 In 2014 CL:AIRE (Contaminated Land: Application in Real Environments) published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

Results

11.4.24 The following range of results was obtained and the full results are presented in Appendix 3. All the results fell within their respective C4SL and SGV limit for a residential end-use. In addition no asbestos was detected.

Soils

Analyte	Concentration Range (mg/kg)		SGV/C4SL Concentration for Residential Use (mg/kg)
Arsenic	2	7	32 (2) / 37 (3)
Cadmium	2.4	4.2	10 (2) / 22 (3)
Chromium (vi)	<5	<5	21 (3)
Copper	23	51	2330 (1)
Mercury	<0.17	0.18	170 (2)
Nickel	23	40	130 (2)
Selenium	3	4	350 (2)
Lead	41	80	200 (3)
Zinc	97	133	3750 (1)
Phenol	<0.2	<0.2	420 (2)
Benzo(a)pyrene	0.41	0.92	5.0 (3)
Dibenzo(a,h)anthracene	<0.04	0.10	0.9 (1)
Naphthalene	<0.03	0.13	8.7 (1)
Fluorene	0.04	0.12	780 (1)
Asbestos	None	None	None

(1) *Values derived by LQM/CIEH "Generic Assessment Criteria for Human Health Risk Assessment" 2009. For organics a SOM of 2.5% assumed.*

(2) *Latest SGV published in 2009.*
< indicates below the limit of detection.

(3) *C4SL published 2014.*

12 GEOENVIRONMENTAL RISK ASSESSMENT

Conceptual Site Model

12.1 A quantitative health and environmental risk assessment has been carried out as part of this assessment. The process of risk assessment is set out in Part IIA of the Environment Protection Act 1990 and amended in part by The Water Act 2003. This defines contaminated land as *"any land which appears to the local authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that there is a significant possibility of significant harm being caused, or that significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused".*

12.2 The Act introduces the concept of a pollution linkage. This linkage consists of a pollution (contaminative) source or hazard and a receptor, together with an established pathway between the two. For land to be contaminated, a pollution linkage (hazard-pathway-receptor) must exist. This forms a so-called 'conceptual model' of the site.

12.3 Examples of pathways and effects from land contamination (after PPS 23) are given below, and these are illustrated on figure 4.

12.4 Human Health (Pathways 1-5, Receptors A – C)

Uptake of contaminants by food plants grown in contaminated soil - Uptake will depend on the concentration of a contaminant in soil, its chemical form, soil pH, plant species and prominence in diet.

Ingestion and inhalation - Substances may be ingested directly by young children playing on contaminated soil, or by eating plants which have absorbed metals or are contaminated with soil or dust. Ingestion may also occur via contaminated water supplies. Metals and some organic material substances may be inhaled from dusts and soils. Land gas, radon and volatile organic compounds can be inhaled directly.

Skin contact - Soil containing tars, oils and corrosive substances may cause irritation to the skin through direct contact. Some substances (e.g. phenols) may be absorbed into the body through the skin or through cuts and abrasions.

Irradiation - As well as being inhaled and absorbed through the skin, radioactive materials emitting gamma rays can cause a radiation response.

Fire and explosion - Materials such as coal, coke particles, oil, tar, pitch, rubber, plastic and domestic waste are all combustible. Both underground fires and biodegradation of organic materials may produce toxic or flammable gases. Methane and other gases may explode if allowed to accumulate in confined spaces.

12.5 Buildings (Pathways 7 and 8)

Fire and explosion - Underground fires may cause ground subsidence and cause structural damage. Accumulations of flammable gases in confined space leads to a risk of explosion. Underground fires may damage services.

Chemical attack on building materials and services - Sulphates may attack concrete structures. Acids, oils and tarry substances may accelerate corrosion of metals or attack plastics, rubber and other polymeric materials used in pipework and service conduits or as jointing seals and protective coatings to concrete and metals.

Physical - Blast-furnace and steel-making slag (and some natural materials) may expand. Degradation of fills may cause settlement and voids in buried tanks and drums may collapse as corrosion occurs or under loading.

12.6 Natural Environment (Pathway 6, Receptors D - E)

Phytotoxicity (prevention/inhibition of plant growth) - Some metals essential for plant growth at low levels are phytotoxic at higher concentrations. Methane and other gases may give rise to phytotoxic effects.

Contamination of water resources - Soil has a limited capacity to absorb, degrade or attenuate the effects of pollutants. When this is exceeded, polluting substances may enter into surface and groundwaters.

Ecotoxological effects - Contaminants in soil may affect microbial, animal and plant populations. Ecosystems or individual species on the site, in surface waters or areas affected by migration from the site may be affected.

12.7 For any contaminant source identified, judgement is used regarding the probability of a pollution linkage occurring and the potential consequences of that linkage. Based on the probability and likely consequences, the overall risk (significance) can be established. The definitions that have been used for this purpose are given in Standard Appendix B. The probability of a hazard, combined with its consequences, can be used to assess risk. This forms the so-called Conceptual Site Model.

12.8 The site has had no previously recorded commercial or industrial use recorded on the historical maps. As such no specific potential contaminants have been identified. There is always the possibility of localised spillages of fuels and oils, lubricants.

Risk Assessment based on Conceptual Site Model

Summary of Hazards, Pathways and Receptors

Source	Potential Pollutant	Pathways	Receptor	Risk (1)
No specific contaminative sources identified **Possible past minor spillages and metals.**	Oils, fuels, grease, hydraulic fluid.	1 - 5	A. Present Occupants	Site Unoccupied.
			B. Groundworkers.	**Low Risk** involved with excavation work, providing personnel adopt suitable precautions, together with washing facilities.
			C. Future Occupants.	**Low Risk** for residential use, providing any Made Ground is capped by clean sub soil and topsoil.
		6	D. Controlled Waters.	**Low Risk**
			E. Ecosystems.	**Low Risk**
		7	F. Building Materials and Services.	**Low Risk.** Install pipes in clean bedding materials. Adequate precautions to be taken in respect of buried concrete.
Organic Material.	Landfill Gases, Radon, VOCs, SVOCs.	8	A - F	**Low Risk.** Low values of ground gases present during the investigation although basic gas protection measures are recommended.

(1) See Standard Appendix B. *The risk ratings are based on the results of the investigation.*

Pathways and Receptors

12.11 The principal receptors are groundworkers, future residents and controlled waters (Receptors B, C and D). However based on the past history of the site and the laboratory testing to date, the probability of contamination being present sufficient to affect the identified receptors is considered to be a low risk.

12.12 The overall risk is assessed to be low. At this stage it is not considered that there is likely to be any significant risk and further intrusive investigation in respect of contamination is not considered to be necessary.

12.13 With any site, the possibility of contaminants being present, sufficient to cause significant harm cannot be entirely precluded without extensive intrusive investigation, sampling and testing since it is not always possible to determine if contaminants have been tipped or buried on the site, or have seeped into the ground, or have migrated below the ground onto the site from adjacent pieces of land. However, based on the investigation carried out to date, this is considered unlikely.

12.14 It is recommended that if during construction any suspicious or unusual odours, colours, liquids or soils are uncovered, these should be brought to the attention of Michael D Joyce Associates LLP and appropriate advice sought.

13 RECOMMENDATIONS

13.1 It is proposed to redevelop the site for residential purposes. At present there do not appear to be any major geotechnical constraints to developing this site. However, there are a number of aspects that need to be taken into consideration when assessing the feasibility and design of this scheme.

13.2 Foundation Criteria

Normal Strip Footings

13.2.1 Normal strip footings will therefore be suitable for most of the new houses. They will have to be sited below any Made Ground (if encountered) and original topsoil still remaining after site clearance, and founded upon the underlying firm clay. This clay can be expected to exhibit moderate swelling and shrinkage properties. In order to allow for seasonal variations in the moisture content of this clay, foundation levels should be at least 0.9m below groundlevel. However, where new planting is proposed, or existing trees are present, this may have to increase. At this depth, for foundations sited upon the firm clay, allowable bearing pressures of up to 80kN/m^2 can be adopted. It would also be prudent to lightly reinforce the footings.

13.2.2 All foundation excavations must be inspected to ensure that no footings are sited upon any weak Made Ground, softer clays or other such weak materials that would be incapable of safely sustaining the applied foundation loads. This will be particularly important should any appreciable amounts of Made Ground occur. Wherever any suspect ground is encountered at proposed foundation level, then that footing must be deepened until a satisfactory bearing medium is obtained.

13.2.3 The footing should also be placed below the coal if the seam is encountered at foundation level. Should the coal seam be encountered in the sides of any foundation or service trench excavations, it should be blinded with concrete to prevent potential future combustion.

13.3 Building Near Trees

13.3.1 Wherever any houses are located near existing or proposed planting of new trees, their foundations must be sited below the potential root growth zone. Reference should therefore be made to the NHBC Standards Chapter 4.2 "Building Near Trees", which gives guidance on foundation criteria, depths and construction. All services will also have to be similarly protected.

13.4 Landfill and Radon Gas

13.4.1 The site is not in an area where radon protection measures are required for new properties, and no elevated levels of ground or landfill gases have been found on the site to date. However since a period of long-term gas monitoring was not possible, and in accordance with good practice, it would be prudent to incorporate basic gas protection measures in the new houses.

13.4.2 If suspended concrete beams and block ground floors are adopted for the houses, it is recommended that a layer of Visqueen 1200 gauge membrane or equivalent is laid over the concrete blocks and covered by a concrete screed in accordance with the manufacturer's recommendations.

13.4.3 Any void spaces beneath ground floors must be well ventilated both internally and externally with closely spaced air-bricks. Sleeper walls should either be of honeycomb structure or contain sufficient openings to ensure a through draught. Air-bricks must be placed at the top of the void space and not allowed to become blocked by soil or vegetation. They should be lined or cased through cavity walls.

13.4.4 British Standard BS8485: 2015 "Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings", and Building Research Establishment Report BR414 "Protective Measures for Housing on Gas Contaminated Land", together with the CIRIA Report 149 "Protecting Development from Methane" and BR211 (2015) "Radon: Guidance on Protective Measures for New Buildings" all give construction advice for preventing gases entering buildings, the principles of which are incorporated in the above recommendations. Advice is also given in respect of sealing services where they pass through impermeable membranes.

13.5 Existing Drains and Services

13.5.1 Should any redundant drains and other services channels are likely to underlie building foundations, they must be dug out and replaced by lean mix concrete, or compacted hardcore. Alternatively, long drainage runs can be grouted up, particularly where their alignments are uncertain but care is needed to ensure that no grout enters any live services. In the case of roads, they should be dug out and the areas infilled by properly compacted fill.

13.6 Road Construction

13.6.1 The new road should conform to The Technical Appendix of '*Better Places to Live in South Yorkshire – A guide to residential development'*, which continues to be implemented by the district council. The new road should also conform to "The Specifications of Highway Works" and "The Notes for Guidance on the Specification for Highway Works".

13.6.2 The subgrade will comprise firm silty clay overlying weathered mudstone bedrock. The MEXE Cone Penetrometer tests recorded typical in-situ CBRs of 1½% to 2½% for these clays.

13.6.3 The design of trafficked pavements must take account of the ground conditions and likely traffic loads during the life of the development. Designs meeting the following requirements will normally be acceptable. At sites where particular poor ground conditions are encountered or where it is anticipated that there will be a particularly high frequency of commercial vehicle or abnormal load movements, further analysis is accordance with the "Design Manual for Roads and Bridges" will be required to demonstrate integrity of the design.

13.6.4 A preliminary design can be prepared using an "Equilibrium CBR" value based on the appropriate type of sub-grade material as set out in the table below. However, if this method of CBR estimation is used, testing by an approved laboratory will be required prior to construction in order to verify the CBR value used for design. Based on the in-situ and laboratory testing, a CBR of 2% would be appropriate.

Equilibrium CBR Value to be used for Design Purposes		
Type of Soil	**Plasticity Index**	**Equilibrium CBR (%)**
Heavy Clay	50 or greater	Less than 2
Heavy Clay	40 to 49	2
Heavy Clay	30 to 39	2
Silty Clay	20 to 29	3
Sandy Clay	10 to 19	4
Silt	Less than 10	1
Sand (Poorly graded)	Non-plastic	20
Sand (well graded)	Non-plastic	40
Gravel (poorly graded)	Non-plastic	40
Sandy Gravel (well graded)	Non-plastic	60

(*Based on Design Manual for Roads and Bridges)*

13.6.5 A granular foundation comprising sub-base or a combination of sub-base and a capping layer can be provided in accordance with the table below.

Pavement Foundation Design					
CBR (%)	**Capping (mm)**	+	**Sub-Base (mm)**	**OR**	**Sub-Base (mm)**
Less than 2	600	+	150		--
2	450	+	150		--
3	350	+	150	OR	300
4	300	+	150	OR	275
5 to 15	250	+	150	OR	225
> than 15	--	+	--		150

13.6.6 Prior to the application of any sub-base, all subgrades must be checked by proof rolling to ensure that an adequate CBR exists. Where any loose granular or soft clayey areas remain, these must be either dug out and replaced by compacted material or an additional 150mm of sub-base added. This will be especially important wherever trench works for drains, sewers and other services have been carried out. Any old foundations should be removed to a depth of 1m below subgrade level to prevent

hardspots occurring. It will also be necessary to prevent the deterioration of the subgrade due to the effects of wet weather and the site traffic.

13.7 Sustainable Surface Water Drainage

13.7.1 Given the virtually impermeable clays and mudstones which cover most of the site, it will be unsuitable for soakaways and consideration will have to be given to discharging surface water to a conventional piped system or possibly nearby watercourse.

13.8 Excavations and Groundwater

13.8.1 Soft ground plant should prove suitable for most of the excavations.

13.8.2 For all deep excavations in excess of 1.2m where vertical sides are necessary, trench supports should be provided as the soils will not be self-supporting for any appreciable length of time. It would also be prudent to monitor excavations for the presence of explosive or asphyxiating gases.

13.8.3 No groundwater seepages were noted in the near surface. However it should be remembered that trapped groundwater can be released from any areas of Made Ground when they are excavated. In addition seasonal variation in groundwater levels will occur and groundwater will be shallower during the winter months.

13.9 Re-use of Materials

13.9.1 In England, the SWMP Regulations 2008 came into force on 6th April 2008. They apply to 'construction projects', and to the whole life of a construction project, from design all the way through to completion. As well as including actual construction works, they include renovation projects, site preparation works, the installation of services, and all kinds of demolition. If you carry out a construction project where the value of the materials plus labour exceeds £300,000, it becomes a criminal offence (for both the project manager and the main contractor) not to produce a SWMP.

13.9.2 The Plans must include basic elements such as who prepared it, who's in charge of the project, who's the main contractor, what's the location, and what's the estimated value. But it must also include details of the decisions taken at the outset on (1) the design of the project, (2) the methods employed and (3) the materials employed in order to minimise the quantity of waste produced on site. It will therefore be necessary to have evidence of that thought process. The SWMP must describe each type of waste that will be produced, and estimate the volume.

13.10 Contamination

13.10.1 Laboratory testing to date has recorded no contaminants and as such, no special precautions are necessary. The existing topsoil can be reused.

13.11 Cement and Buried Concrete

13.11.1 The Made Ground has generally been found to contain low levels of soluble sulphates and near neutral pH values.

13.11.2 In accordance therefore with the Building Research Establishment Special Digest No. 1 "Concrete in Aggressive Ground", a normal Portland cement in accordance with Group DS-1. Specifications should be used for all buried concrete, mortar, and pre-cast concrete pipes.

13.14 Further Monitoring and Inspection

13.14.1 Should any geotechnical or geoenvironmental problems arise on site or if ground conditions are different from those that we predicted, they should be referred back to Michael D Joyce Associates LLP.

A D Joyce

BSc MSc ARSM CEng CGeol CEnv MICE FGS SiLC

May 2018

This report is subject to the provisions of the Copyright Acts and is for the sole benefit of Alfa Homes Limited in respect of a preliminary assessment of geotechnical and contamination conditions on the site. It does not purport to provide specialist legal advice in respect of environmental issues. The report cannot be assigned to, or relied on, by any other party without prior permission.

Procedure Notes

The desk study and ground investigation have been carried out in accordance with the principles of BS EN 1997-1: 2004 "Eurocode 7 - Geotechnical Design - Part 1: General Rules", BS EN 1997-2: 2007 "Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing", BS5930: 1999 and BS10175: 2001, and the terms of the client's brief. By its very nature any ground investigation only samples a small percentage of the ground. Consequently changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimize such risks. Conclusions and recommendations are based on the information presented in this report, but unforeseen features may exist. Therefore, actual ground conditions should be noted during construction and further advice sought if they differ significantly from those predicted.

Further investigation can be carried out to further reduce uncertainty and risk but ultimately these risks cannot be eliminated. Similarly a desk study normally only considers readily available information and further information could be held by other sources. In commissioning further research or investigation the cost/benefit of doing so must be considered.

Where buildings are present on a site, structural and asbestos surveys have not been carried out, unless specifically stated. An unexploded ordnance survey has not been carried out. In relevant situations it would be prudent to commission such surveys.

Where information has been obtained from Third Parties, no liability can be accepted for the accuracy or completeness of this information. Where anecdotal evidence or speculations are presented, they must be treated as such and cannot be relied upon.



Cote Lane, Thurgoland

Site Location

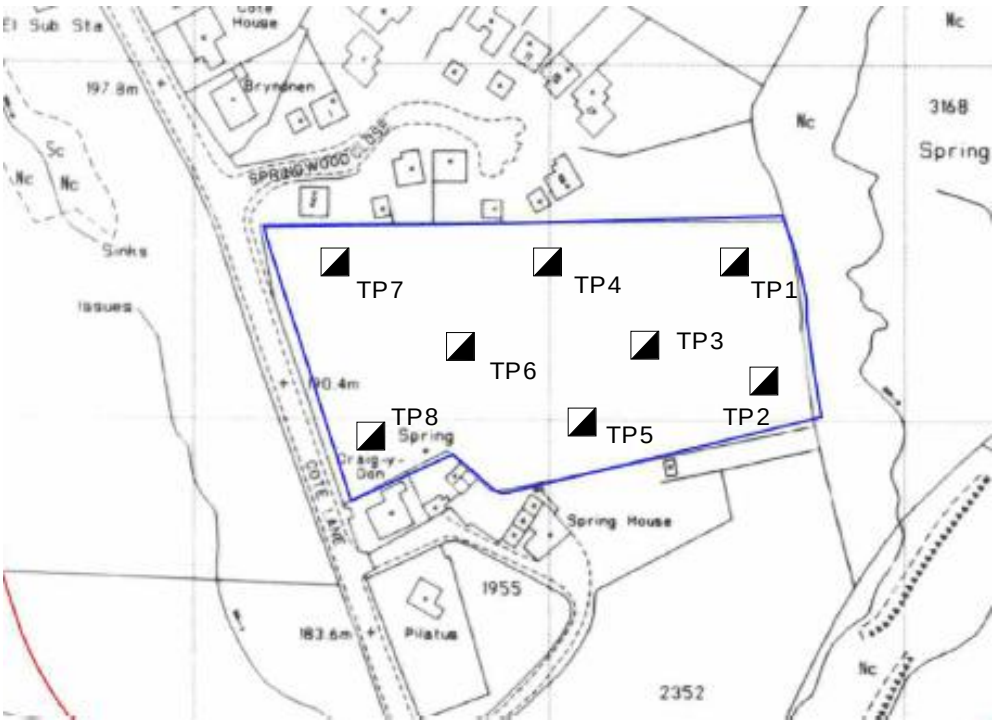
Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Reproduced from the Ordnance Survey Map with the permission of the controller of Her Majesty's Stationery Office. Crown copyright reserved. Licence No. AL 100004970

Scale: NTS

Figure: 1



Cote Lane, Thurgoland

Site Plan with Trial Pit Positions

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Reproduced from the Ordnance Survey Map with the permission of the controller of Her Majesty's Stationery Office. Crown copyright reserved. Licence No. AL 100004970

Scale: NTS

Figure: 2



Cote Lane, Thurgoland

Site Plan with Development Proposals

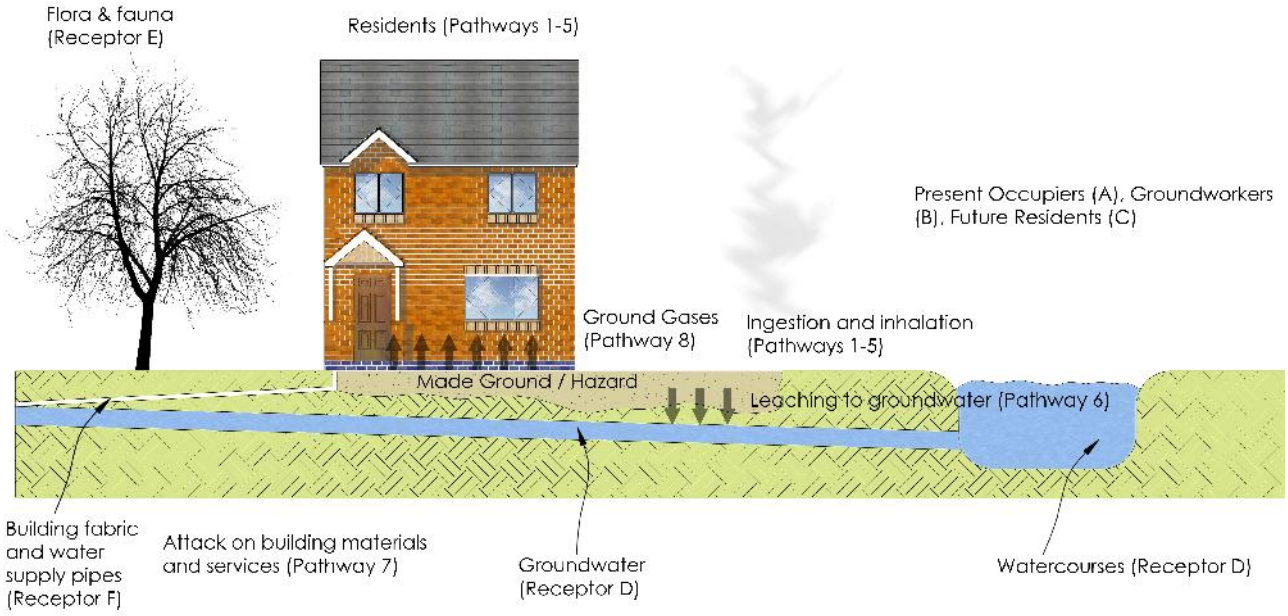
Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Reproduced from the Ordnance Survey Map with the permission of the controller of Her Majesty's Stationery Office. Crown copyright reserved. Licence No. AL 100004970

Scale: NTS

Figure: 3



Pathways

1. Ingestion of contaminated soil/dust
2. Ingestion of contaminated food
3. Ingestion of contaminated water
4. Inhalation of contaminated vapours
5. Dermal contact with contaminated soil/dust or water
6. Pollution of controlled water and off site migration
7. Attack on building materials and services
8. Migration of landfill gases and radon

Receptors

A. Present site occupiers
B. Site development personnel
C. Future residents
D. Controlled waters
E. Flora and fauna
F. Building and services

Schematic Representation of Conceptual Site Model

Schematic Representation of Conceptual Site Model

Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Figure: 4

APPENDIX 1

Trial Pit Records

Site: Cote Lane [3819]

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 1

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L x 3.00m / W x 0.60m D x 2.00m	-0.3		Turf over dark brown clayey TOPSOIL.	
1.00	D			-1.8	1	Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-2	2	Brown moderately weathered clayey shaly MUDSTONE.	
						End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m, full reach of digger

Groundwater: None encountered

Site: Cote Lane [3819]

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 2

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L x 3.00m / W x 0.60m D x 1.80m	-0.2		Turf over dark brown clayey TOPSOIL.	
				-1.1	1	Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1.3		Black intact COAL.	
1.40	D			-1.8		Brown moderately weathered clayey shaly MUDSTONE.	
					2	End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m, full reach of digger

Groundwater: None encountered

Site: Cote Lane [3819)

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 3

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
			L x 3.00m / W x 0.60m D x 1.90m	-0.15		Turf over dark brown clayey TOPSOIL.	
0.40	D			-0.9		Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1.9	1	Brown moderately weathered clayey shaly MUDSTONE.	
					2	End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m, full reach of digger

Groundwater: None encountered

Site: Cote Lane [3819]

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 4

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.15	ES		L x 3.00m / W x 0.60m D x 1.80m	-0.2		Turf over dark brown clayey TOPSOIL.	
0.90	D			-1.2	1	Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1.6		Brown moderately weathered clayey shaly MUDSTONE.	
				-1.8		Grey and brown moderately weathered MUDSTONE.	
					2	End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m on intact bedrock

Groundwater: None encountered

Site: Cote Lane [3819]

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 5

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L x 3.00m / W x 0.60m D x 1.60m	-0.15		Turf over dark brown clayey TOPSOIL.	
				-0.8		Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1		Black intact COAL.	
1.40	D			-1.5	1	Brown moderately weathered clayey shaly MUDSTONE.	
				-1.6		Grey moderately weathered MUDSTONE.	
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides stable

General: Refusal at 1.6m on intact bedrock

Groundwater: None encountered

Site: Cote Lane [3819)

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 6

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L x 3.00m / W x 0.60m D x 1.80m	-0.1		Turf over dark brown clayey TOPSOIL.	
						Light brown medium weathered fine and medium grained SANDSTONE.	
				-0.8			
1.00	D				1	Orange and brown clayey MUDSTONE.	
				-1.4			
				-1.6		Grey brown clayey MUDSTONE.	
				-1.8		Grey intact moderately weathered MUDSTONE.	
					2	End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m on intact bedrock

Groundwater: None encountered

Site: Cote Lane [3819)

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 7

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.05	ES		L x 3.00m / W x 0.60m D x 1.00m	-0.15		Turf over dark brown clayey TOPSOIL.	
				-0.9		Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1	1	Brown moderately weathered clayey shaly MUDSTONE.	
						End of Trial Pit	
					2		
					3		
					4		

Stability: Sides stable

General: Refusal at 1.0m on intact bedrock

Groundwater: None encountered

Site: Cote Lane [3819]

Location: Thurgoland, Barnsley

Excavated by: Mini Digger

Date: 20th July 2017

Client: Alfa Homes Limited

Trial Pit No: 8

Michael D Joyce Associates LLP

Depth (m)	Samples	Water Depth (m)	Field Records	Depth (m)	Depth (m)	Description	Legend
				0	0	Ground Surface	
0.10	ES		L x 3.00m / W x 0.60m D x 1.80m	-0.2		Turf over dark brown clayey TOPSOIL.	
				-1.3	1	Firm light brown and grey silty CLAY, grading into highly weathered mudstone.	
				-1.8		Brown moderately weathered clayey shaly MUDSTONE.	
					2	End of Trial Pit	
					3		
					4		

Stability: Sides stable

General: Refusal at 1.8m on intact bedrock

Groundwater: None encountered

APPENDIX 2

Geotechnical Laboratory Test Results

Laboratory Report

2788

GEO Site & Testing Services Ltd

Contract Number: 36057

Client's Reference:

Report Date: **31-07-2017**

Client **Michael D Joyce Associates LLP**
Michael D Joyce Associates LLP
Charnock Court 6
South Parade
Wakefield
West Yorkshire
WF1 1LR

Contract Title: **Thurgoland**

For the attention of: **Anthony D Joyce**

Date Received: **25-07-2017**

Date Commenced: **25-07-2017**

Date Completed: **31-07-2017**

Test Description	Qty
Moisture Content 1377 : 1990 Part 2 : 3.2 - * UKAS	4
4 Point Liquid & Plastic Limit (LL/PL) 1377 : 1990 Part 2 : 4.3 & 5.3 - * UKAS	4
Water Soluble Sulphate 2:1 extract 1377 : 1990 Part 3 : 5 - @ Non Accredited Test	4
pH Value of Soil. 1377 : 1990 Part 3 : 9 - @ Non Accredited Test	4
Disposal of Samples on Project	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
*** - denotes test included in laboratory scope of accreditation**
 # - denotes test carried out by approved contractor
@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:
Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)
Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Quality Assistant)
Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd
Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN
Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

GSTL	LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX (BS 1377 : Part 2 : 1990 Method 5) DESCRIPTIONS	
Contract Number	**36057**	
Site Name	**Thurgoland**	

TP Trialpit	Sample Number	Sample Type	Depth (m)			Descriptions
TP1		D	1.00	-		Brown slightly fine gravelly silty CLAY
TP4		D	0.90	-		Grey/brown silty CLAY
TP6		D	1.00	-		Brown fine to coarse gravelly silty CLAY
TP3		D	0.40	-		Brown fine to coarse gravelly silty CLAY
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		
				-		

Operators	Checked	30/07/2017	Sean Penn	
RO/MH	Approved	31/07/2017	Ben Sharp	

UKAS TESTING
2788

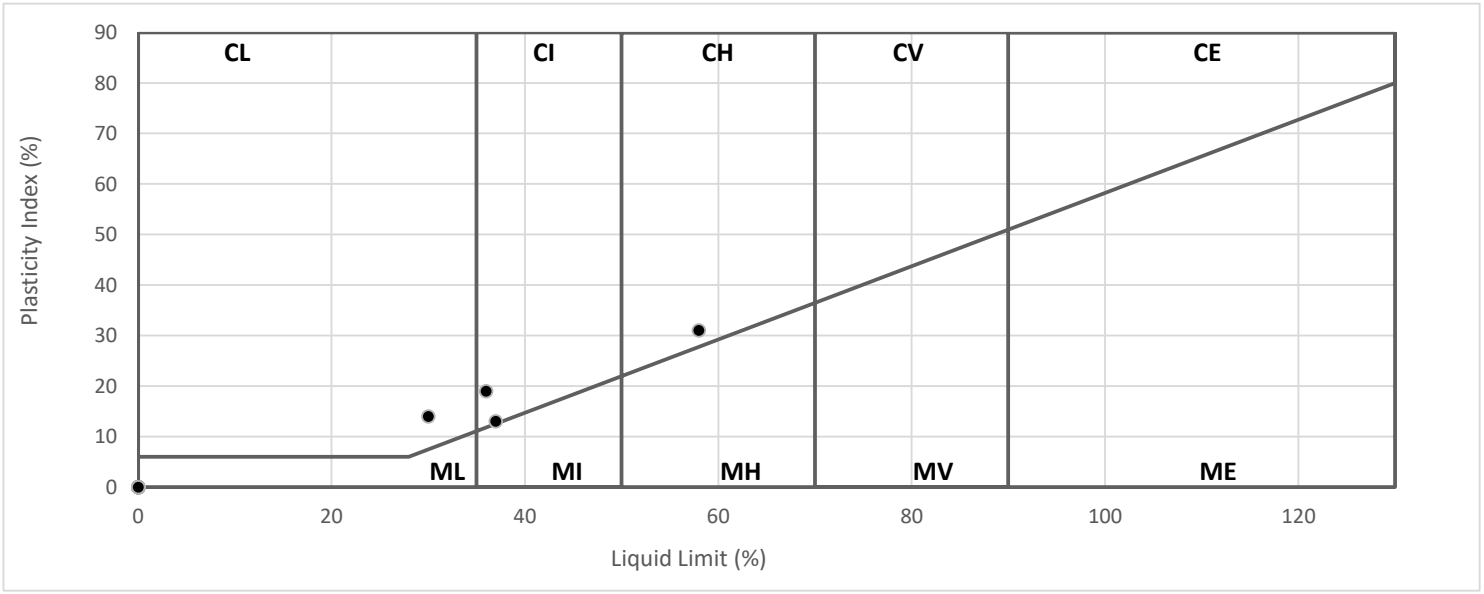
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX
(BS 1377 : Part 2 : 1990 Method 5)

Contract Number	**36057**
Site Name	**Thurgoland**

TP Trialpit	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing .425mm %	Remarks
TP1		D	1.00	-		21	37	24	13	97	CI Intermediate Plasticity
TP4		D	0.90	-		26	58	27	31	100	CH High Plasticity
TP6		D	1.00	-		13	30	16	14	68	CL Low Plasticity
TP3		D	0.40	-		14	36	17	19	66	CI Intermediate Plasticity
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION
BS 5930:1999+A2:2010



Operators	Checked	30/07/2017	Sean Penn	
DB	Approved	31/07/2017	Ben Sharp	

UKAS TESTING 2788

GSTL	Certificate of Chemical Analysis (B.S. 1377 : PART 3 : 1990)	Contract Number	36057
		Client Reference	
Client	MDJ	Date Received	25/07/2017
Site Name	Cote Land, Thurgoland	Date Started	28/07/2017
		Date Completed	31/07/2017
		No. of Samples	4

Hole Number	Sample Number	Sample Type	Depth (m)			Acid Soluble Sulphate	Aqueous Extract Sulphate	Water Soluble Chloride	PH Value	Organic Matter Content	Redox Mv	Loss On Ignition
TP01		SB	1.00	-			0.02		6.93			
TP04		SB	0.90	-			0.02		6.88			
TP06		SB	1.00	-			0.01		7.51			
TP03		SB	0.40	-			0.01		7.36			
				-								
				-								
				-				

APPENDIX 3

Contamination Laboratory Test Results

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/05021
Issue Number: 1 **Date:** 28 July, 2017

Client:
Michael D Joyce Associates LLP
Charnock Court
6 South Parade
Wakefield
WF1 1LR

Project Manager: Mr Anthony Joyce
Project Name: Cote Lane, Thurgoland
Project Ref: Not specified
Order No: N/A
Date Samples Received: 21/07/17
Date Instructions Received: 24/07/17
Date Analysis Completed: 28/07/17

Prepared by:
Melanie Marshall
Laboratory Coordinator

Approved by:
John Gustafson
Director

Envirolab Job Number: 17/05021

Client Project Name: Cote Lane, Thurgoland

Client Project Ref: Not specified

Lab Sample ID	17/05021/1	17/05021/2	17/05021/3	17/05021/4	17/05021/5	17/05021/6	17/05021/7		Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP4	TP5	TP6	TP7	TP8			
Depth to Top	0.10	0.10	0.15	0.10	0.05	0.05	0.10			
Depth To Bottom										
Date Sampled	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	6E	6E	6E	6E	6E	6E			
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	A-T-044
pH$_D^{M\#}$	7.45	7.08	6.67	6.71	6.73	6.87	6.77		pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.01	<0.01	0.01	<0.01	0.04	<0.01	<0.01		g/l	A-T-026s
Cyanide (total)$_A^{M\#}$	<1	<1	<1	<1	<1	<1	<1		mg/kg	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		mg/kg	A-T-050s
Arsenic$_D^{M\#}$	2	5	7	2	5	4	3		mg/kg	A-T-024s
Cadmium$_D^{M\#}$	2.7	2.4	2.9	2.8	2.6	2.8	4.2		mg/kg	A-T-024s
Copper$_D^{M\#}$	27	51	28	31	34	44	23		mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<5	<5	<5	<1	<1	<1	<1		mg/kg	A-T-040s
Lead$_D^{M\#}$	80	60	65	56	60	68	41		mg/kg	A-T-024s
Mercury$_D$	<0.17	0.18	<0.17	0.18	<0.17	<0.17	<0.17		mg/kg	A-T-024s
Nickel$_D^{M\#}$	25	26	23	30	28	33	40		mg/kg	A-T-024s
Selenium$_D$	3	3	3	3	3	3	4		mg/kg	A-T-024s
Zinc$_D^{M\#}$	120	100	105	120	131	133	97		mg/kg	A-T-024s

Envirolab Job Number: 17/05021

Client Project Name: Cote Lane, Thurgoland

Client Project Ref: Not specified

Lab Sample ID	17/05021/1	17/05021/2	17/05021/3	17/05021/4	17/05021/5	17/05021/6	17/05021/7		Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP4	TP5	TP6	TP7	TP8			
Depth to Top	0.10	0.10	0.15	0.10	0.05	0.05	0.10			
Depth To Bottom										
Date Sampled	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	6E	6E	6E	6E	6E	6E			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A			

Envirolab Job Number: 17/05021

Client Project Name: Cote Lane, Thurgoland

Client Project Ref: Not specified

Lab Sample ID	17/05021/1	17/05021/2	17/05021/3	17/05021/4	17/05021/5	17/05021/6	17/05021/7		Units	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP4	TP5	TP6	TP7	TP8			
Depth to Top	0.10	0.10	0.15	0.10	0.05	0.05	0.10			
Depth To Bottom										
Date Sampled	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Sample Matrix Code	4E	6E	6E	6E	6E	6E	6E			
PAH 16										
Acenaphthene$_A^{M\#}$	0.15	0.05	0.11	0.12	0.07	0.14	<0.01		mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.01	<0.01	0.01	0.02	0.01	0.03	<0.01		mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.27	0.11	0.24	0.22	0.16	0.27	<0.02		mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.82	0.41	0.75	0.69	0.57	1.01	<0.04		mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.73	0.41	0.62	0.62	0.54	0.92	<0.04		mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.72	0.42	0.60	0.60	0.50	0.89	<0.05		mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.29	0.15	0.23	0.23	0.22	0.36	<0.05		mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.25	0.14	0.23	0.20	0.20	0.37	<0.07		mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.81	0.47	0.72	0.69	0.61	1.01	<0.06		mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.08	<0.04	0.06	0.06	0.05	0.10	<0.04		mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	1.54	0.78	1.48	1.33	1.00	1.96	<0.08		mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.12	0.04	0.11	0.11	0.07	0.11	<0.01		mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.41	0.20	0.34	0.32	0.30	0.50	<0.03		mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	0.09	<0.03	0.09	0.13	0.07	0.04	<0.03		mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	1.27	0.55	1.25	1.16	0.81	1.38	0.03		mg/kg	A-T-019s
Pyrene$_A^{M\#}$	1.33	0.69	1.30	1.14	0.87	1.68	<0.07		mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	8.91	4.43	8.15	7.66	6.06	10.7	<0.08		mg/kg	A-T-019s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

APPENDIX 4

GroundSure Geo-Insight and Enviro-Insight Reports

Michael D Joyce Associates LLP

6, South Parade,
Wakefield, WF1 1LR

Report Reference: HMD-354-4038824

Your Reference: Cote_Lane_-_Thurgoland

Report Date 3 Jul 2017

Report Delivery Method: Email - pdf

Geo Insight

Address: 429222, 400661,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on (0)1924 360458 quoting the above report reference number.

Yours faithfully,

Michael D Joyce Associates LLP

Enc.
Groundsure Geo Insight

Geo Insight

Address:	**429222, 400661,**
Date:	**3 Jul 2017**
Reference:	**HMD-354-4038824**
Client:	**Michael D Joyce Associates LLP**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	07-Jun-2013
Grid Reference:	429205,400624
Site Size:	0.97ha

Contents Page

Contents Page ... 3
Overview of Findings ... 5
1:10,000 Scale Availability ... 8
Availability of 1:10,000 Scale Geology Mapping ... 9
1 Geology (1:10,000 scale) ... 10
1.1 Artificial Ground Map (1:10,000 scale) ... 10
1. Geology 1:10,000 scale ... 11
1.1 Artificial Ground ... 11
1.2 Superficial Deposits and Landslips Map (1:10,000 scale) ... 12
1.2 Superficial Deposits and Landslips ... 13
1.2.1 Superficial Deposits/ Drift Geology ... 13
1.2.2 Landslip ... 13
1.3 Bedrock and Faults Map (1:10,000 scale) ... 14
1.3 Bedrock and Faults ... 15
1.3.1 Bedrock/ Solid Geology ... 15
1.3.2 Faults ... 15
2 Geology 1:50,000 Scale ... 17
2.1 Artificial Ground Map ... 17
2. Geology 1:50,000 scale ... 18
2.1 Artificial Ground ... 18
2.1.1 Artificial/ Made Ground ... 18
2.1.2 Permeability of Artificial Ground ... 18
2.2 Superficial Deposits and Landslips Map (1:50,000 scale) ... 19
2.2 Superficial Deposits and Landslips ... 20
2.2.1 Superficial Deposits/ Drift Geology ... 20
2.2.2 Permeability of Superficial Ground ... 20
2.2.3 Landslip ... 20
2.2.4 Landslip Permeability ... 20
2.3 Bedrock and Faults Map (1:50,000 scale) ... 21
2.3 Bedrock, Solid Geology & Faults ... 22
2.3.1 Bedrock/Solid Geology ... 22
2.3.2 Permeability of Bedrock Ground ... 22
2.3.3 Faults ... 23
3 Radon Data ... 24
3.1 Radon Affected Areas ... 24
3.2 Radon Protection ... 24
4 Ground Workings Map ... 25
4 Ground Workings ... 26
4.1 Historical Surface Ground Working Features derived from Historical Mapping ... 26
4.2 Historical Underground Working Features derived from Historical Mapping ... 26
4.3 Current Ground Workings ... 27
5 Mining, Extraction & Natural Cavities ... 29
5.1 Historical Mining ... 29
5.2 Coal Mining ... 29
5.3 Johnson Poole and Bloomer ... 29
5.4 Non-Coal Mining ... 30
5.5 Non-Coal Mining Cavities ... 30
5.6 Natural Cavities ... 30
5.7 Brine Extraction ... 30
5.8 Gypsum Extraction ... 31
5.9 Tin Mining ... 31
5.10 Clay Mining ... 31
6 Natural Ground Subsidence ... 32
6.1 Shrink-Swell Clay Map ... 32
6.2 Landslides Map ... 33
6.3 Ground Dissolution of Soluble Rocks Map ... 34
6.4 Compressible Deposits Map ... 35
6.5 Collapsible Deposits Map ... 36
6.6 Running Sand Map ... 37

6 Natural Ground Subsidence..... 38
6.1 Shrink-Swell Clays.....38
6.2 Landslides.....39
6.3 Ground Dissolution of Soluble Rocks.....40
6.4 Compressible Deposits.....40
6.5 Collapsible Deposits.....40
6.6 Running Sands.....40
7 Borehole Records..... 42
8 Estimated Background Soil Chemistry..... 43
9 Railways and Tunnels Map..... 44
9 Railways and Tunnels..... 45
9.1 Tunnels 45
9.2 Historical Railway and Tunnel Features 45
9.3 Historical Railways.....46
9.4 Active Railways.....46
9.5 Railway Projects.....46

Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	No
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	Yes

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	No
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	No
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	No
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of faults within 500m of the study site boundary?	Yes

Section 3: Radon

3. Radon	3.1Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	5	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	11
4.3 Current Ground Workings	0	0	0	1	6

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	4
5.2 Coal Mining	1	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
5.4 Non-Coal Mining*	1	0	0	0	3
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

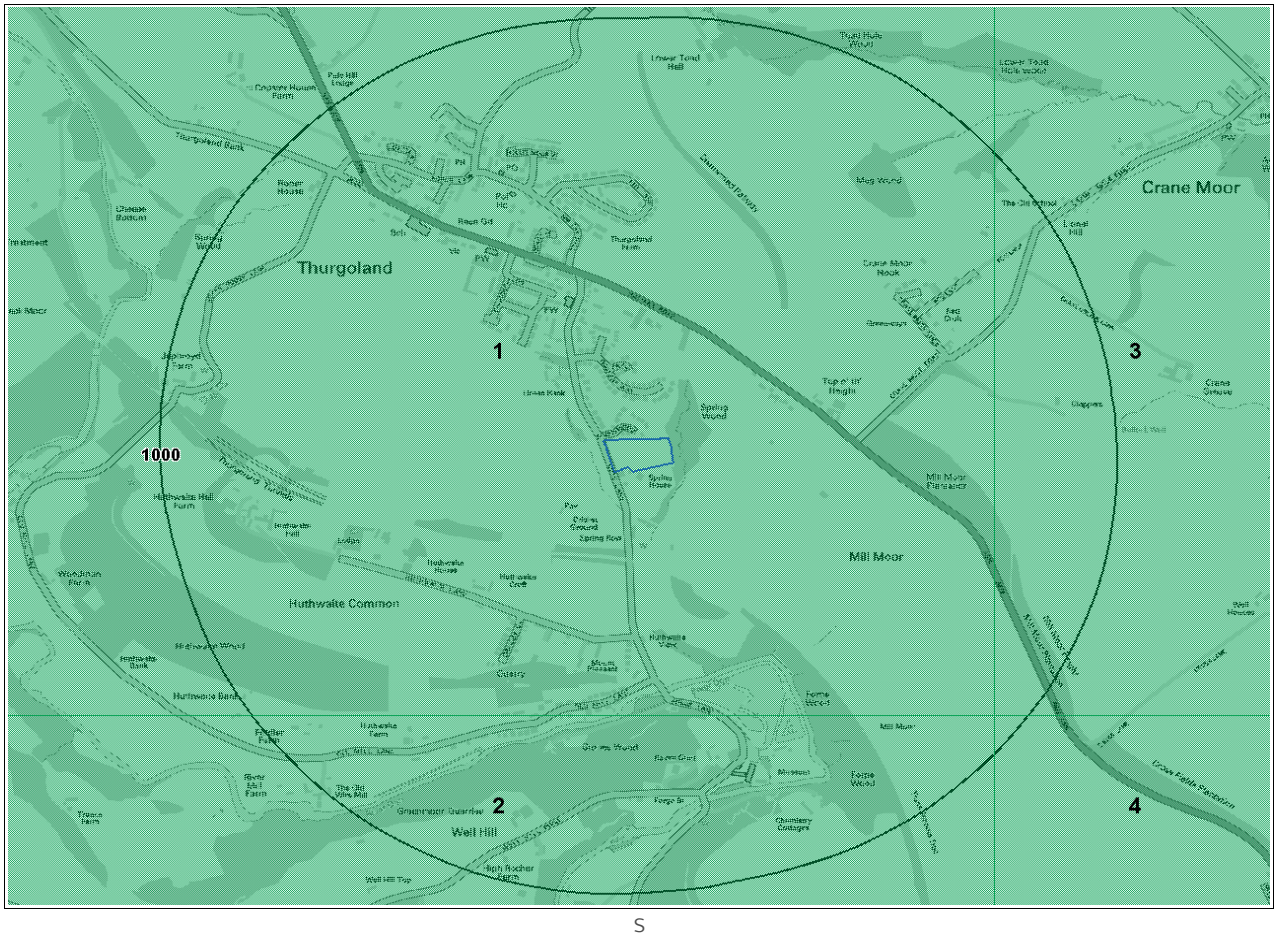
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Very Low
6.2 Landslides	Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Negligible
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Negligible

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	0	5	1

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	3	3	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	0	2	2	Not Searched
9.3 Historical Railways	0	0	3	Not Searched
9.4 Active Railways	0	0	0	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

Full Coverage

Partial Coverage

No Coverage

50
250
Search Buffers (m)

Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	Some deposits are mapped
2	577.0	Some deposits are mapped	Full	Full	Some deposits are mapped
3	723.0	Some deposits are mapped	Full	Full	Some deposits are mapped
4	940.0	Some deposits are mapped	Full	Full	No coverage

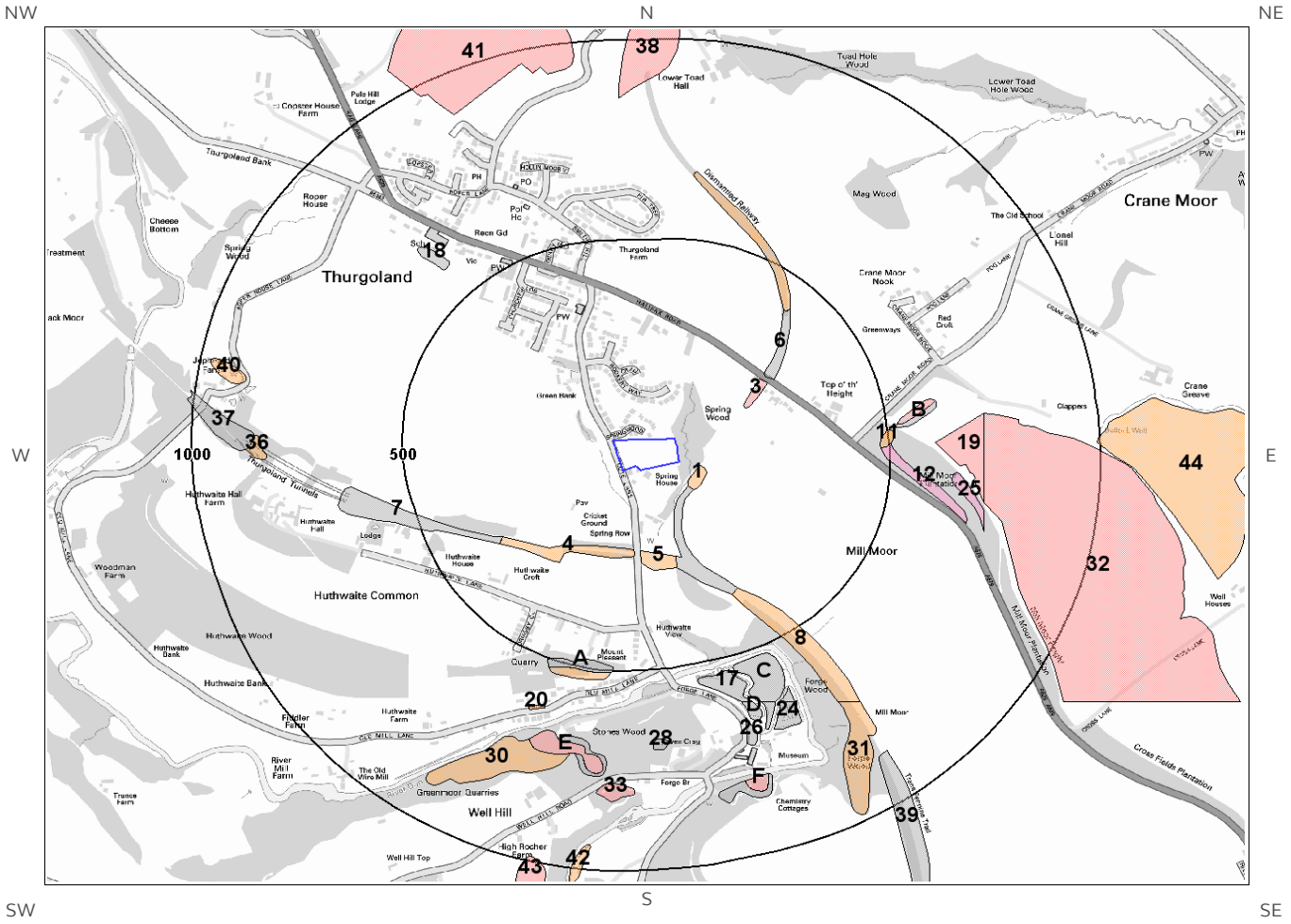
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground Map (1:10,000 scale)



Artificial Ground Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

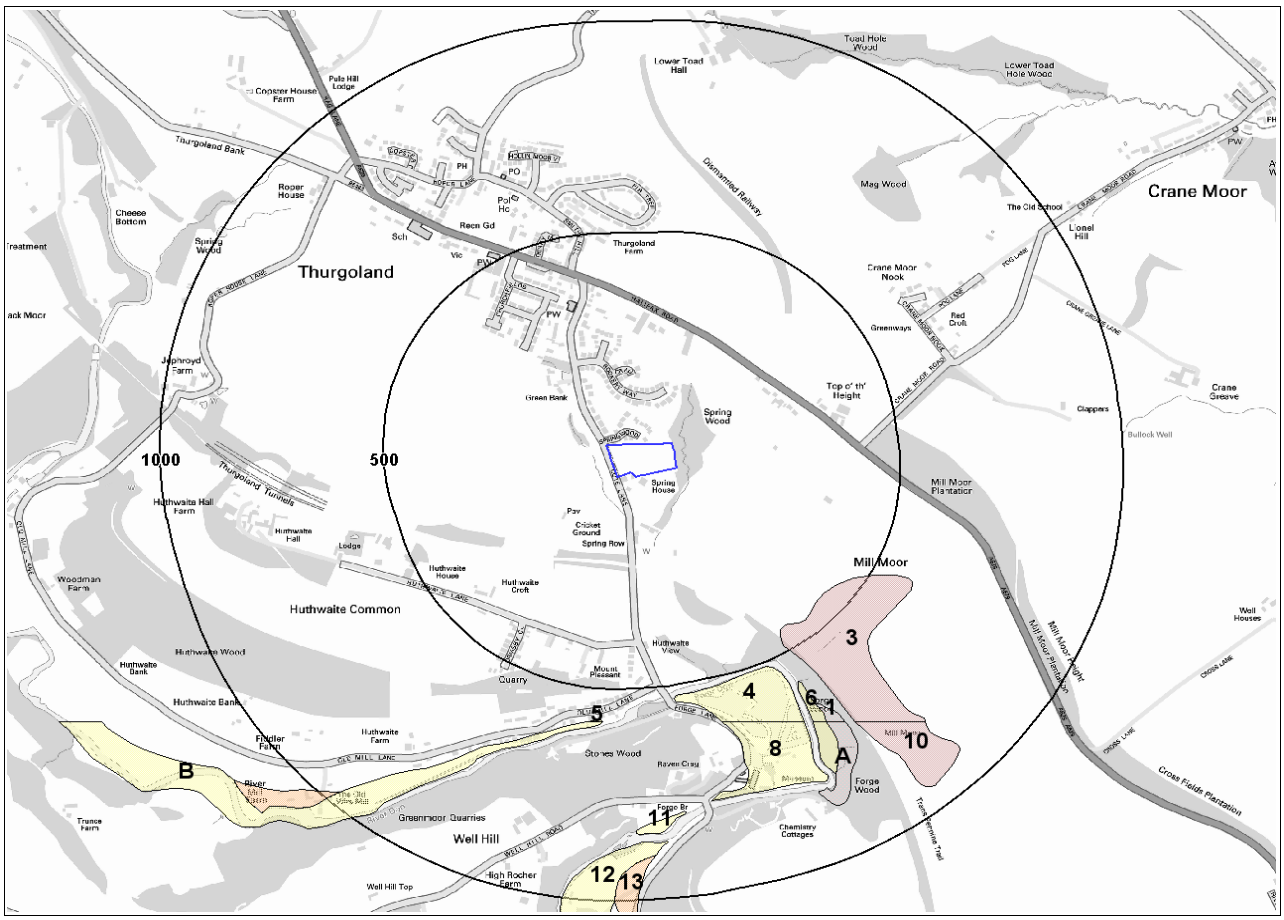
ID	Distance	Direction	LEX Code	Description	Rock Description
1	43.0	SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	63.0	S	WGR-VOID	Worked Ground (Undivided)	Void
3	183.0	NE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	191.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
5	201.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
6	266.0	NE	WGR-VOID	Worked Ground (Undivided)	Void
7	329.0	SW	WGR-VOID	Worked Ground (Undivided)	Void
8	343.0	SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
9	414.0	NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
10A	477.0	S	WGR-VOID	Worked Ground (Undivided)	Void
11	477.0	E	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
12	480.0	E	DDGR-UKNOWN	Disturbed Ground (Undivided)	Unknown/unclassified Entry

1.2 Superficial Deposits and Landslips Map (1:10,000 scale)

NW N NE

W E

SW S SE



Artificial Ground Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
3	442.0	SE	HEAD-DMTN	Head - Diamicton	Diamicton

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

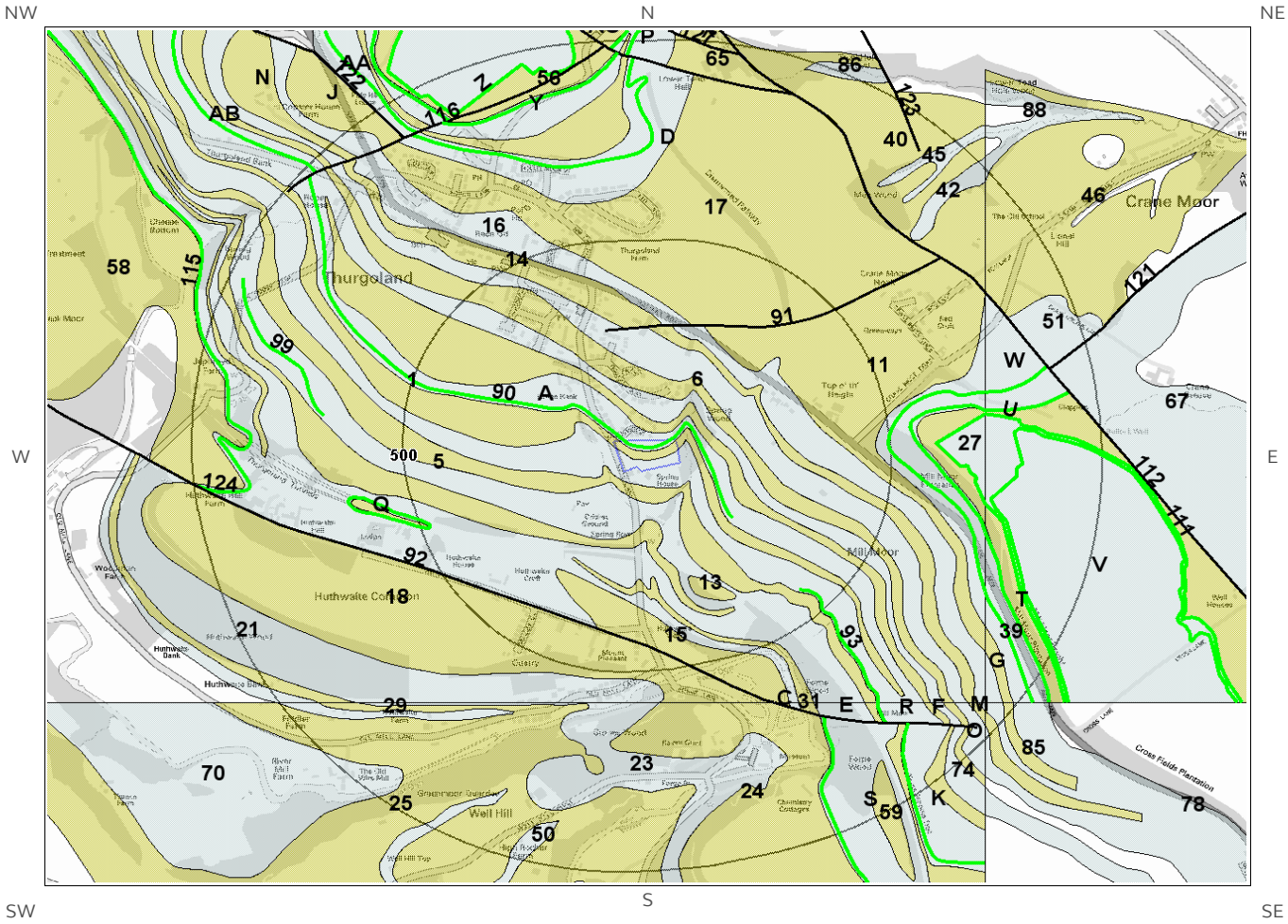
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and Faults Map (1:10,000 scale)



Bedrock and Faults Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
2A	0.0	On Site	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
3	20.0	SW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
4A	20.0	N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
5	40.0	SW	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
6	102.0	N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
7	121.0	S	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
8	133.0	NE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
9	191.0	NE	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
10	209.0	NE	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
11	243.0	NE	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
12	245.0	SW	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
13	281.0	S	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
14	282.0	N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
15	283.0	SW	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age
16	287.0	N	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
17	290.0	N	PF-SDST	Penistone Flags - Sandstone	Langsettian Sub-age
18	389.0	S	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age
19B	464.0	E	PLCM-MDSS	Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone	Langsettian Sub-age
20Q	486.0	W	GR-SDST	Grenoside Sandstone - Sandstone	Langsettian Sub-age

1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	Category Description	Feature Description
90	0.0	On Site	ROCK	Coal seam, inferred
91	277.0	N	FAULT	Normal fault, inferred
92	389.0	S	FAULT	Normal fault, inferred

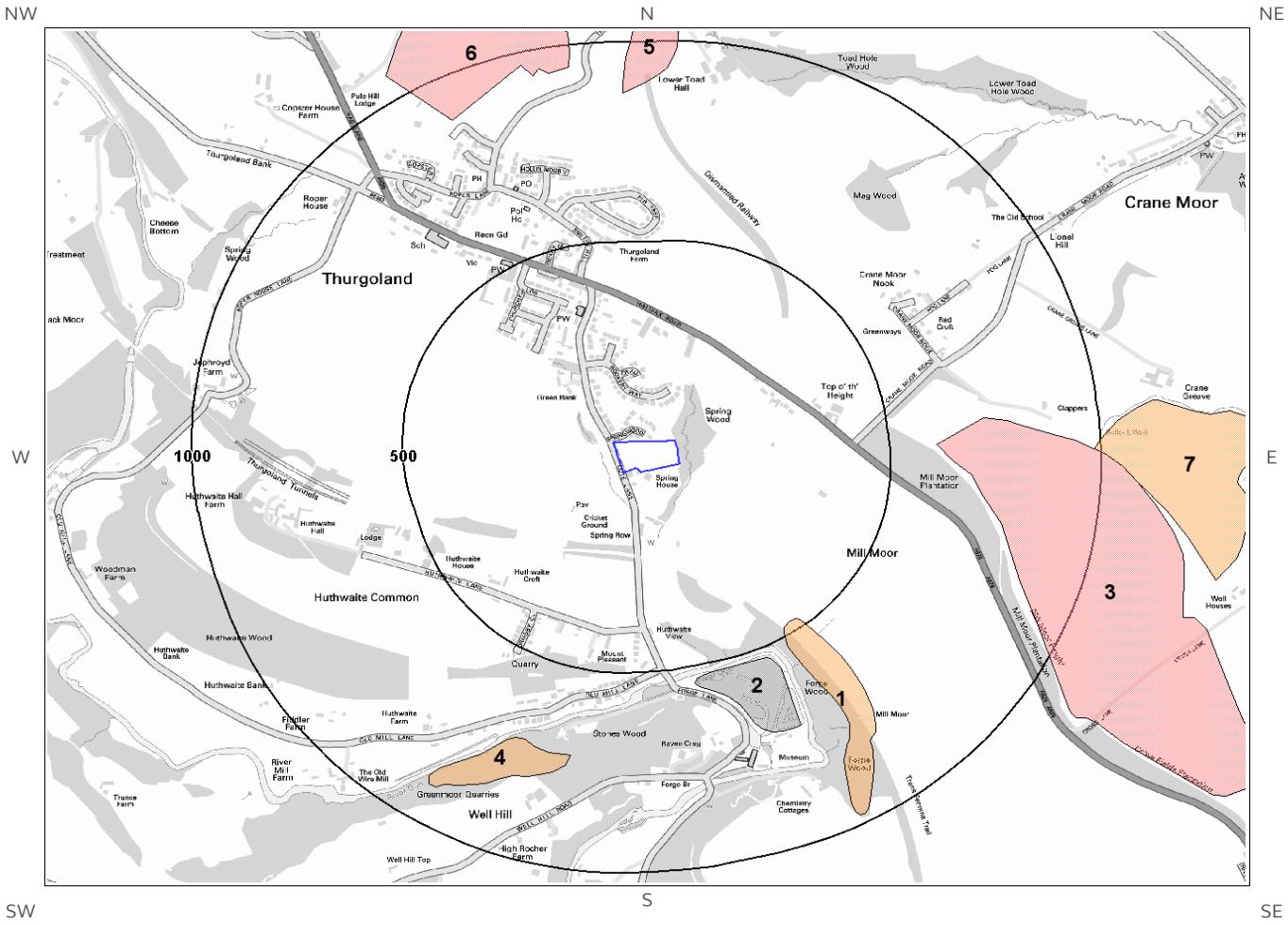
ID	Distance (m)	Direction	Category Description	Feature Description
93	425.0	SE	ROCK	Coal seam, inferred
94Q	479.0	W	ROCK	Coal seam, inferred
95B	496.0	E	ROCK	Coal seam, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 087

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	471.0	SE	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

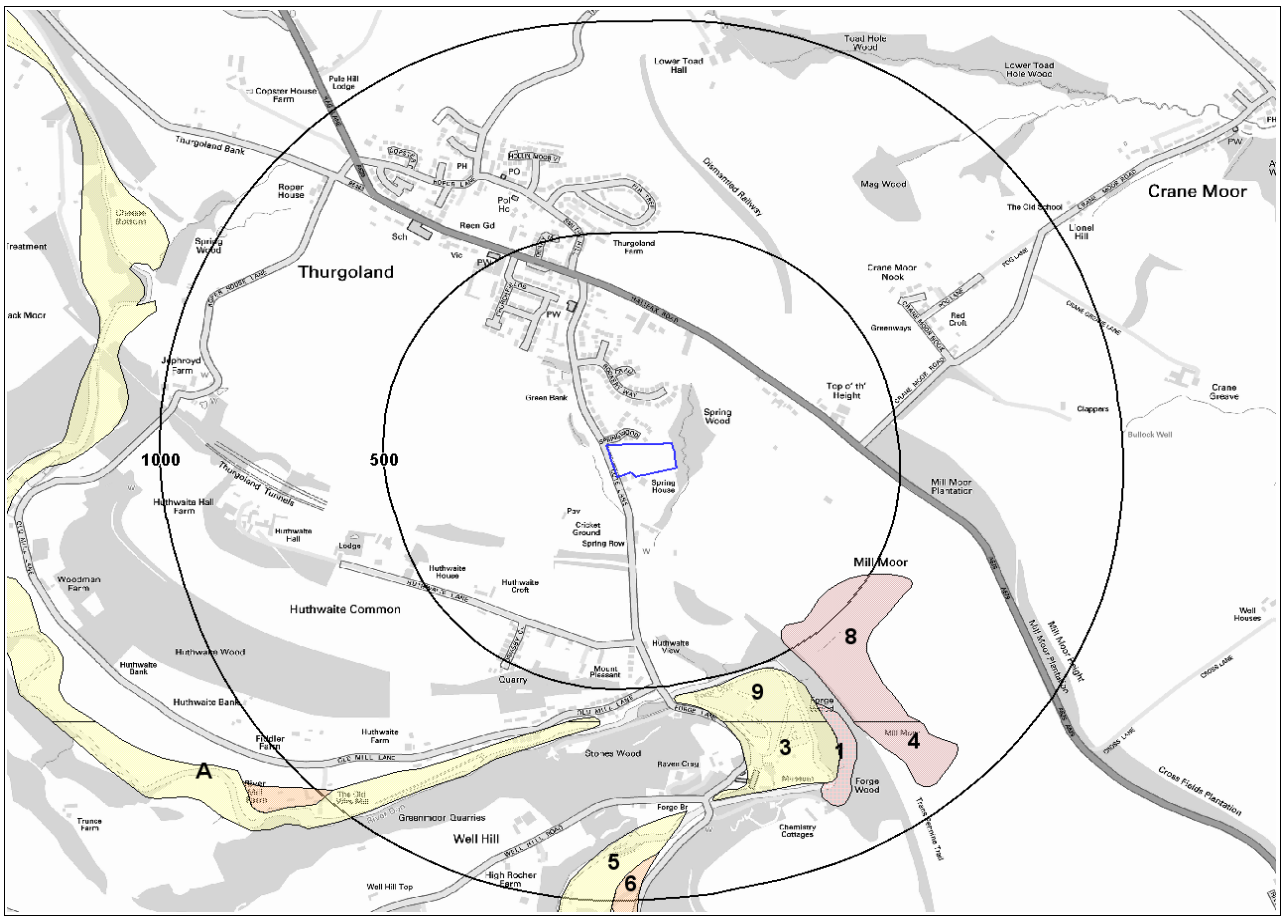
Database searched and no data found.

2.2 Superficial Deposits and Landslips Map (1:50,000 scale)

NW N NE

W E

SW S SE



Ground Workings Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
8	443.0	SE	HEAD-DMTN	HEAD	DIAMICTON

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? No

Database searched and no data found.

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

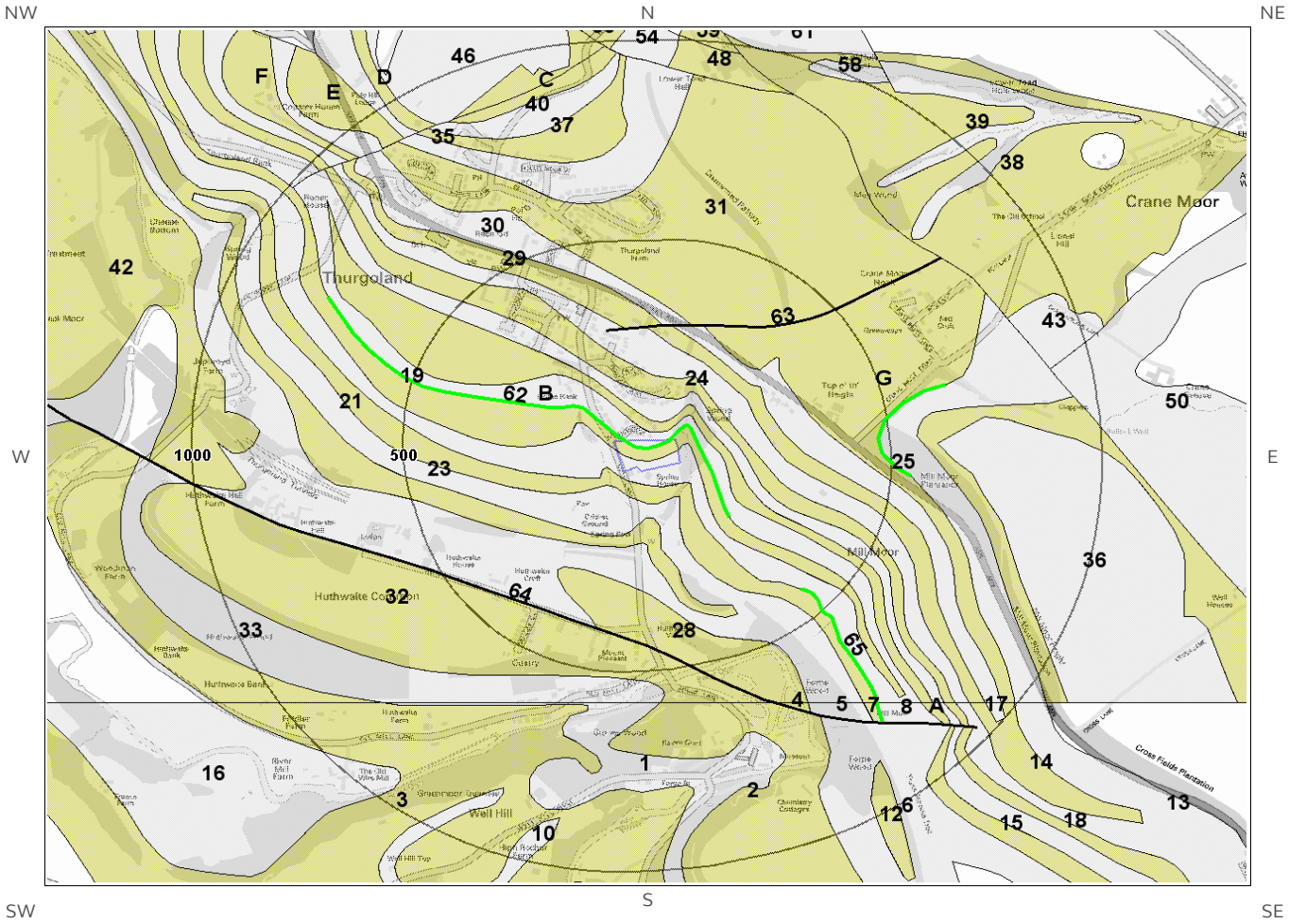
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and Faults Map (1:50,000 scale)



Ground Workings Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 087

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
19	0.0	On Site	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
20B	0.0	On Site	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
21	14.0	SW	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
22B	21.0	N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
23	42.0	SW	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
24	104.0	N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
25	130.0	NE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
26G	190.0	NE	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
27	220.0	NE	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
28	261.0	S	GR-SDST	GRENOSIDE SANDSTONE - SANDSTONE	WESTPHALIAN
29	281.0	N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
30	287.0	N	PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
31	290.0	N	PF-SDST	PENISTONE FLAGS - SANDSTONE	WESTPHALIAN
32	389.0	S	GR-SDST	GRENOSIDE SANDSTONE - SANDSTONE	WESTPHALIAN

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	High	Low
0.0	On Site	Fracture	High	Moderate
14.0	SW	Fracture	High	Moderate
21.0	N	Fracture	High	Moderate

2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? Yes

ID	Distance	Direction	Category Description	Feature Description
62	0.0	On Site	ROCK	Coal seam, inferred
63	277.0	N	FAULT	Fault, inferred
64	389.0	S	FAULT	Fault, inferred
65	425.0	SE	ROCK	Coal seam, inferred
66G	474.0	E	ROCK	Coal seam, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

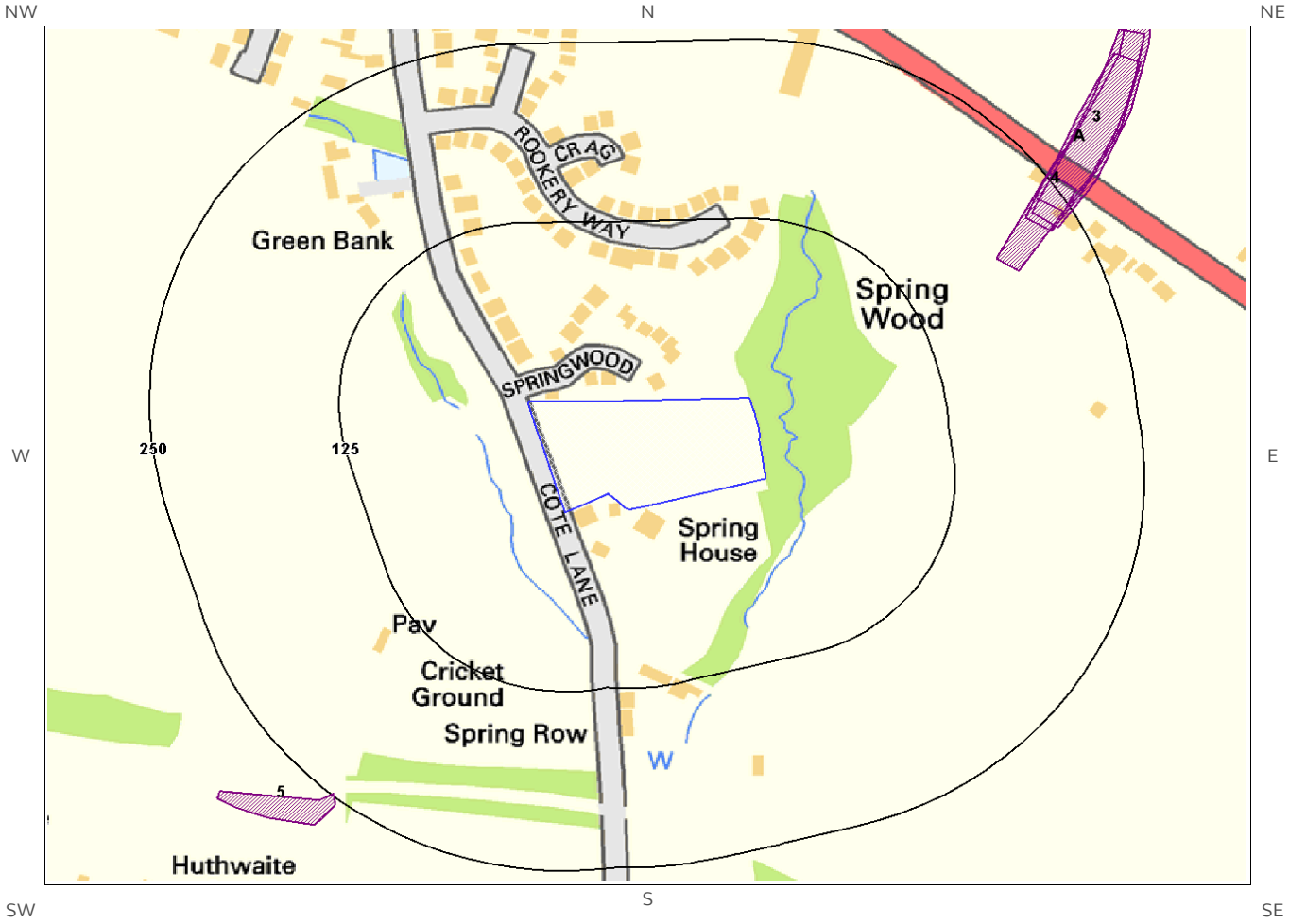
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

---

4 Ground Workings Map



Ground Workings Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1A	190.0	NE	429499 400864	Cuttings	1891
2A	222.0	NE	429487 400836	Cuttings	1903
3	227.0	NE	429493 400858	Cuttings	1932
4	234.0	NE	429468 400801	Cuttings	1951
5	249.0	SW	428954 400371	Unspecified Heap	1951

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	631.0	E	429935 400475	Unspecified Old Levels	1932
Not shown	641.0	W	428360 400589	Tunnel	1987
Not shown	641.0	W	428360 400589	Tunnel	1951
Not shown	641.0	W	428360 400589	Tunnel	1965
Not shown	643.0	W	428348 400591	Tunnel	1891
Not shown	643.0	W	428348 400591	Tunnel	1932
Not shown	643.0	W	428348 400591	Tunnel	1903

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	646.0	W	428334 400582	tunnel	1987
Not shown	676.0	E	429950 400478	Unspecified Old Levels	1951
Not shown	686.0	S	428952 399915	Unspecified Shaft	1951
Not shown	696.0	S	428913 399917	Unspecified Shaft	1932

4.3 Current Ground Workings

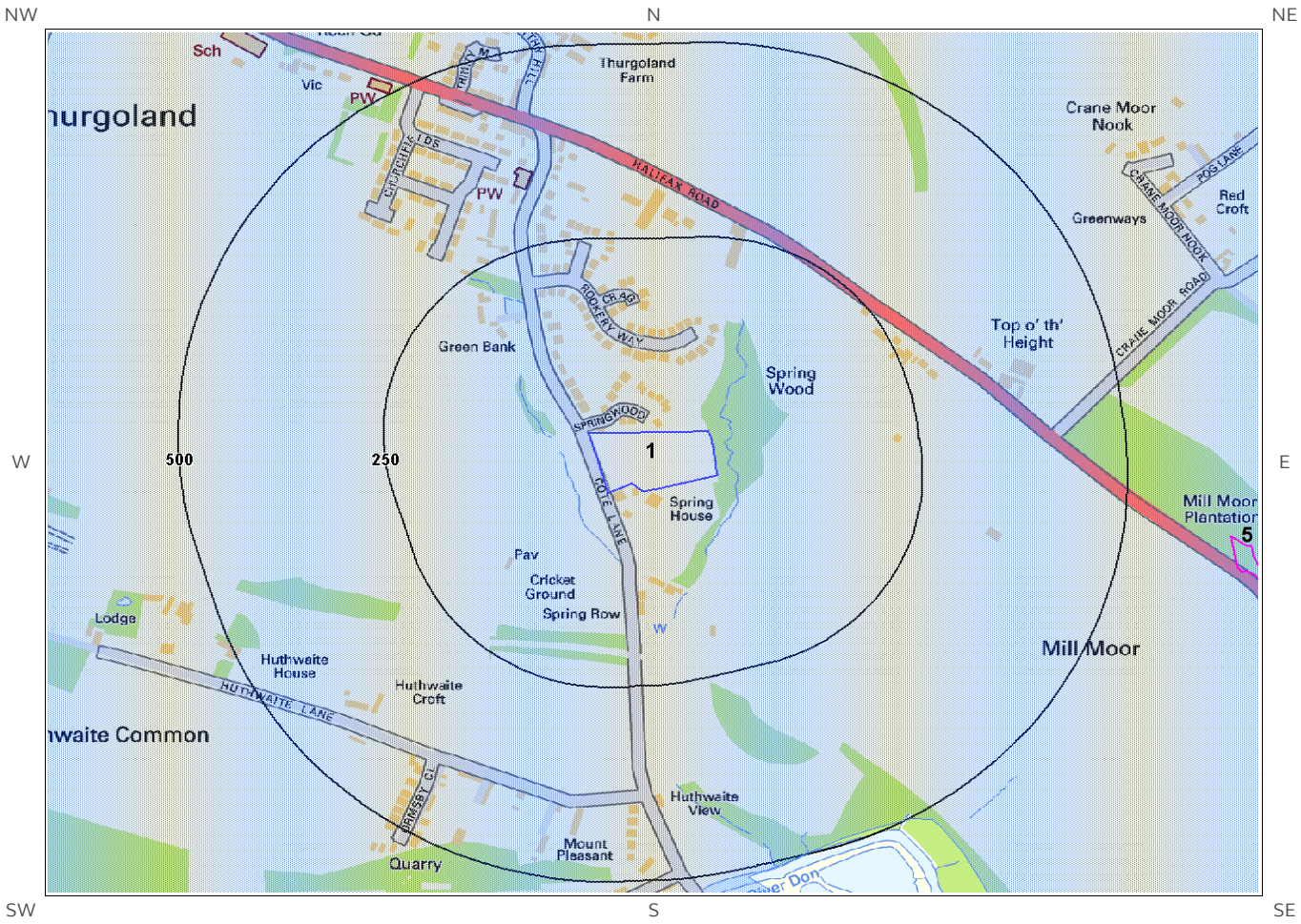
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

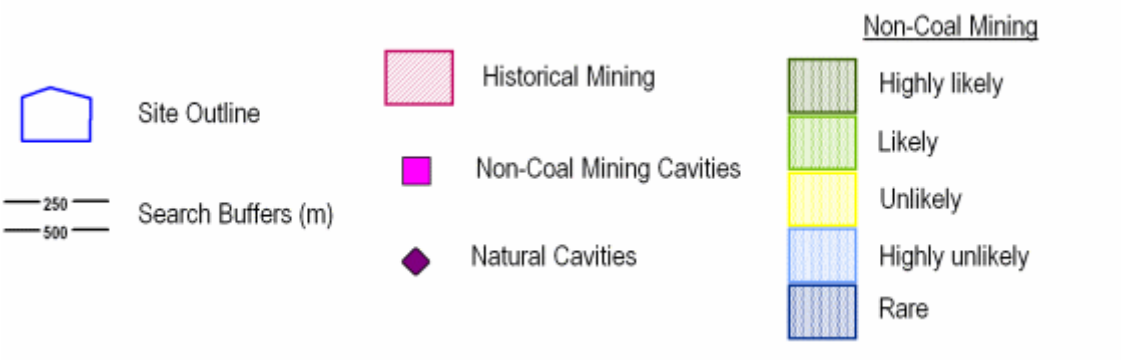
ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	487.0	S	429155 400090	Sandstone	Huthwaite Quarries	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	506.0	S	429074 400076	Sandstone	Huthwaite	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	513.0	S	429000 400085	Sandstone	Huthwaite	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	714.0	S	428990 399880	Sandstone	Victoria	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	745.0	S	429080 399835	Sandstone	Greenmoor	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	813.0	S	429121 399764	Sandstone	Well Hill Road	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	948.0	NE	430089 401127	Sandstone	Crane Moor	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? Yes

The following Historical Mining information is provided by Groundsure:

ID	Distance (m)	Direction	NGR	Details	Date
5	631.0	E	429935 400475	Unspecified Old Levels	1932
Not shown	676.0	E	429950 400478	Unspecified Old Levels	1951
Not shown	686.0	S	428952 399915	Unspecified Shaft	1951
Not shown	696.0	S	428913 399917	Unspecified Shaft	1932

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Sheffield Area	Vein Mineral/Iron ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	577.0	S	Sheffield Area	Vein Mineral/Iron ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	723.0	E	Sheffield Area	Vein Mineral/Iron ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
Not shown	940.0	SE	Sheffield Area	Vein Mineral/Iron ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

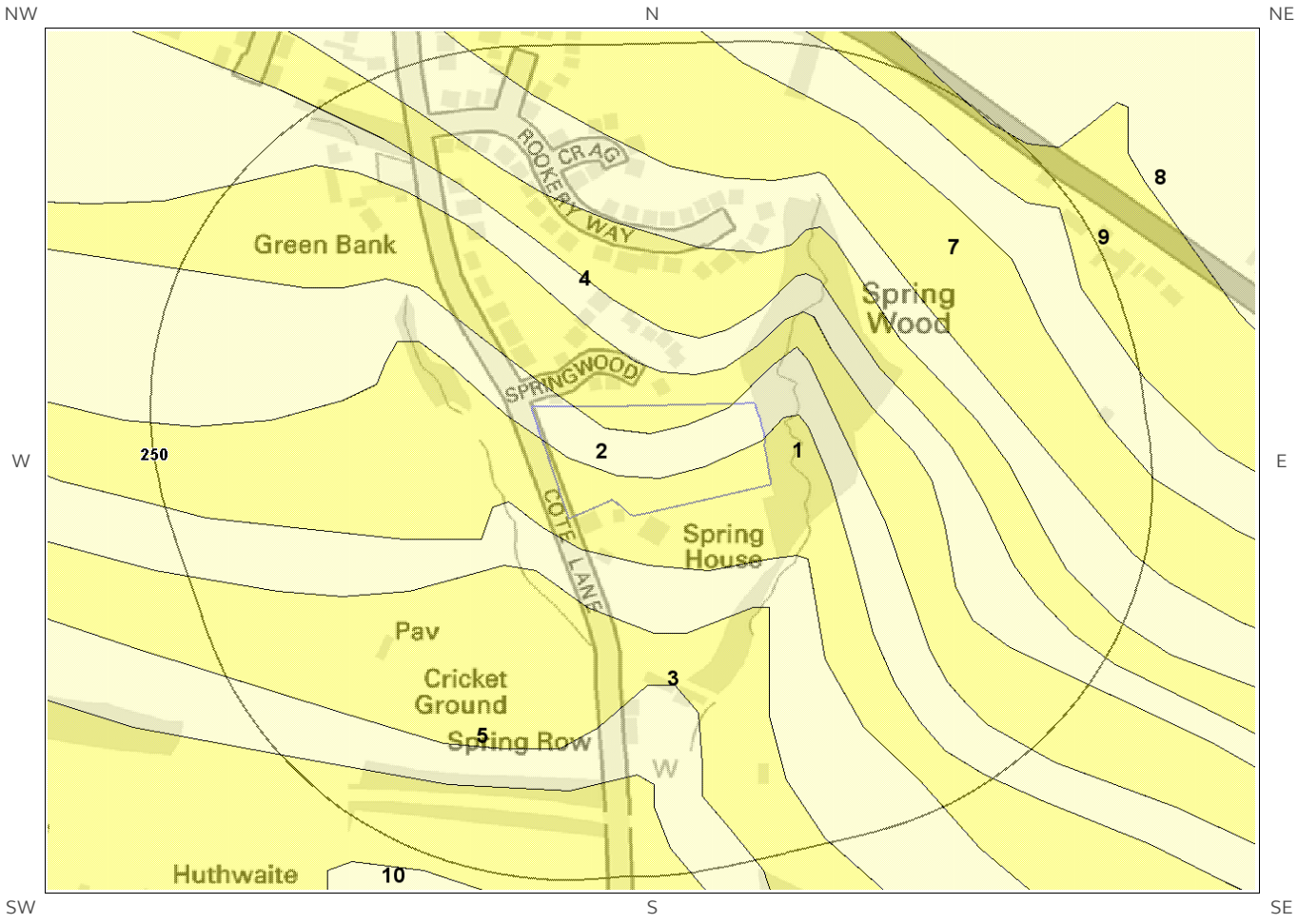
Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map

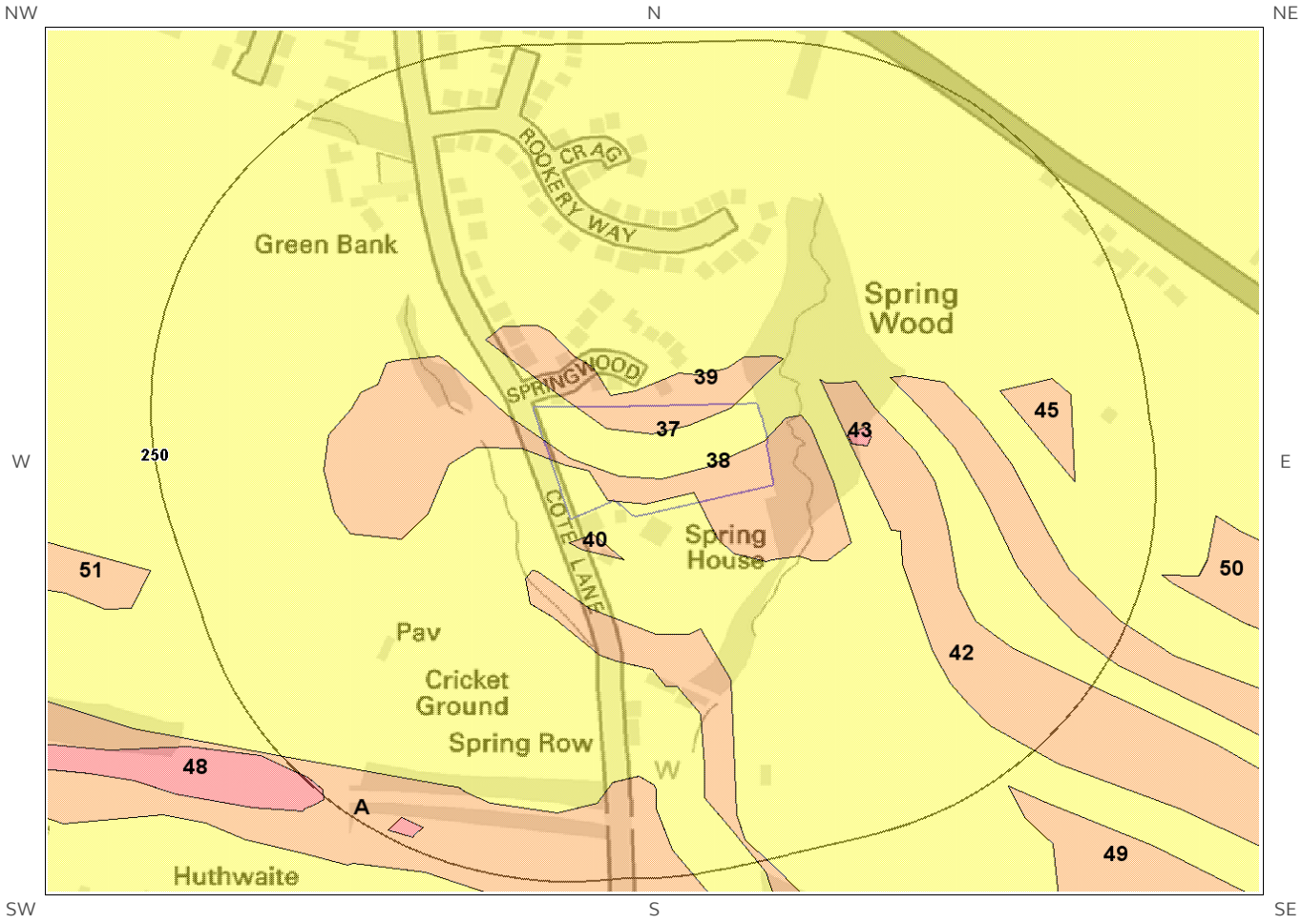


Shrink Swell Clay Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



6.2 Landslides Map

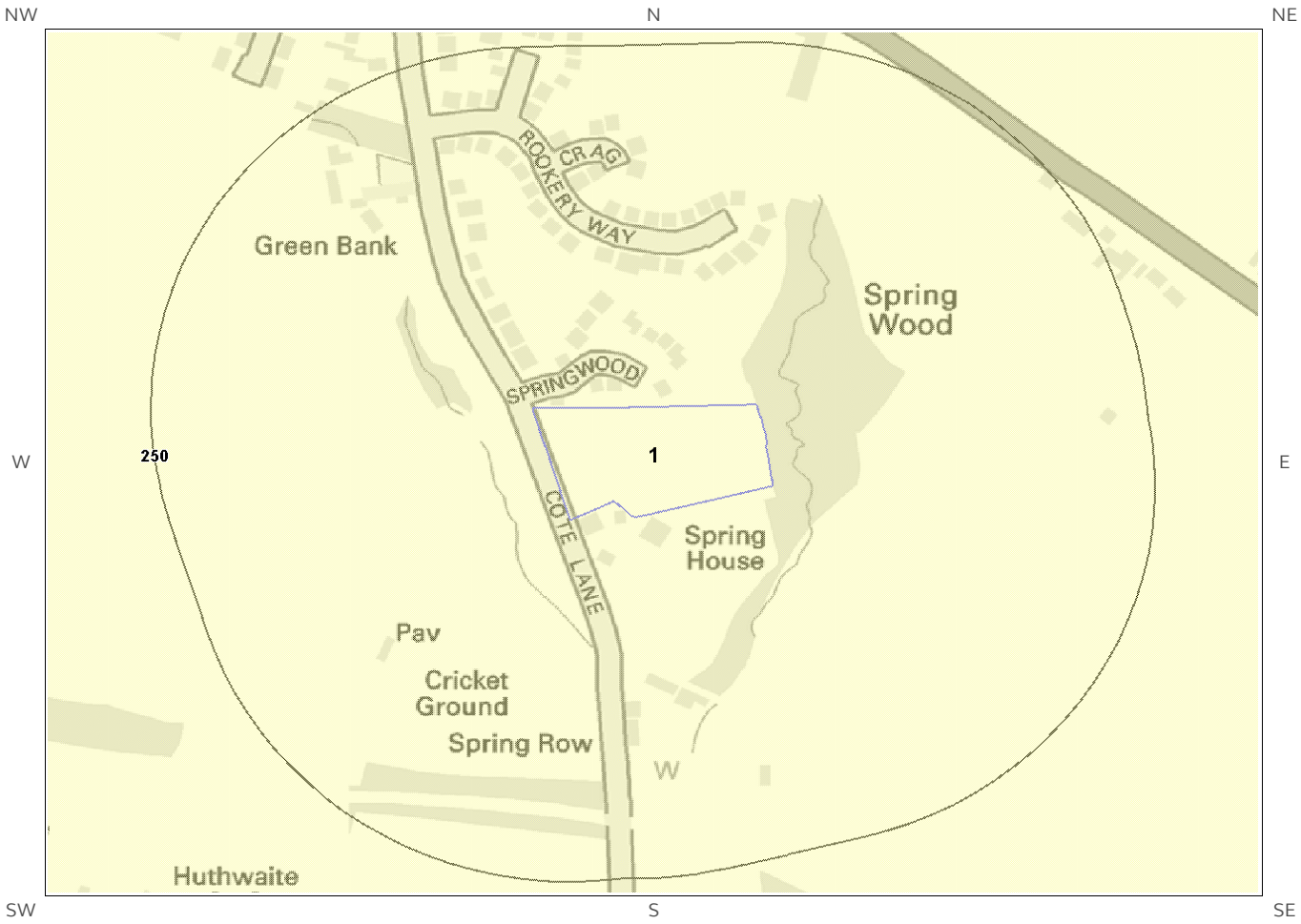


Landslides Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



6.3 Ground Dissolution of Soluble Rocks Map

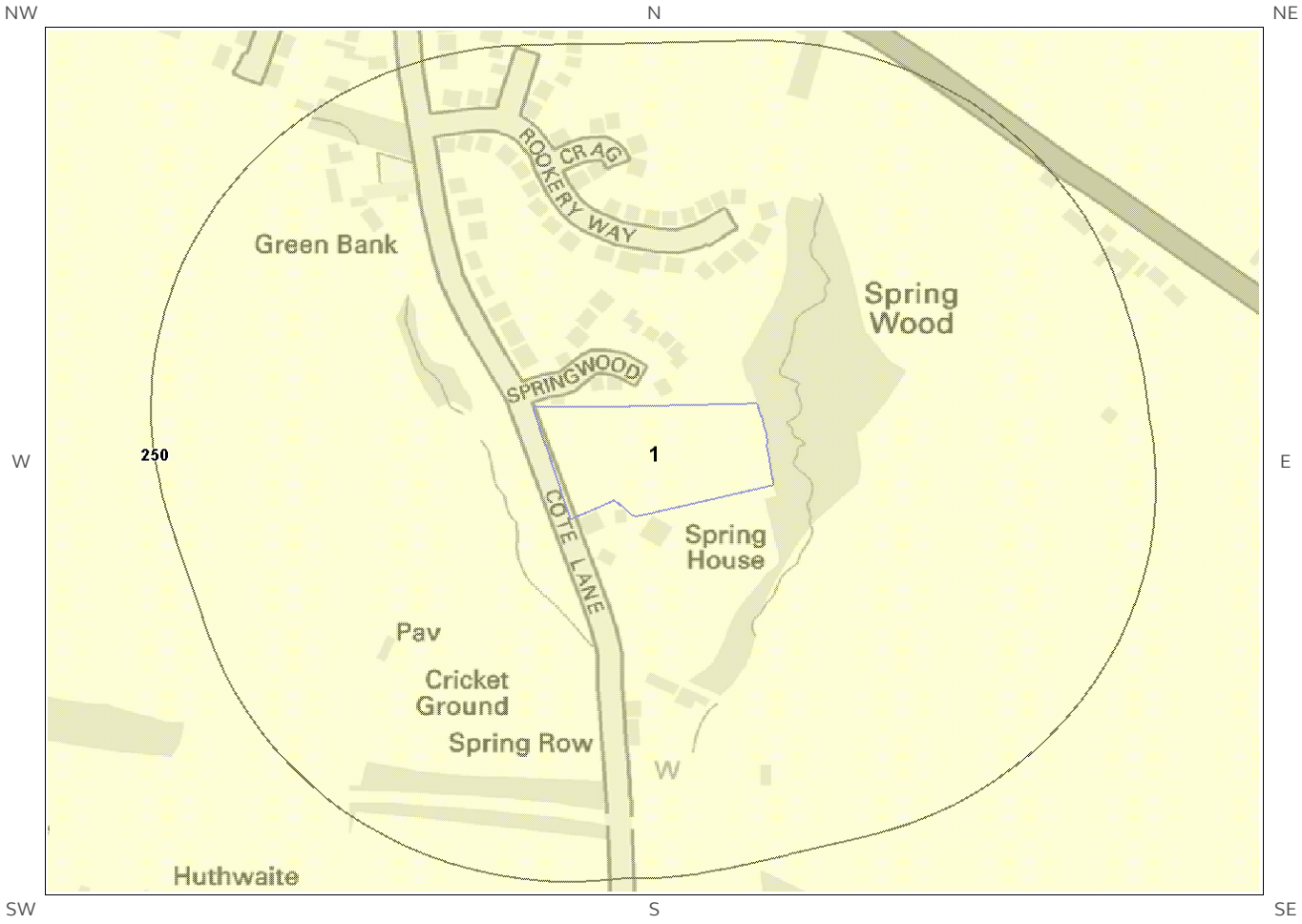


Ground Dissolution Soluble Rocks Legend

© Crown copyright and database rights 2017. Ordnance Survey license 100035207.



6.4 Compressible Deposits Map

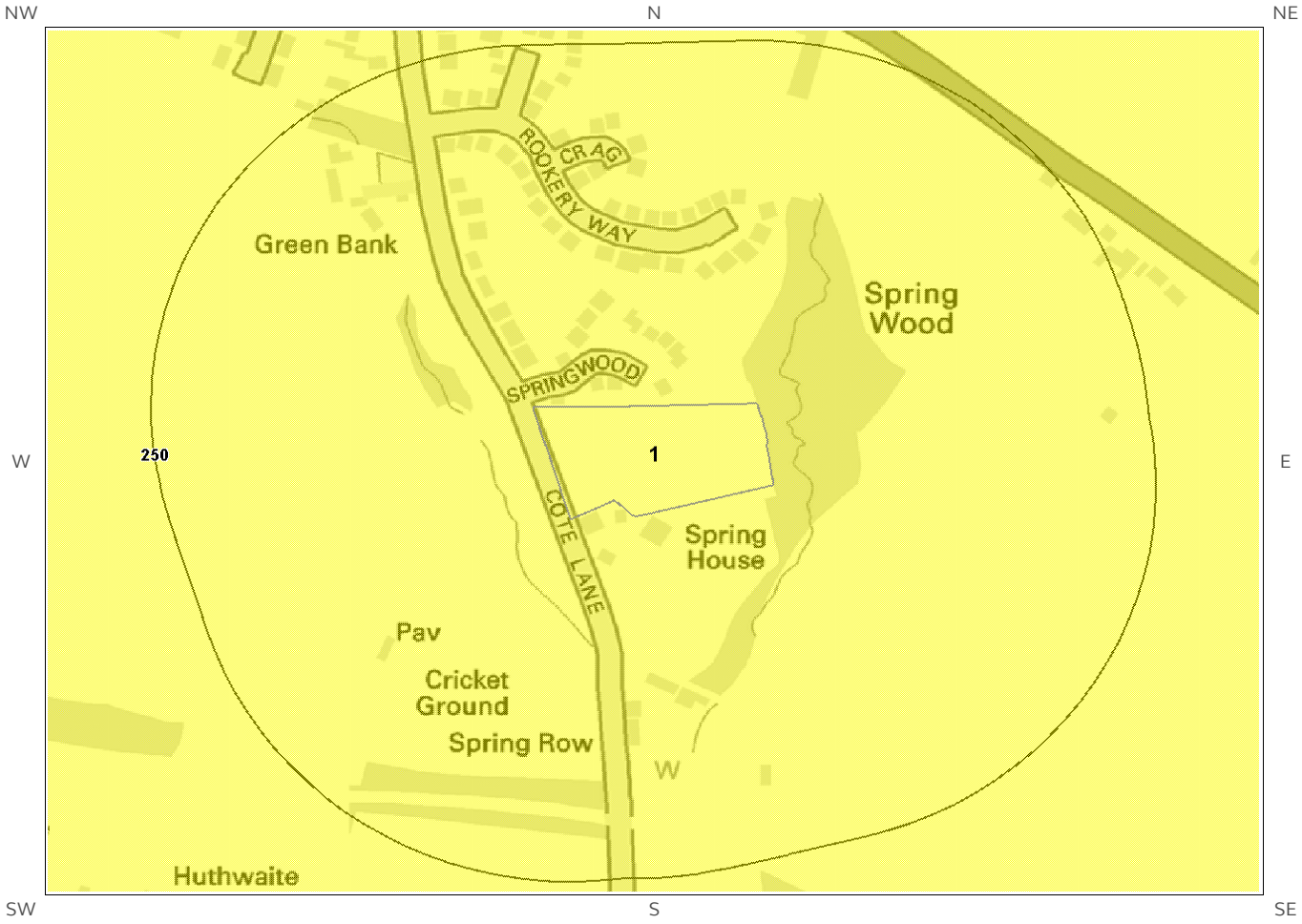


Compressible Deposits Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



6.5 Collapsible Deposits Map

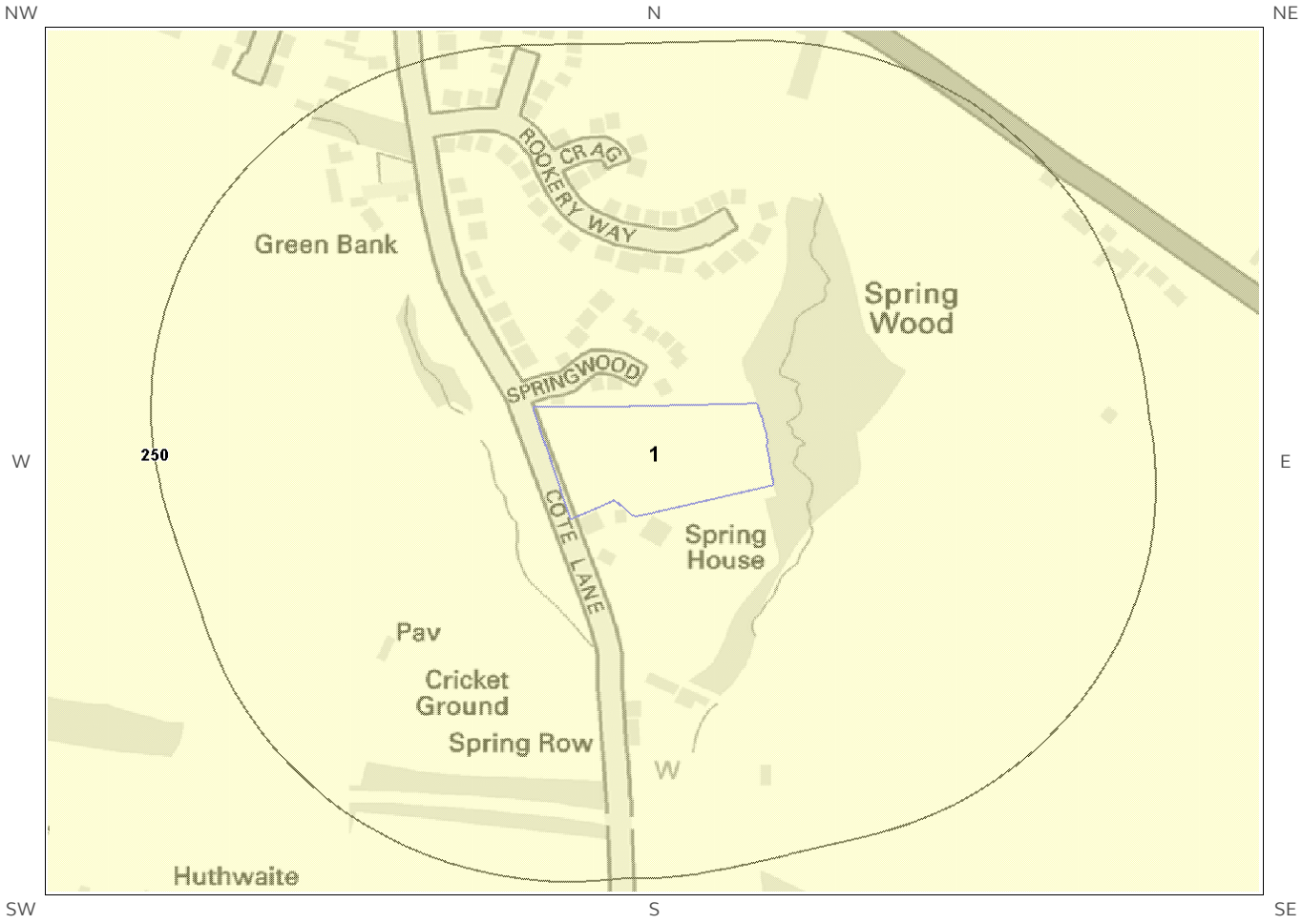


Collapsible Deposits Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



6.6 Running Sand Map



Running Sand Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.



6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Low

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
3	14.0	SW	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
4	21.0	N	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.
5	42.0	SW	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

* This includes an automatically generated 50m buffer zone around the site

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
37	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
38	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
39	0.0	On Site	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
40	15.0	S	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
41	42.0	SW	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.
42	44.0	E	Low	Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property - no significant increase in insurance risk due to natural slope instability problems.

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records Map



Borehole Records Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

Borehole Locations

125
250
Search Buffers (m)

7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 6

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	5.0	N	429200 400660	SE20SE50	-1.0	COTE LANE THURGOLAND TP 1
2	15.0	N	429170 400670	SE20SE53	-1.0	COTE LANE THURGOLAND TP 4
3	24.0	N	429220 400680	SE20SE52	-1.0	COTE LANE THURGOLAND TP 3
4	35.0	N	429190 400690	SE20SE51	-1.0	COTE LANE THURGOLAND TP 2
5	35.0	N	429150 400690	SE20SE54	-1.0	COTE LANE THURGOLAND TP 5
6	55.0	N	429140 400710	SE20SE55	-1.0	COTE LANE THURGOLAND TP 6

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

8 Estimated Background Soil Chemistry

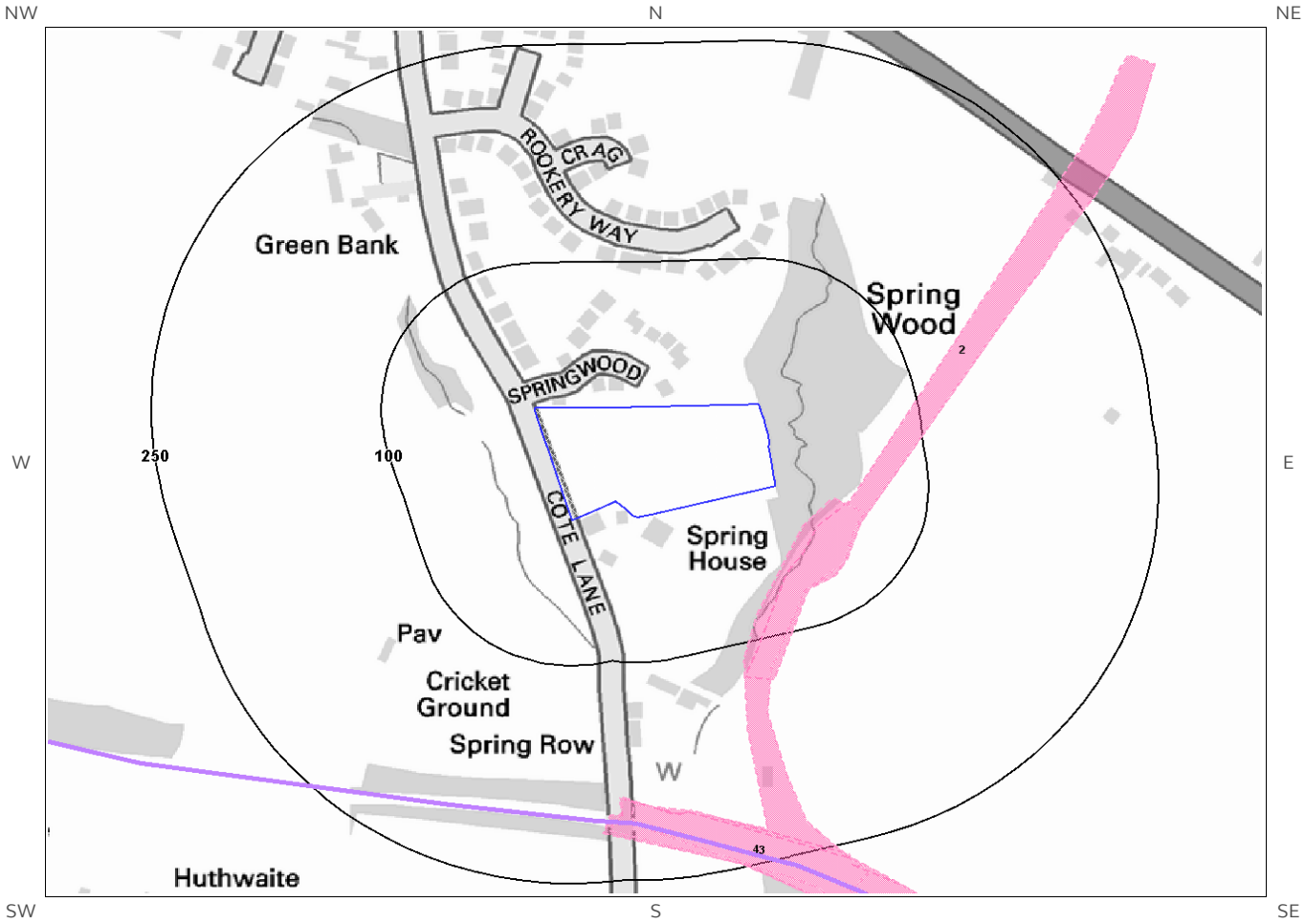
Records of background estimated soil chemistry within 250m of the study site boundary: 6

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
14.0	SW	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
32.0	N	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
39.0	SW	RuralSoil	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.
© OpenStreetMapContributors

- Site Outline
- Search Buffers (m) — 250 — 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	32	SE	429261 400450	Railway Sidings	1951
2	39	SE	429391 400683	Railway Sidings	1903
3	193	S	429289 400330	Railway Sidings	1932
4	194	S	429279 400334	Railway Sidings	1903

Any records that have been identified are represented on the Railways and Tunnels Map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Status
204	S	Abandoned
207	S	Abandoned
211	S	Abandoned

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail 1 rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

Contact Details

e.Michael D Joyce Associates LLP

Telephone: (0)1924 360458
mdja@geoenvironmental.co.uk

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
Main switchboard: 020 7654 8000

Johnson Poole & Bloomer Limited

Harris and Pearson Building, Brettel Lane
Brierley Hill, West Midlands
DY5 3LH
Tel: +44 (0) 1384 262 000
Email:**enquiries.gs@jpb.co.uk**
Website: **www.jpb.co.uk**

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS

Tel: 08456 050505
Website: http://www.ordnancesurvey.co.uk/

Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444
Website:**http://www1.getmapping.com/**

Peter Brett Associates

Caversham Bridge House
Waterman Place
Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail:**reading@pba.co.uk**
Website:**http://www.peterbrett.com/home**

Acknowledgements: Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028]. This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
https://www.groundsure.com/terms-and-conditions-sept-2016/



Michael D Joyce Associates LLP

6, South Parade,
Wakefield, WF1 1LR

Groundsure Reference:	HMD-354-4038823
Your Reference:	Cote_Lane_-_Thurgoland
Report Date	3 Jul 2017
Report Delivery Method:	Email - pdf

Enviro Insight

Address: 429222, 400661,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on (0)1924 360458 quoting the above report reference number.

Yours faithfully,

Michael D Joyce Associates LLP

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**429222, 400661,**
Date:	**3 Jul 2017**
Reference:	**HMD-354-4038823**
Client:	**Michael D Joyce Associates LLP**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	07-Jun-2013
Grid Reference:	429205,400624
Site Size:	0.97ha

Report Reference: HMD-354-4038823
Client Reference: Cote_Lane_-_Thurgoland

Contents Page

Contents Page 3
Overview of Findings 6
Using this report 10
1. Historical Land Use 11
1. Historical Industrial Sites 12
1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping 12
1.2 Additional Information – Historical Tank Database 13
1.3 Additional Information – Historical Energy Features Database 13
1.4 Additional Information – Historical Petrol and Fuel Site Database 13
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database 13
1.6 Potentially Infilled Land 14
2. Environmental Permits, Incidents and Registers Map 15
2. Environmental Permits, Incidents and Registers 16
2.1 Industrial Sites Holding Licences and/or Authorisations 16
2.1.1 Records of historic IPC Authorisations within 500m of the study site: 16
2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site: 16
2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: 16
2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 16
2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 16
2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 17
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations: 17
2.1.8 Records of Licensed Discharge Consents within 500m of the study site: 17
2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 18
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 18
2.2 Dangerous or Hazardous Sites 18
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents 18
2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site: 18
2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site: 18
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990 19
3. Landfill and Other Waste Sites Map 20
3. Landfill and Other Waste Sites 21
3.1 Landfill Sites 21
3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site: 21
3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site: 21
3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site: 22
3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site: 22
3.2 Other Waste Sites 22
3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site: 22
3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site: 22
4. Current Land Use Map 24
4. Current Land Uses 25
4.1 Current Industrial Data 25
4.2 Petrol and Fuel Sites 25
4.3 National Grid High Voltage Underground Electricity Transmission Cables 25
4.4 National Grid High Pressure Gas Transmission Pipelines 26

5. Geology 27
5.1 Artificial Ground and Made Ground 27
5.2 Superficial Ground and Drift Geology 27
5.3 Bedrock and Solid Geology 27
6 Hydrogeology and Hydrology 28
6a. Aquifer Within Superficial Geology 28
6b. Aquifer Within Bedrock Geology and Abstraction Licenses 29
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses 30
6d. Hydrogeology – Source Protection Zones within confined aquifer 31
6e. Hydrology – Detailed River Network and River Quality 32
6.Hydrogeology and Hydrology 33
6.1 Aquifer within Superficial Deposits 33
6.2 Aquifer within Bedrock Deposits 33
6.3 Groundwater Abstraction Licences 34
6.4 Surface Water Abstraction Licences 34
6.5 Potable Water Abstraction Licences 35
6.6 Source Protection Zones 35
6.7 Source Protection Zones within Confined Aquifer 35
6.8 Groundwater Vulnerability and Soil Leaching Potential 35
6.9 River Quality 36
6.9.1 Biological Quality: 36
6.9.2 Chemical Quality: 36
6.10 Detailed River Network 36
6.11 Surface Water Features 37
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea) 38
7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map 39
7 Flooding 40
7.1 River and Coastal Zone 2 Flooding 40
7.2 River and Coastal Zone 3 Flooding 40
7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating 40
7.4 Flood Defences 40
7.5 Areas benefiting from Flood Defences 40
7.6 Areas benefiting from Flood Storage 41
7.7 Groundwater Flooding Susceptibility Areas 41
7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes 41
7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions? 41
7.8 Groundwater Flooding Confidence Areas 41
8. Designated Environmentally Sensitive Sites Map 42
8. Designated Environmentally Sensitive Sites 43
8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 43
8.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 43
8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 43
8.4 Records of Special Protection Areas (SPA) within 2000m of the study site: 43
8.5 Records of Ramsar sites within 2000m of the study site: 43
8.6 Records of Ancient Woodland within 2000m of the study site: 44
8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site: 45
8.8 Records of World Heritage Sites within 2000m of the study site: 45
8.9 Records of Environmentally Sensitive Areas within 2000m of the study site: 45

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site: 45
8.11 Records of National Parks (NP) within 2000m of the study site: 45
8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:....45
8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:....46
8.14 Records of Green Belt land within 2000m of the study site:....46
9. Natural Hazards Findings 47
9.1 Detailed BGS GeoSure Data....47
9.1.1 Shrink Swell....47
9.1.2 Landslides....47
9.1.3 Soluble Rocks....47
9.1.4 Compressible Ground....48
9.1.5 Collapsible Rocks....48
9.1.6 Running Sand....48
9.2 Radon....48
9.2.1 Radon Affected Areas....48
9.2.2 Radon Protection....49
10. Mining 50
10.1 Coal Mining....50
10.2 Non-Coal Mining....50
10.3 Brine Affected Areas 50
Contact Details 51
Standard Terms and Conditions 53

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	2	10	20
1.2 Additional Information – Historical Tank Database	0	0	0	3
1.3 Additional Information – Historical Energy Features Database	0	0	3	3
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	4	0
1.6 Potentially Infilled Land	0	0	5	16

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	1
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	3
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	1
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	1	1	2
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	3

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	1	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	2
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	None
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	3
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	1
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	0	1	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	No	No	No	Yes
6.10 Detailed River Network entries within 500m of the site	0	2	4	6	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	6	18
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	1	1	1
8.14 Records of Green Belt land	0	1	0	0	3	1

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Negligible
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	Yes
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

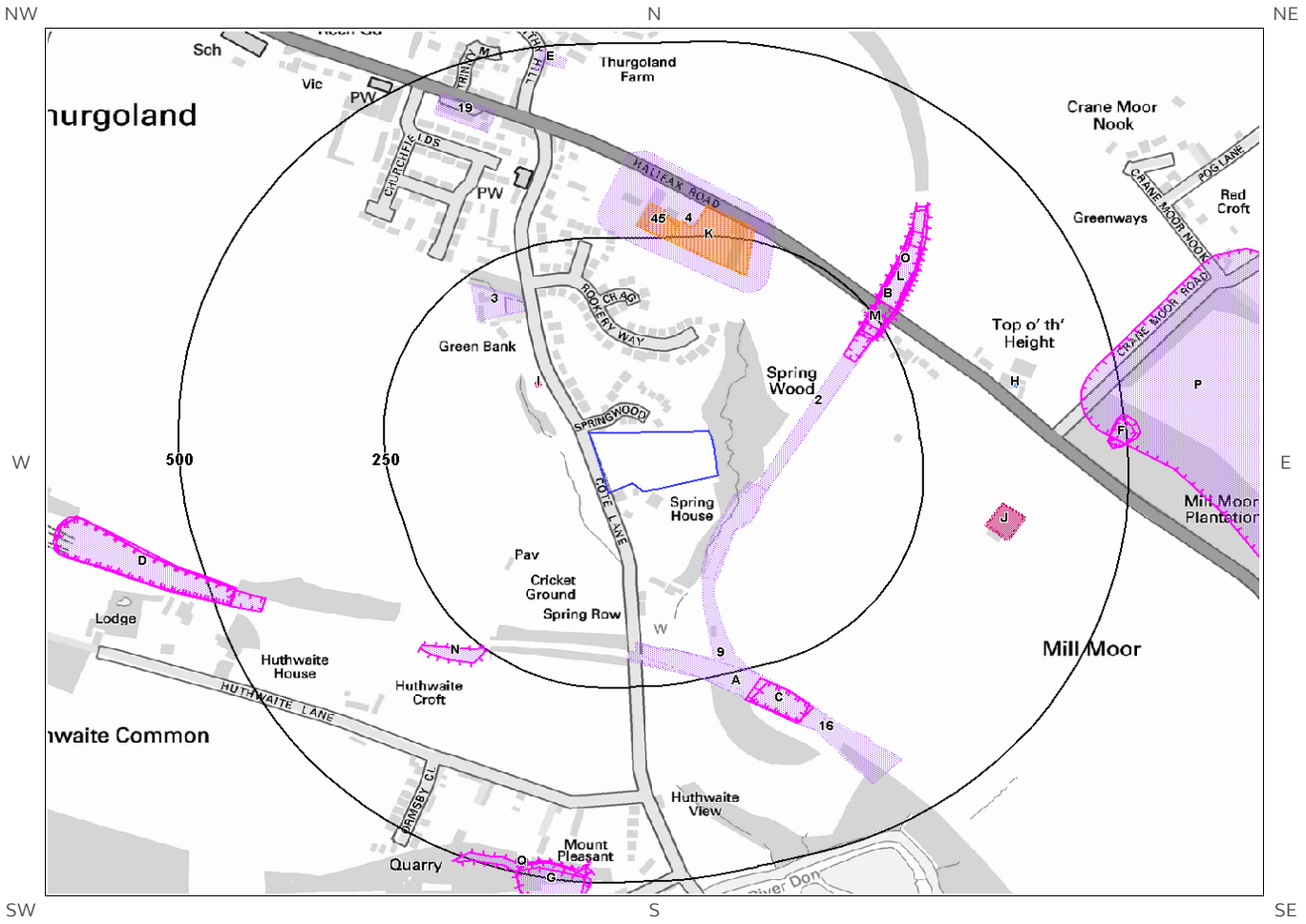
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 32

ID	Distance [m]	Direction	Use	Date
1	32	SE	Railway Sidings	1951
2	39	SE	Railway Sidings	1903
3	175	NW	Wire Mill	1891
4	183	N	Garage	1965
5B	190	NE	Cuttings	1891
6A	193	S	Railway Sidings	1932
7A	194	S	Railway Sidings	1903
8B	222	NE	Cuttings	1903
9	222	S	Railway Building	1951
10L	227	NE	Cuttings	1932
11M	234	NE	Cuttings	1951
12N	249	SW	Unspecified Heap	1951
13C	266	S	Cuttings	1891
14C	266	S	Cuttings	1932
15C	266	S	Cuttings	1903
16	266	S	Railway Sidings	1891
17O	267	NE	Cuttings	1951
18C	273	S	Cuttings	1951
19	405	N	Unspecified Depot	1987
20D	440	W	Cuttings	1891
21P	451	E	Opencast Workings	1965
22D	470	W	Cuttings	1932
23D	470	W	Cuttings	1903
24E	470	N	Smithy	1891
25E	470	N	Smithy	1903
26D	472	W	Cuttings	1951
27F	477	E	Refuse Heap	1932
28G	478	S	Unspecified Quarry	1951
29Q	479	S	Unspecified Disused Quarry	1987
30F	479	E	Refuse Heap	1951
31G	480	S	Unspecified Quarry	1932
32G	480	S	Unspecified Quarry	1903

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 3

ID	Distance (m)	Direction	Use	Date
33H	372	E	Unspecified Tank	1980
34H	372	E	Unspecified Tank	1988
35H	374	E	Unspecified Tank	1993

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 6

ID	Distance (m)	Direction	Use	Date
36I	85	NW	Electricity Substation	1980
37I	85	NW	Electricity Substation	1988
38I	85	NW	Electricity Substation	1993
39J	330	E	Electricity Substation	1980
40J	330	E	Electricity Substation	1988
41J	334	E	Electricity Substation	1993

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 4

ID	Distance (m)	Direction	Use	Date
42K	204	N	Garage	1988
43K	204	N	Garage	1980
44K	205	N	Garage	1993
45	246	N	Garage	1959

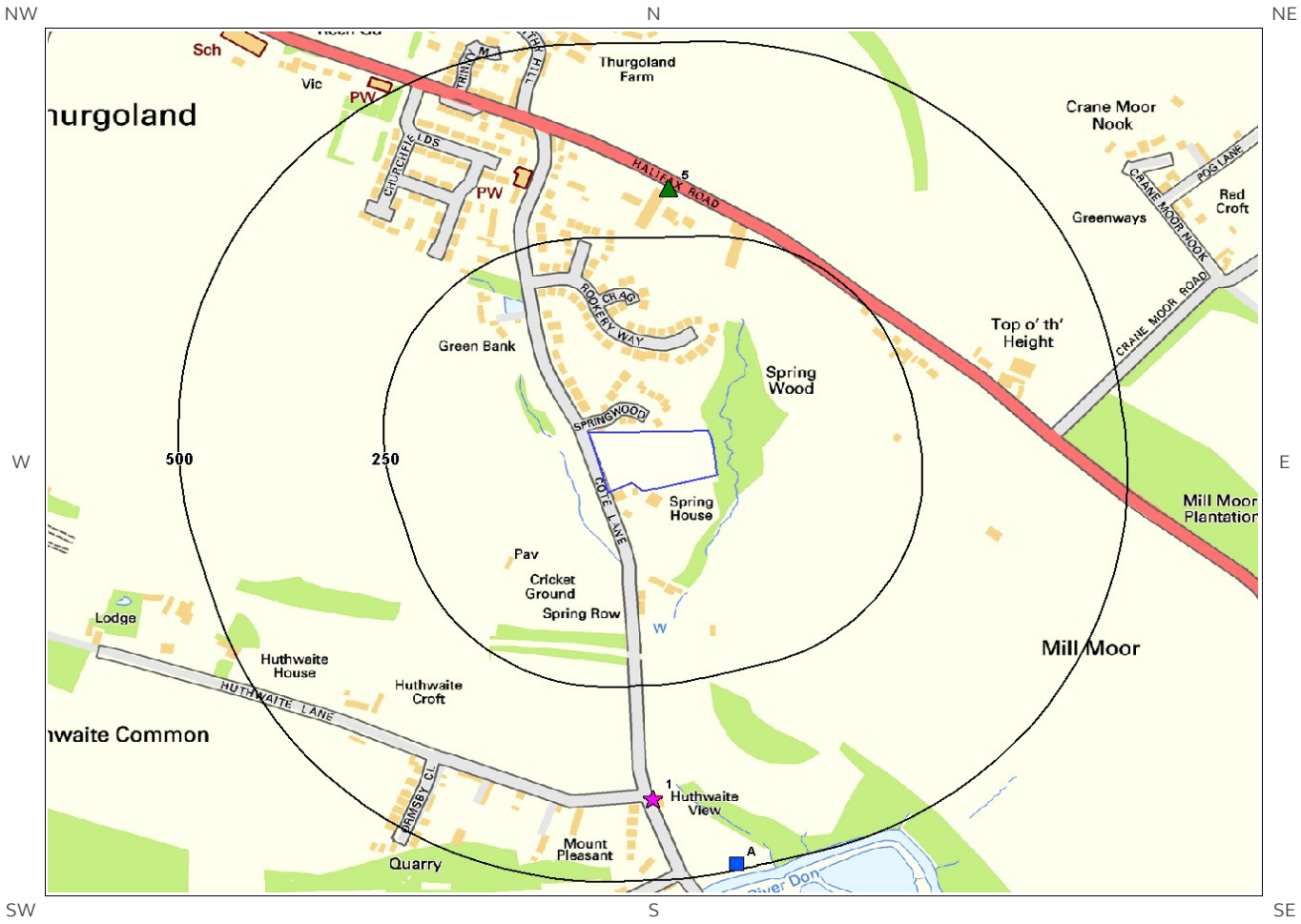
1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 21

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
46B	190	NE	Cuttings	1891
47B	222	NE	Cuttings	1903
48L	227	NE	Cuttings	1932
49M	234	NE	Cuttings	1951
50N	249	SW	Unspecified Heap	1951
51C	266	S	Cuttings	1891
52C	266	S	Cuttings	1903
53C	266	S	Cuttings	1932
54O	267	NE	Cuttings	1951
55C	273	S	Cuttings	1951
56D	440	W	Cuttings	1891
57P	451	E	Opencast Workings	1965
58D	470	W	Cuttings	1932
59D	470	W	Cuttings	1903
60D	472	W	Cuttings	1951
61F	477	E	Refuse Heap	1932
62G	478	S	Unspecified Quarry	1951
63Q	479	S	Unspecified Disused Quarry	1987
64F	479	E	Refuse Heap	1951
65G	480	S	Unspecified Quarry	1903
66G	480	S	Unspecified Quarry	1932

2. Environmental Permits, Incidents and Registers Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

- Site Outline
- Search Buffers (m) 250 / 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
5	311	N	429217 400967	Address: Ernest Thorpe & Co. Limited, Central Garage, Halifax Road, Thurgoland, Sheffield, S35 7AJ Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

3

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
2A	492	S	429300 400100	Address: SSO AT THURGOLAND PUMPING STATION Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 2992 Permit Version: 1	Receiving Water: RIVER DON Status: TRANSFERRED FROM R(PP)A 1951-1961 Issue date: 05/11/1973 Effective Date: 09-Nov-1973 Revocation Date: 30/03/2007
3A	492	S	429300 400100	Address: SSO AT THURGOLAND PUMPING STATION Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 2992 Permit Version: 2	Receiving Water: RIVER DON Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 21/03/2005 Effective Date: 31-Mar-2007 Revocation Date: 23/03/2010
4A	492	S	429300 400100	Address: SSO AT THURGOLAND PUMPING STATION Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 2992 Permit Version: 3	Receiving Water: RIVER DON Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 24/03/2010 Effective Date: 24-Mar-2010 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

1

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	396	S	429197 400183	Incident Date: 12-Jun-2002 Incident Identification: 84318 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

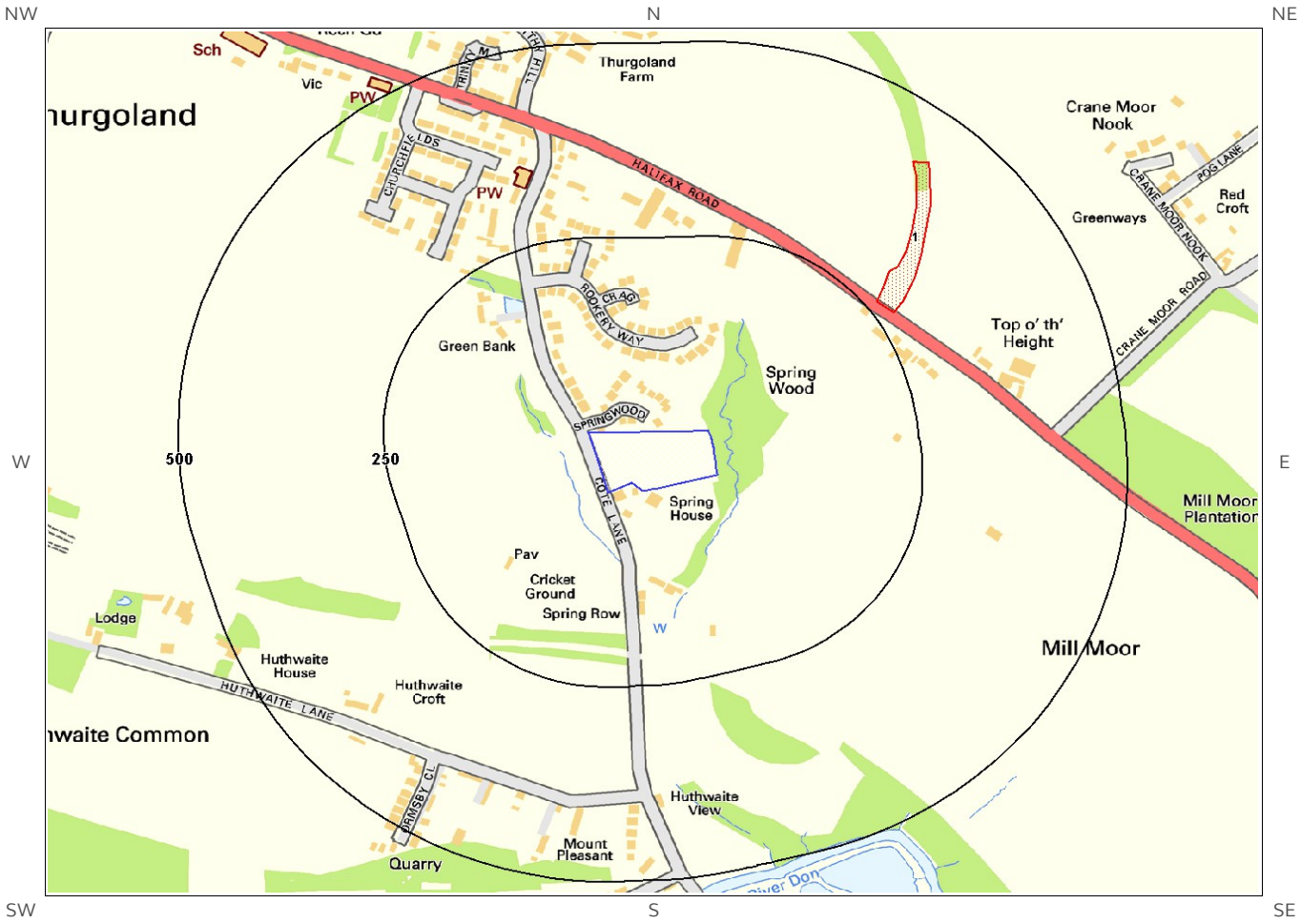
Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

4

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
1	264	NE	429500 400800	Site Address: Disused Railway Cutting off A629, Halifax Road, Thurgoland, Barnsley Waste Licence: Yes Site Reference: WD20 Eng5, WD2 B13, 2B13(32), 4400/B13 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 26-Nov-1980 Licence Surrendered: 31-Dec-1990 Licence Holder Address: - Operator: South Yorkshire County Council Licence Holder: South Yorkshire County Council First Recorded: 31-Dec-1980 Last Recorded: 31-Dec-1990
Not shown	922	NE	430100 401100	Site Address: Lionell Hill, Cranemoor Road, Crane Moor Waste Licence: - Site Reference: 4400/(31) Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: L Airstone Licence Holder: L Airstone First Recorded: 31-Dec-1976 Last Recorded: 31-Dec-1980
Not shown	1157	S	428700 399400	Site Address: Well Hill Road, Green Moor, Penistone Waste Licence: - Site Reference: 4400/(122) Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1483	SW	427700 399800	Site Address: California Quarry, Greenmoor, Near. Penistone Waste Licence: Yes Site Reference: WD20 B97, 4400/B97, 20B97(63) Waste Type: Industrial, Commercial, Liquid, sludge Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 01-Jul-1977 Licence Surrendered: 17-Apr-1991 Licence Holder Address: Green Road, Penistone Operator: David Brown Gear Licence Holder: David Brown Gear Industrials Limited First Recorded: 31-Jul-1977 Last Recorded: 31-Mar-1981

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

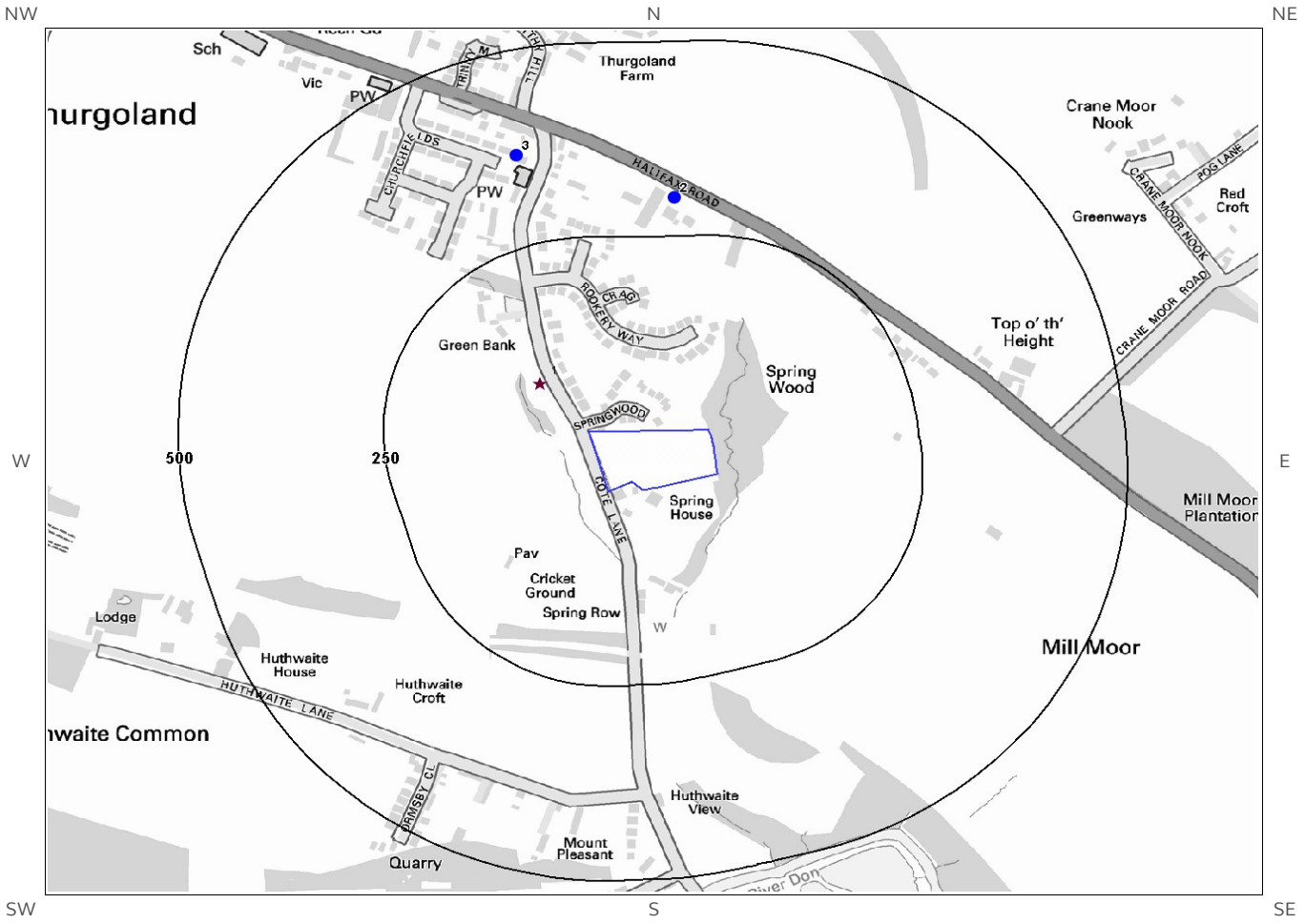
3

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1088	S	429110 399490	Site Address: 1, Low Forge, Wortley, Sheffield, South Yorkshire, S35 7DN Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 000167 EPR reference: - Operator: Haigh Brian Waste Management licence No: 65380 Annual Tonnage: 0.0	Issue Date: 13/12/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bh Scrap Metals Correspondence Address: 1, Low Forge, Wortley, Sheffield, South Yorkshire, S35 7DN

ID	Distance (m)	Direction	NGR	Details	
Not shown	1088	S	429110 399490	Site Address: 1, Low Forge, Wortley, Sheffield, South Yorkshire, S35 7DN Type: 75kte Vehicle Depollution Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 000167 EPR reference: EA/EPR/CP3499LU/V002 Operator: Haigh Brian Waste Management licence No: 65380 Annual Tonnage: 0.0	Issue Date: 12/13/2004 Effective Date: - Modified: 12/22/2008 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: B H Scrap Metals Correspondence Address: 1, Low Forge, Wortley, Sheffield, South Yorkshire, S35 7DN
Not shown	1088	S	429110 399490	Site Address: 1, Low Forge, Wortley, Sheffield, South Yorkshire, S35 7DN Type: 75kte Vehicle Depollution Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BHS002 EPR reference: EA/EPR/FP3393LA/T001 Operator: B H Scrap Metals Ltd Waste Management licence No: 65380 Annual Tonnage: 7500.0	Issue Date: 13/12/2004 Effective Date: 05/01/2010 Modified: 05/11/2009 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: B H Scrap Metals, Forge Lane Correspondence Address: -

4. Current Land Use Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 1

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	87	NW	Electricity Sub Station	429060 400717	Electricity Sub Station, S35	Electrical Features	Infrastructure and Facilities

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
2	300	N	429224 400956	Unbranded	Thorpes Transport, A629, A629, Thurgoland, Sheffield, South Yorkshire, S36 2SQ	No	Open
3	367	N	429031 401010	Obsolete	Mathews Haulage, Huddersfield Road, Huddersfield Road, Thurgoland, Sheffield, South Yorkshire, S36	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.3 Bedrock and Solid Geology

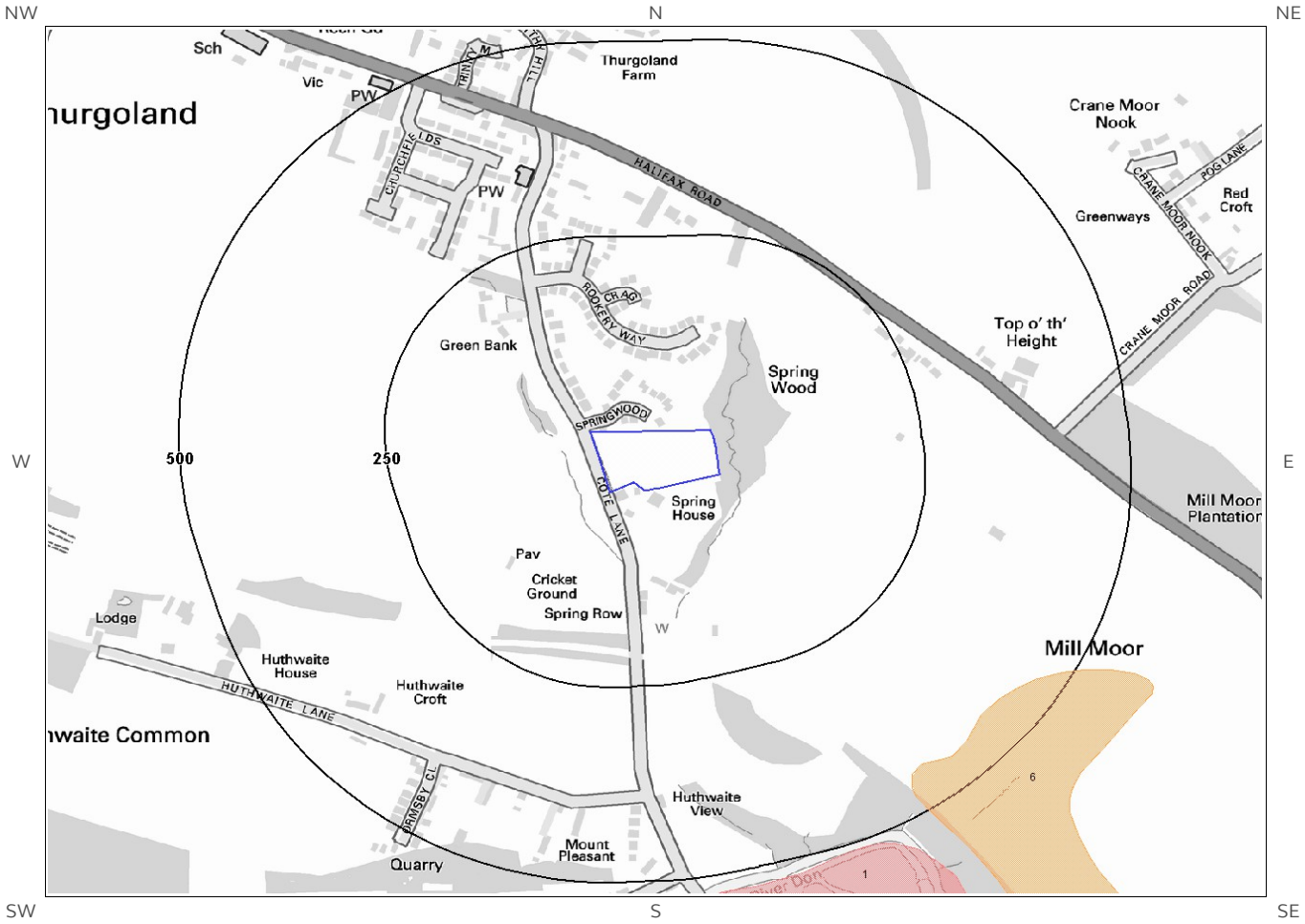
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
PF-SDST	PENISTONE FLAGS	SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PF-SDST	PENISTONE FLAGS	SANDSTONE
PF-SDST	PENISTONE FLAGS	SANDSTONE
PLCM-MDSS	PENNINE LOWER COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE

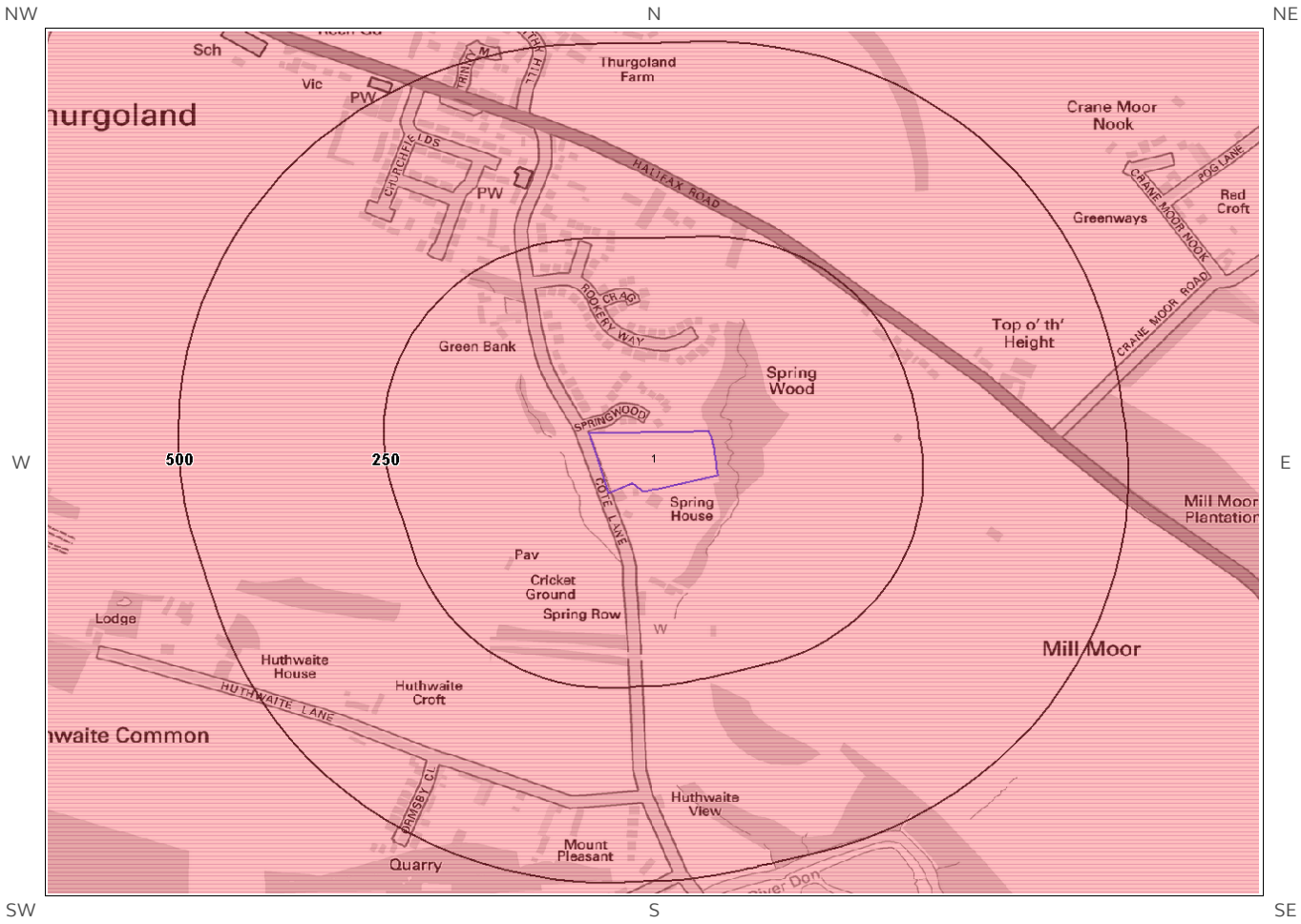
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



6b. Aquifer Within Bedrock Geology and Abstraction Licenses



© Crown copyright and database rights 2017
Ordnance Survey license 100035207.

Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

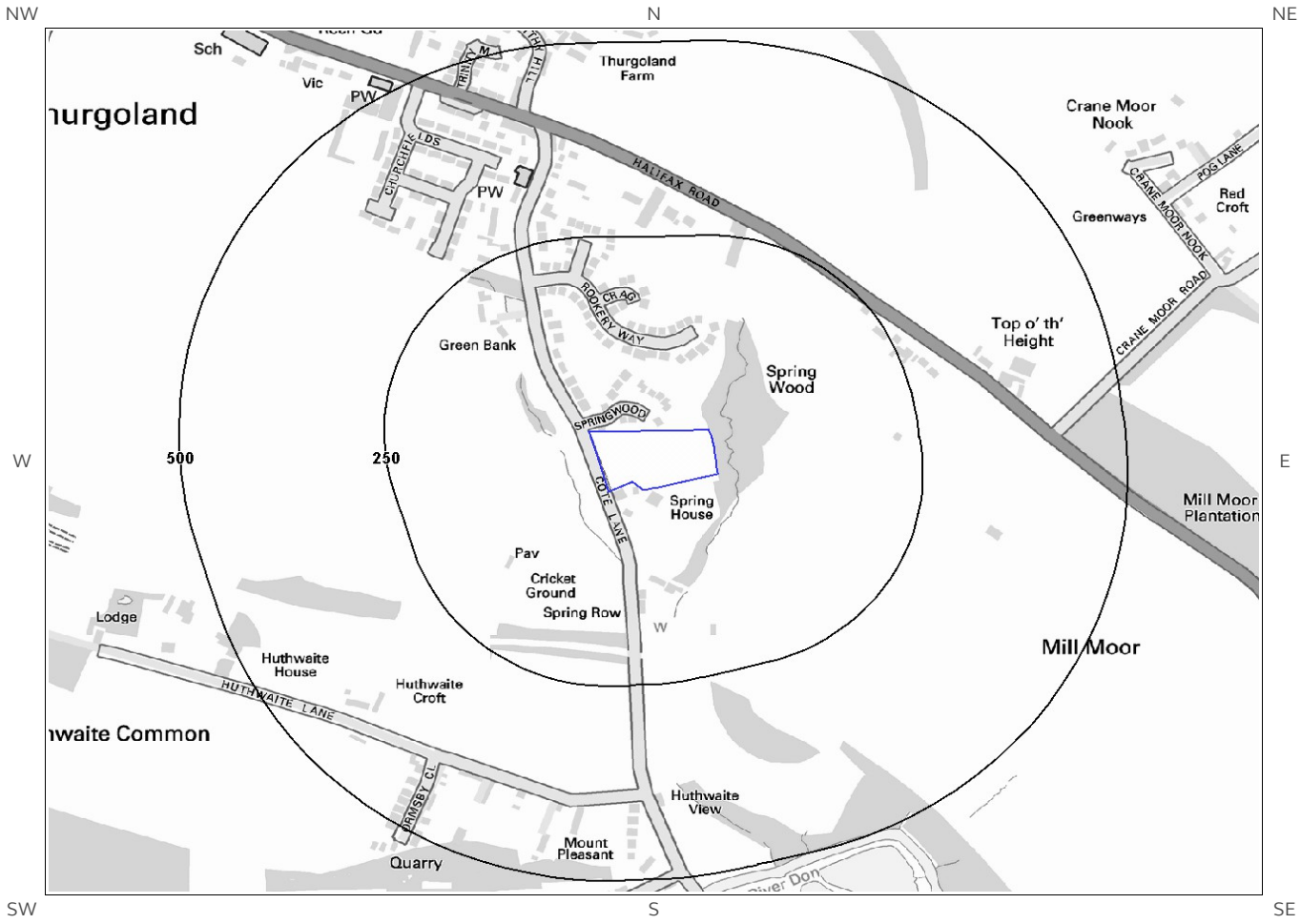
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



© Crown copyright and database rights 2017
Ordnance Survey license 100035207.

Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

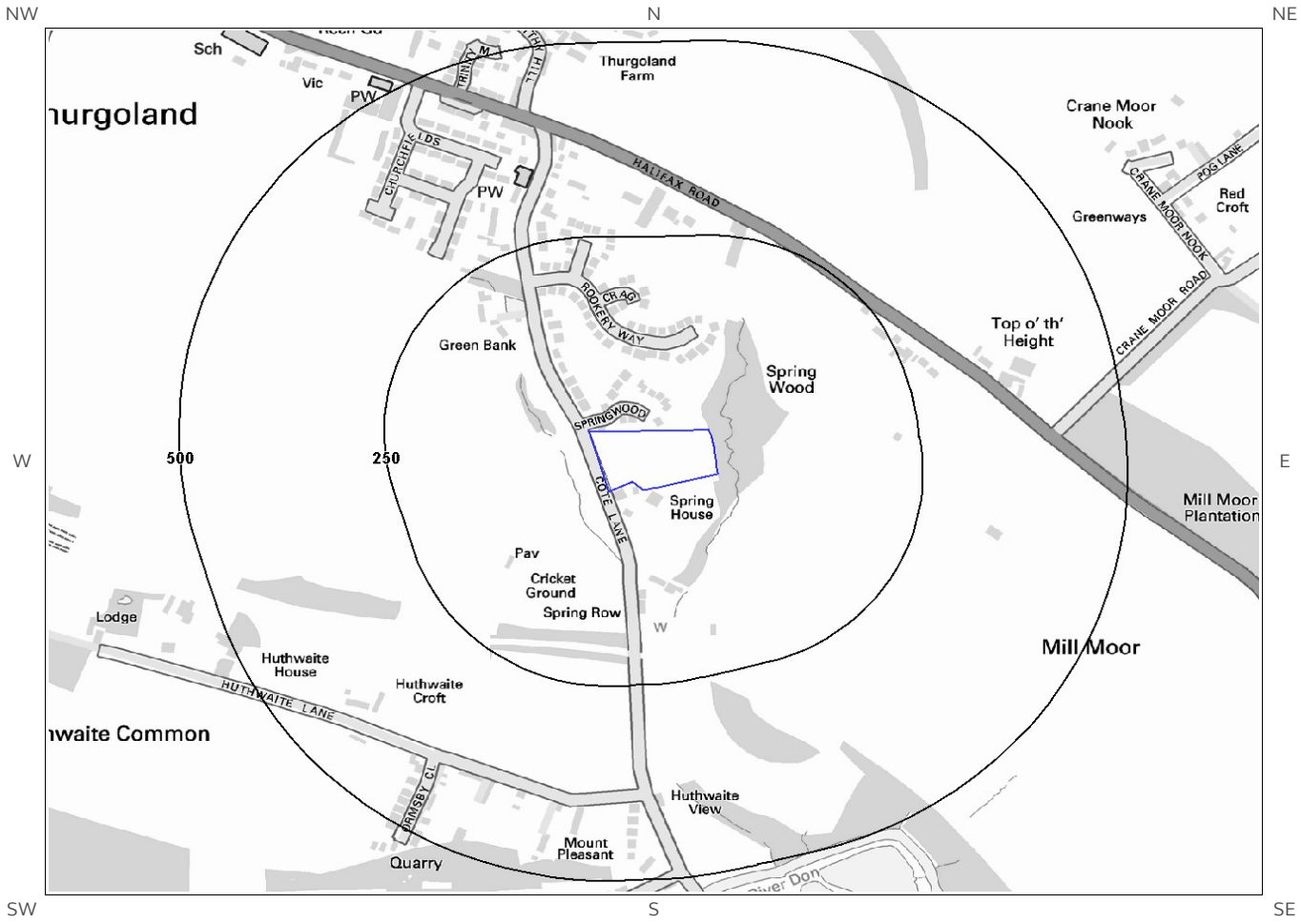
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



© Crown copyright and database rights 2017
Ordnance Survey license 100035207.

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

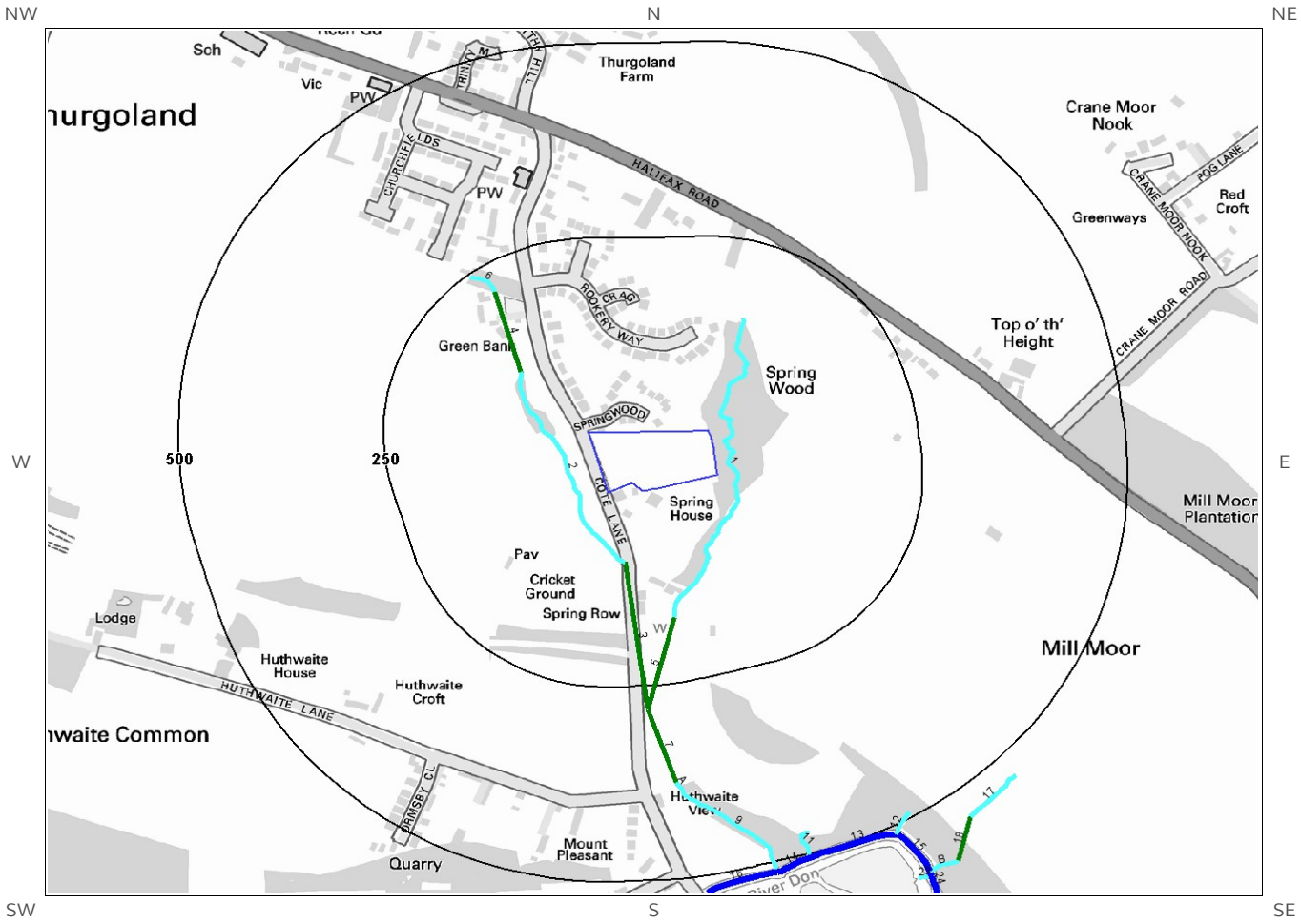
Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

Site Outline

250
500
Search Buffers (m)

6e. Hydrology – Detailed River Network and River Quality



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

250
500
Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
6	443	SE	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1864	E	431020 399940	Status: Historical Licence No: 2/27/08/134 Details: Spray Irrigation - Direct Direct Source: Groundwaters Point: Borehole- Coal Measures - Wortley-Sheffield Data Type: Point Name: WORTLEY GOLF CLUB	Annual Volume (m^3): 7000 Max Daily Volume (m^3): 89 Original Application No: 8106 Original Start Date: 9/3/2004 Expiry Date: 31/3/2017 Issue No: 3 Version Start Date: 13/2/2008 Version End Date:
Not shown	1953	E	431100 399900	Status: Historical Licence No: 2/27/08/108 Details: Spray Irrigation - Direct Direct Source: Groundwaters Point: Borehole Data Type: Point Name: WORTLEY GOLF CLUB	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6469 Original Start Date: 24/6/1994 Expiry Date: 30/09/2003 Issue No: 100 Version Start Date: 3/2/1999 Version End Date:
Not shown	1953	E	431100 399900	Status: Historical Licence No: 2/27/08/108 Details: Spray Irrigation - Direct Direct Source: Groundwaters Point: Borehole - Coal Measures - Wortley Sheffield Data Type: Point Name: WORTLEY GOLF CLUB	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6469 Original Start Date: 24/6/1994 Expiry Date: 30/9/2003 Issue No: 100 Version Start Date: 3/2/1999 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1231	W	427890 400620	Status: Historical Licence No: 2/27/05/201 Details: Hydroelectric Power Generation Direct Source: Surface Water Point: River Don - The Old Mill - Thurgoland Data Type: Point Name: ROLLINSON	Annual Volume (m^3): 10249200 Max Daily Volume (m^3): 28080 Application No: 8268 Original Start Date: 4/9/2007 Expiry Date: 31/3/2017 Issue No: 2 Version Start Date: 5/3/2008 Version End Date:

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
330	NE	Minor Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

					Chemical Quality Grade				
ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
Not shown	1132	W	428063 401058	River Name: River Don Reach: Cheesebottom Stw Little Don River End/Start of Stretch: Start of Stretch NGR	A	A	A	A	A
Not shown	1132	W	428063 401058	River Name: River Don Reach: Cubley Brook Cheesebottom Stw End/Start of Stretch: End of Stretch NGR	A	A	A	A	A

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	14	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	35	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
3	91	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
4	113	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
5	166	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
6	215	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
7	281	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
8A	377	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
9	382	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10A	382	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11	471	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
12	493	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

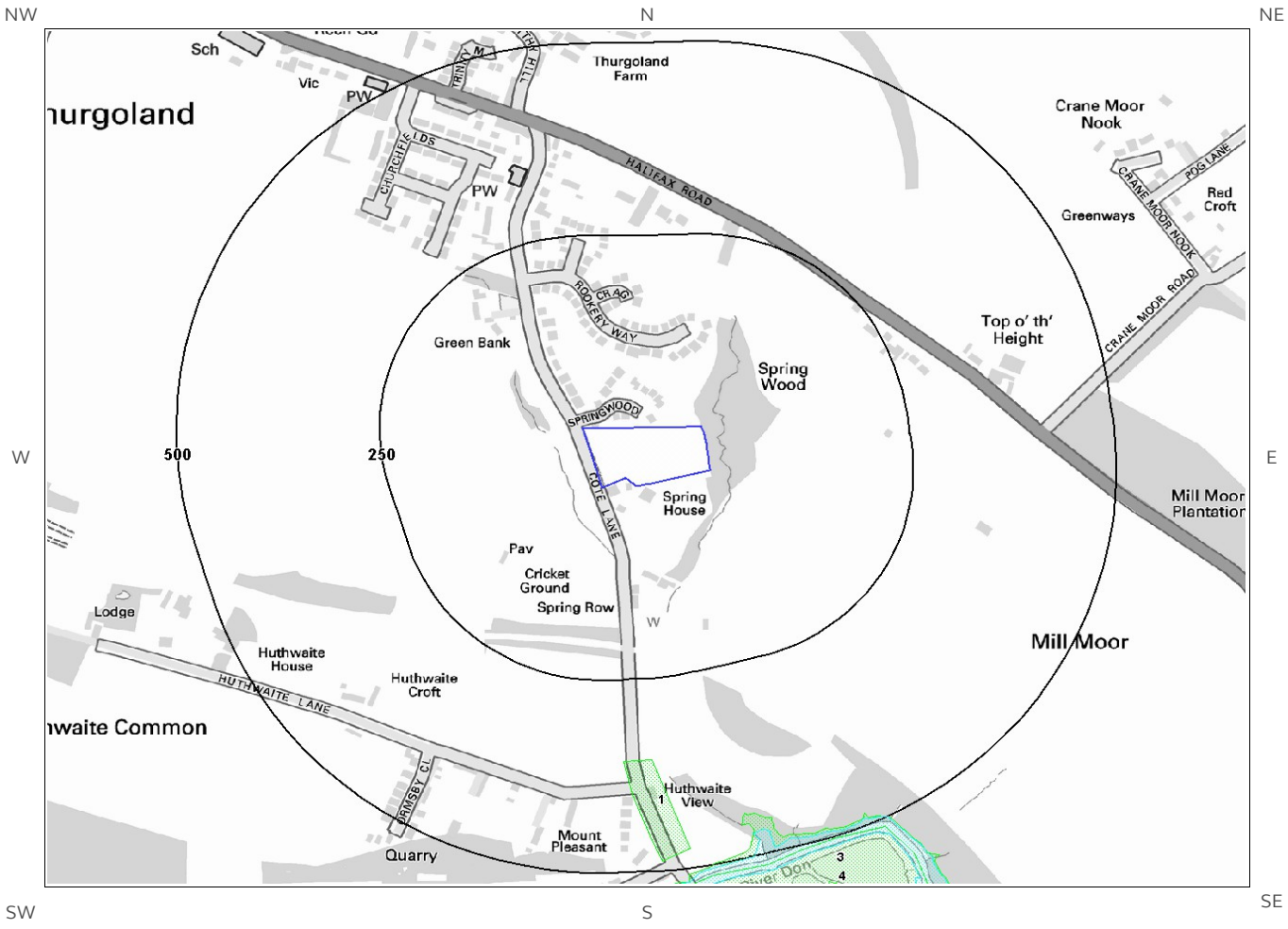
6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
14	E
35	W
46	W
138	S
215	NW

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

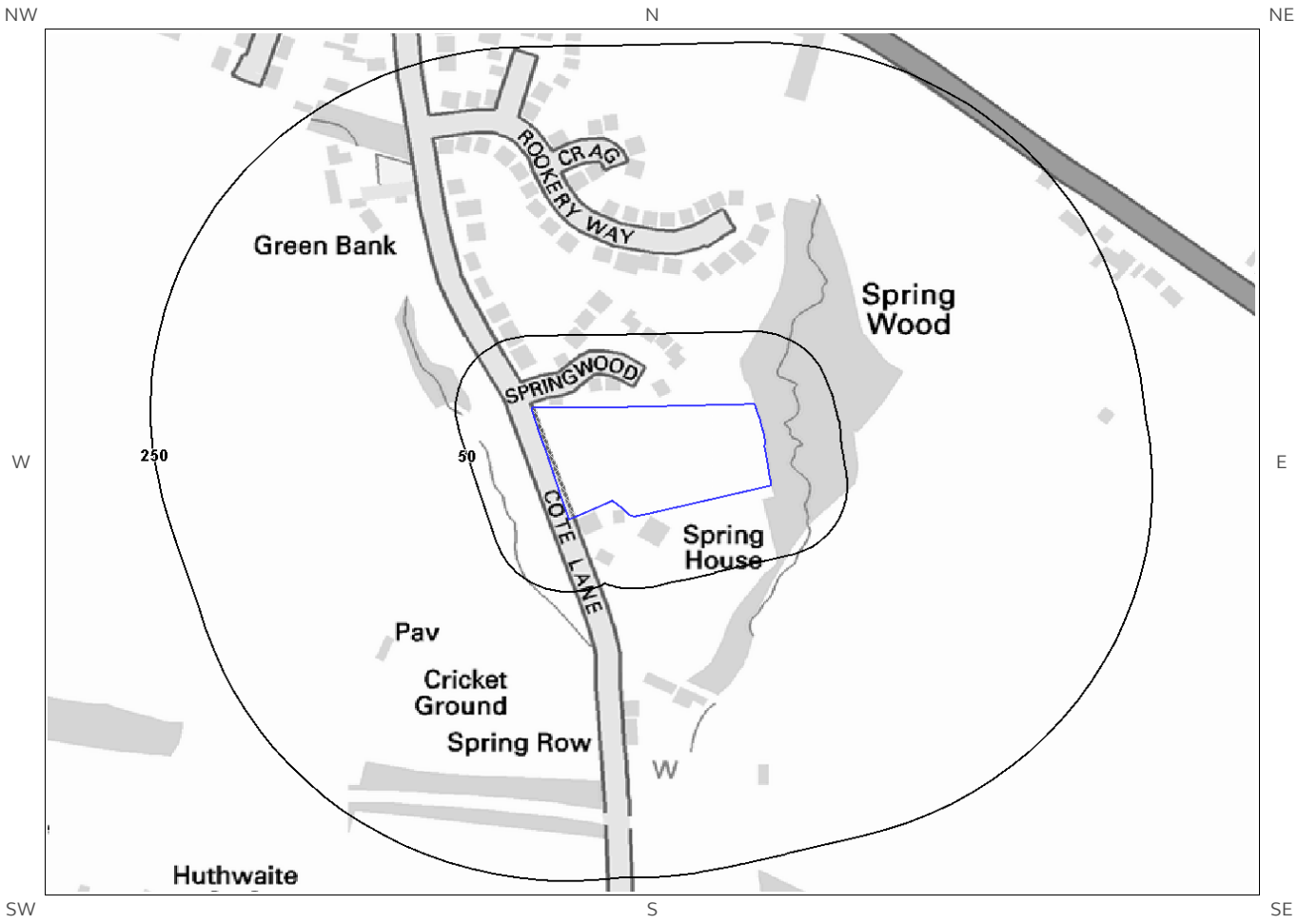
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

100 250 Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? No

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

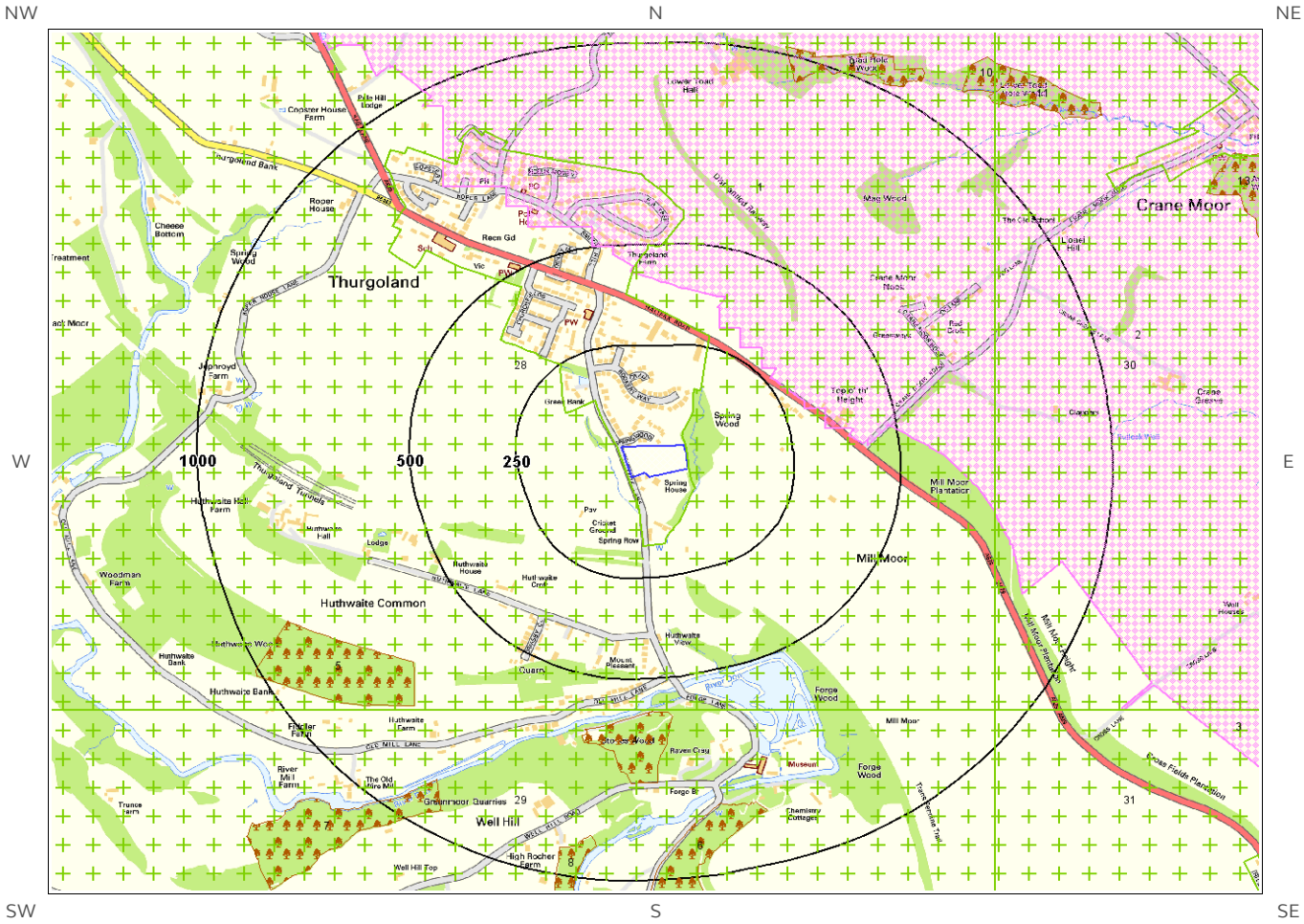
7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



© Crown copyright and database rights 2017.
Ordnance Survey license 100035207.

Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?	Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
4	581	S	UNKNOWN	Ancient and Semi-Natural Woodland
5	688	SW	UNKNOWN	Ancient and Semi-Natural Woodland
6	825	S	UNKNOWN	Ancient and Semi-Natural Woodland
7	878	SW	UNKNOWN	Ancient and Semi-Natural Woodland
8	893	S	UNKNOWN	Ancient Replanted Woodland
9	941	N	UNKNOWN	Ancient and Semi-Natural Woodland
10	1097	NE	UNKNOWN	Ancient Replanted Woodland
11	1120	NE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1337	N	UNKNOWN	Ancient Replanted Woodland
13	1381	NE	UNKNOWN	Ancient Replanted Woodland
Not shown	1551	W	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1591	NE	UNKNOWN	Ancient Replanted Woodland
Not shown	1617	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1671	N	UNKNOWN	Ancient Replanted Woodland
Not shown	1690	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1717	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1724	S	UNKNOWN	Ancient Replanted Woodland
Not shown	1806	NE	UNKNOWN	Ancient Replanted Woodland
Not shown	1818	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1829	S	UNKNOWN	Ancient Replanted Woodland
Not shown	1839	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1845	S	UNKNOWN	Ancient Replanted Woodland
Not shown	1869	NE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1895	NE	UNKNOWN	Ancient Replanted Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

3

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	265	NE	Existing	DEFRA
2	723	E	Existing	DEFRA
3	1317	SE	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

5

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
28	1	E	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
29	577	S	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
30	723	E	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
31	940	SE	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
Not shown	1696	S	Liverpool, Manchester and West Yorks Greenbelt	Sheffield District (B)

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Possibility of slope instability problems after major changes in ground conditions. Consideration should be given to stability if changes to drainage or excavations take place. Possible increase in construction cost to reduce potential slope stability problems. Existing property no significant increase in insurance risk due to natural slope instability problems.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand*[*] hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Sheffield Area	Vein Mineral/Iron ore	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

Past underground mine workings may occur. The rock types present in these areas are such that small mineral veins may be present on which it is possible that small scale mining has been undertaken and/or it is possible that limited underground extraction of other materials may have occurred. All such occurrences are likely to be of minor localised extent and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

e.Michael D Joyce Associates LLP
Telephone: (0)1924 360458
mdja@geoenvironmental.co.uk

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Barnsley Metropolitan Borough Council
Phone: 01226 770770
Web: http://www.barnsley.gov.uk/
Address: PO Box 634, Barnsley, South Yorkshir, S70 9GG

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.
PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
https://www.groundsure.com/terms-and-conditions-sept-2016

APPENDIX 5

Historical Mapping



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1893**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1893
Revised 1893
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1905**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1905
Revised 1905
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

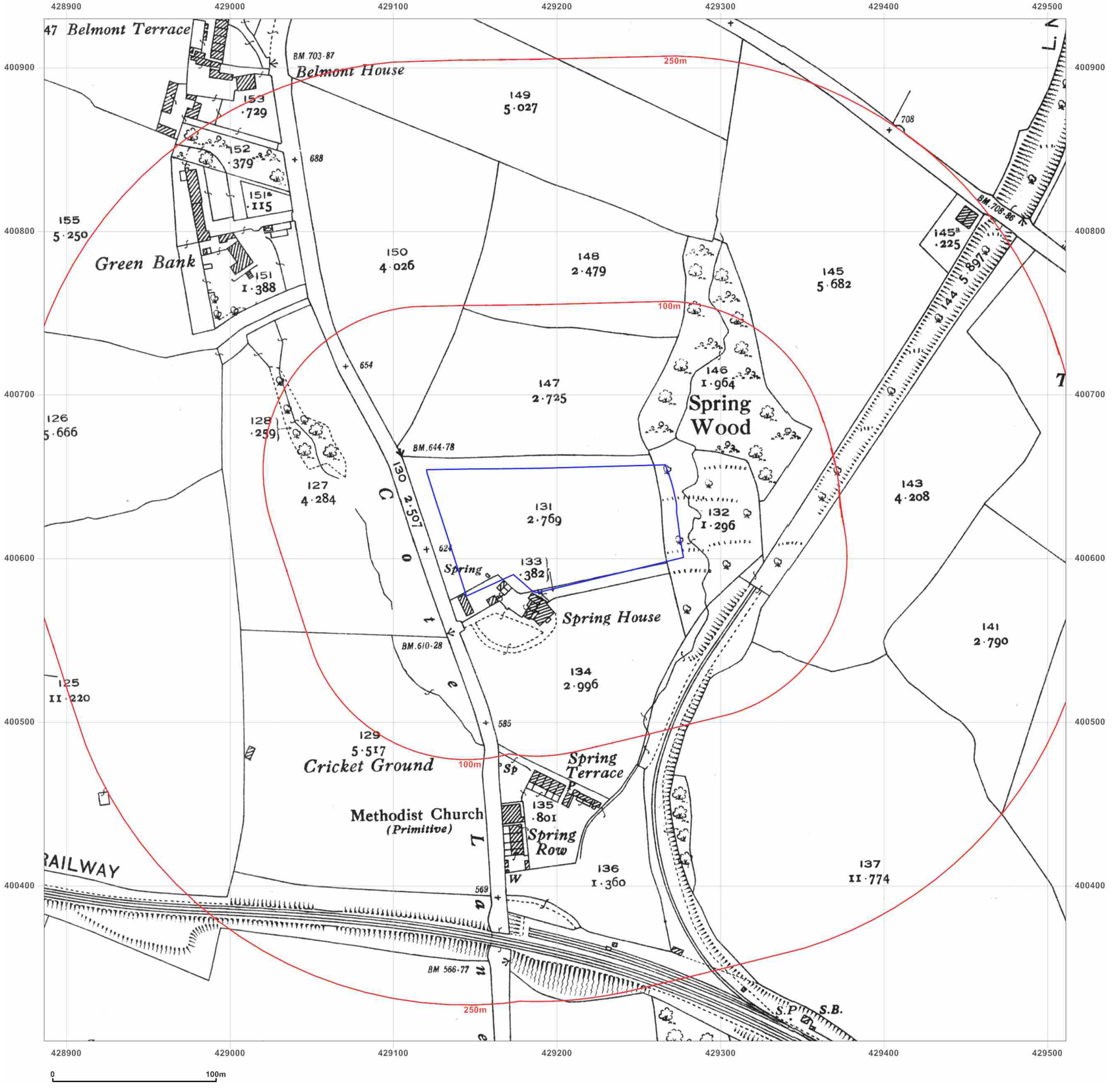
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1931**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1931
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1959**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1960
Levelled 1930

Groundsure INSIGHTS

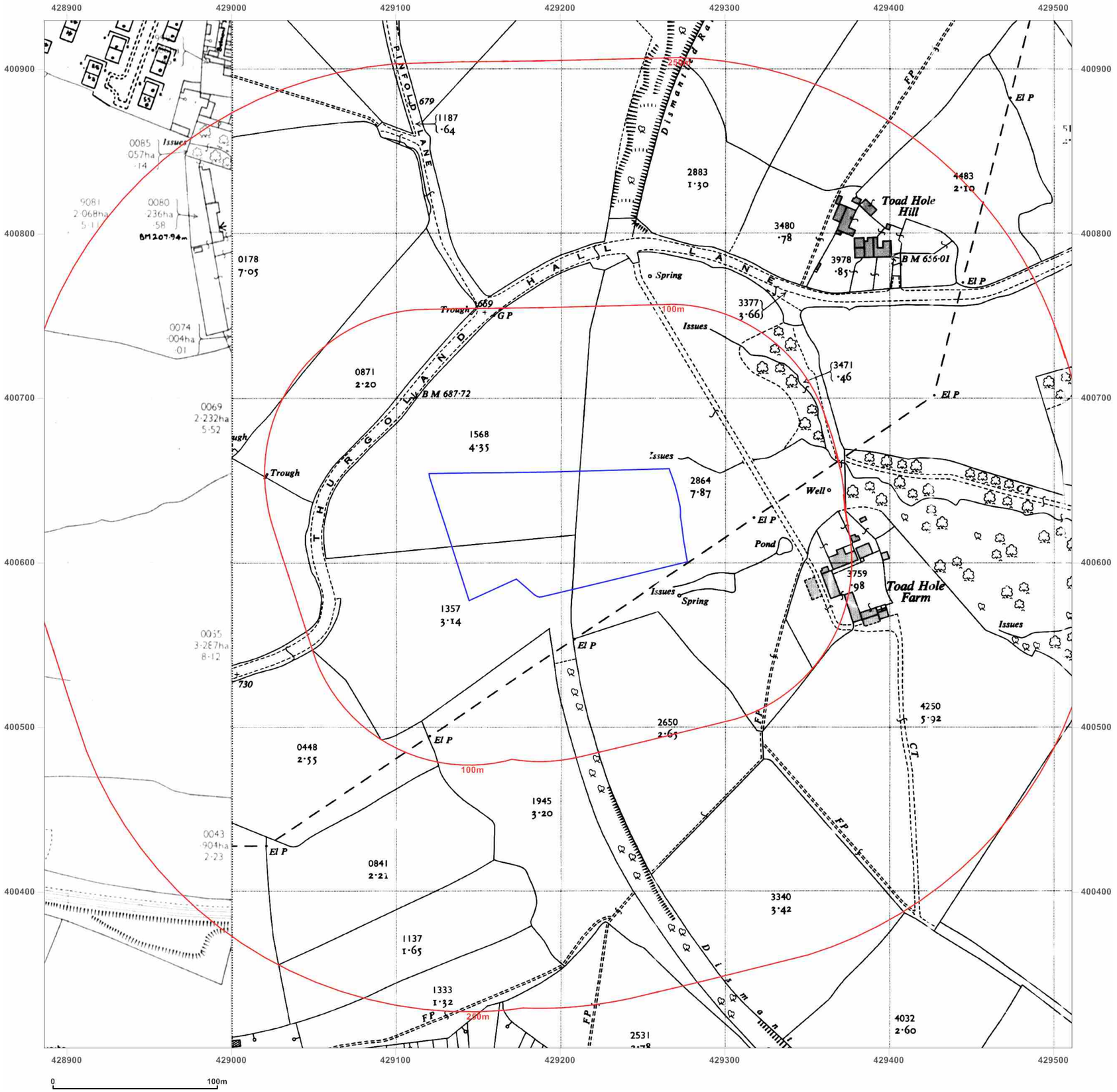
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1959-1960**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled 1959

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

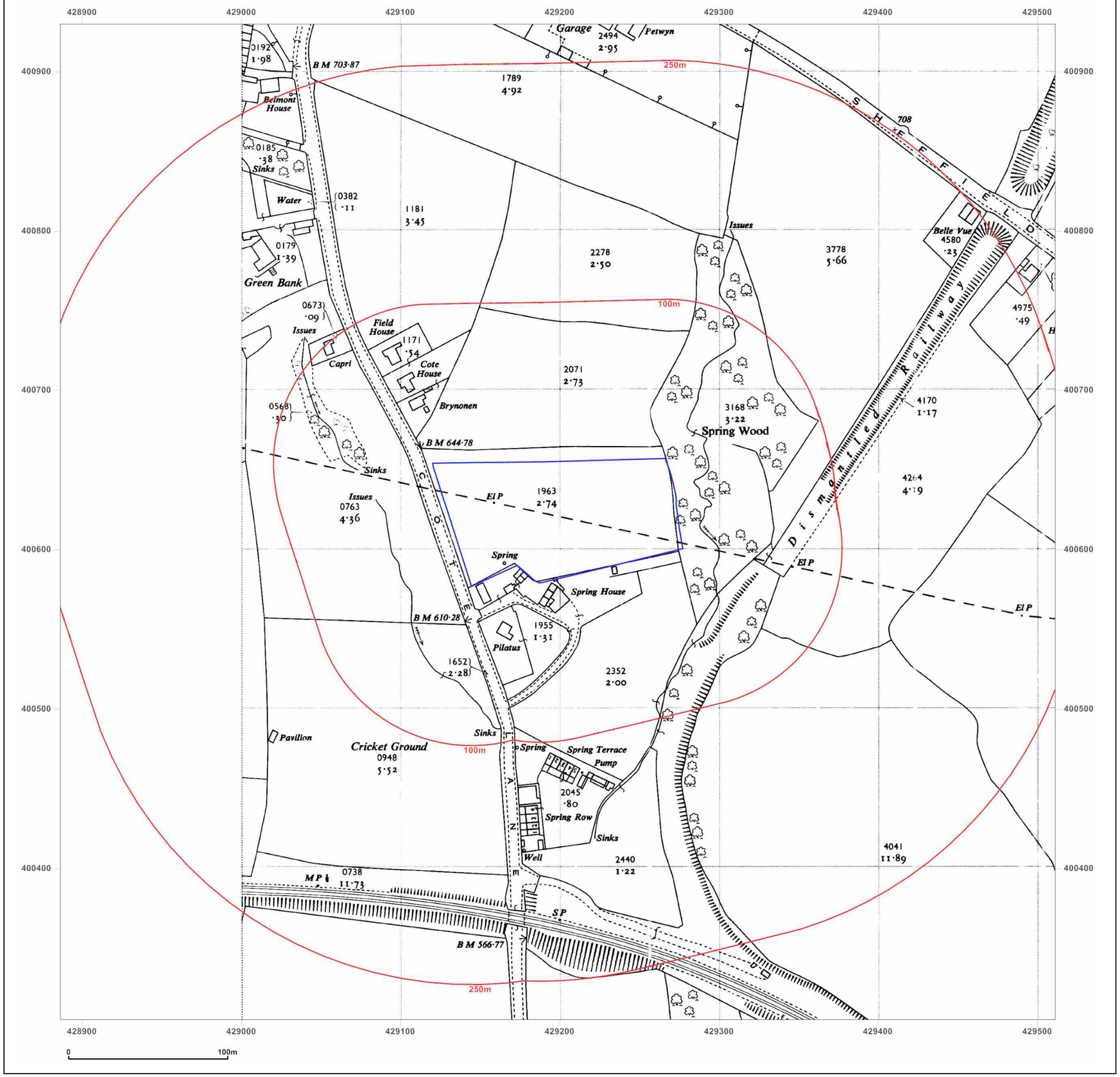
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1977-1980**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1980
Levelled 1963

Groundsure INSIGHTS

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

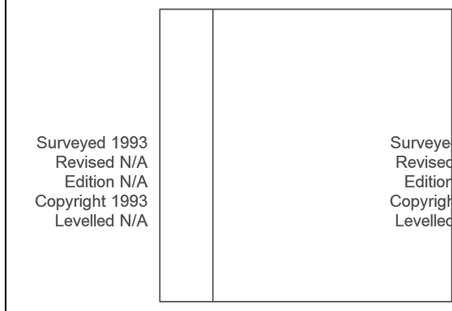
Map Name: National Grid

Map date: **1988-1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Groundsure INSIGHTS

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

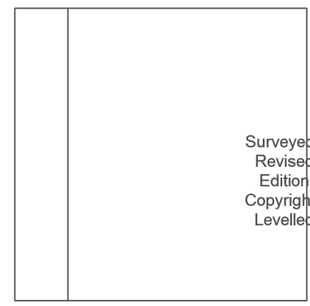
Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S



Groundsure INSIGHTS

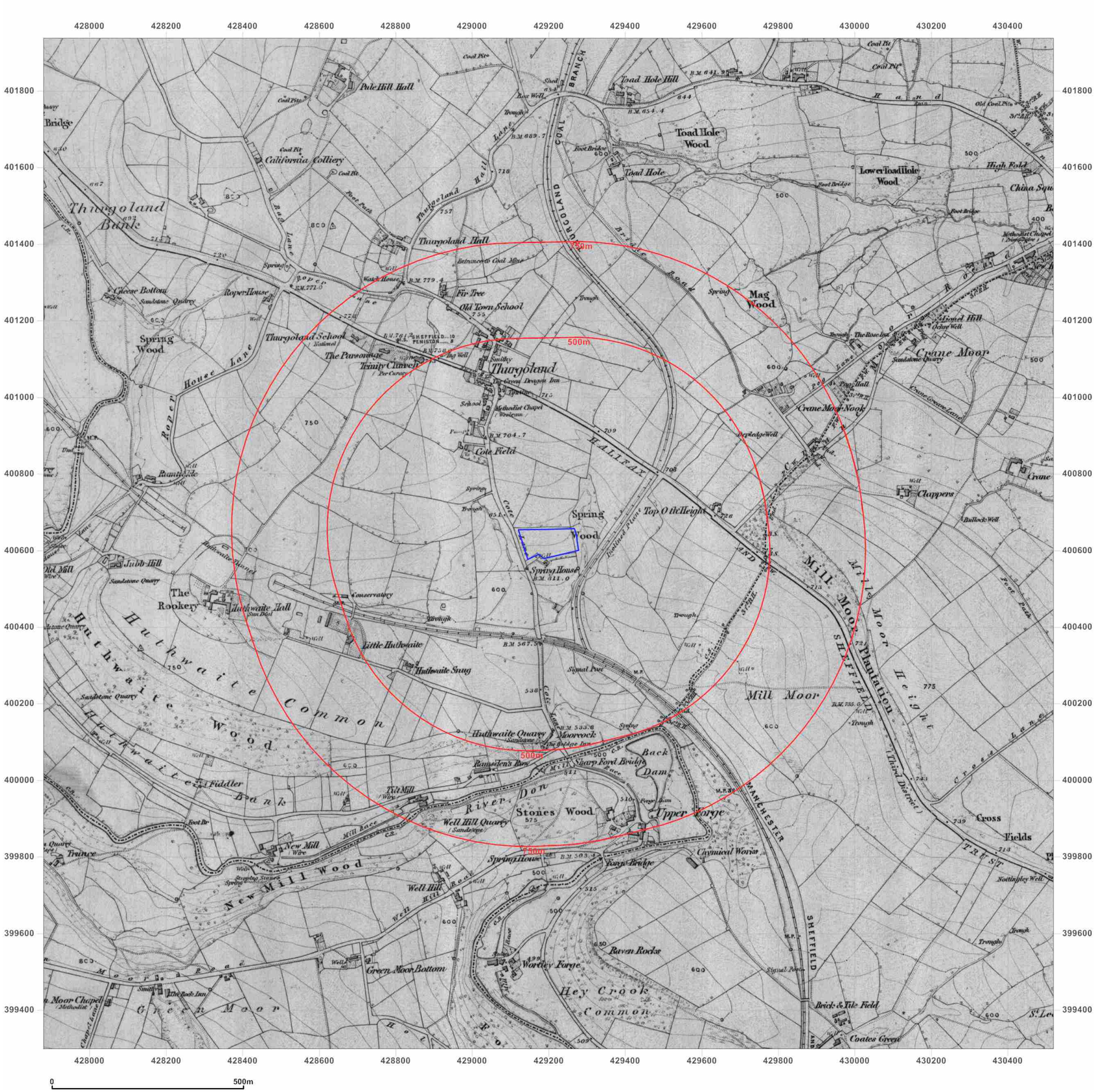
Powered by

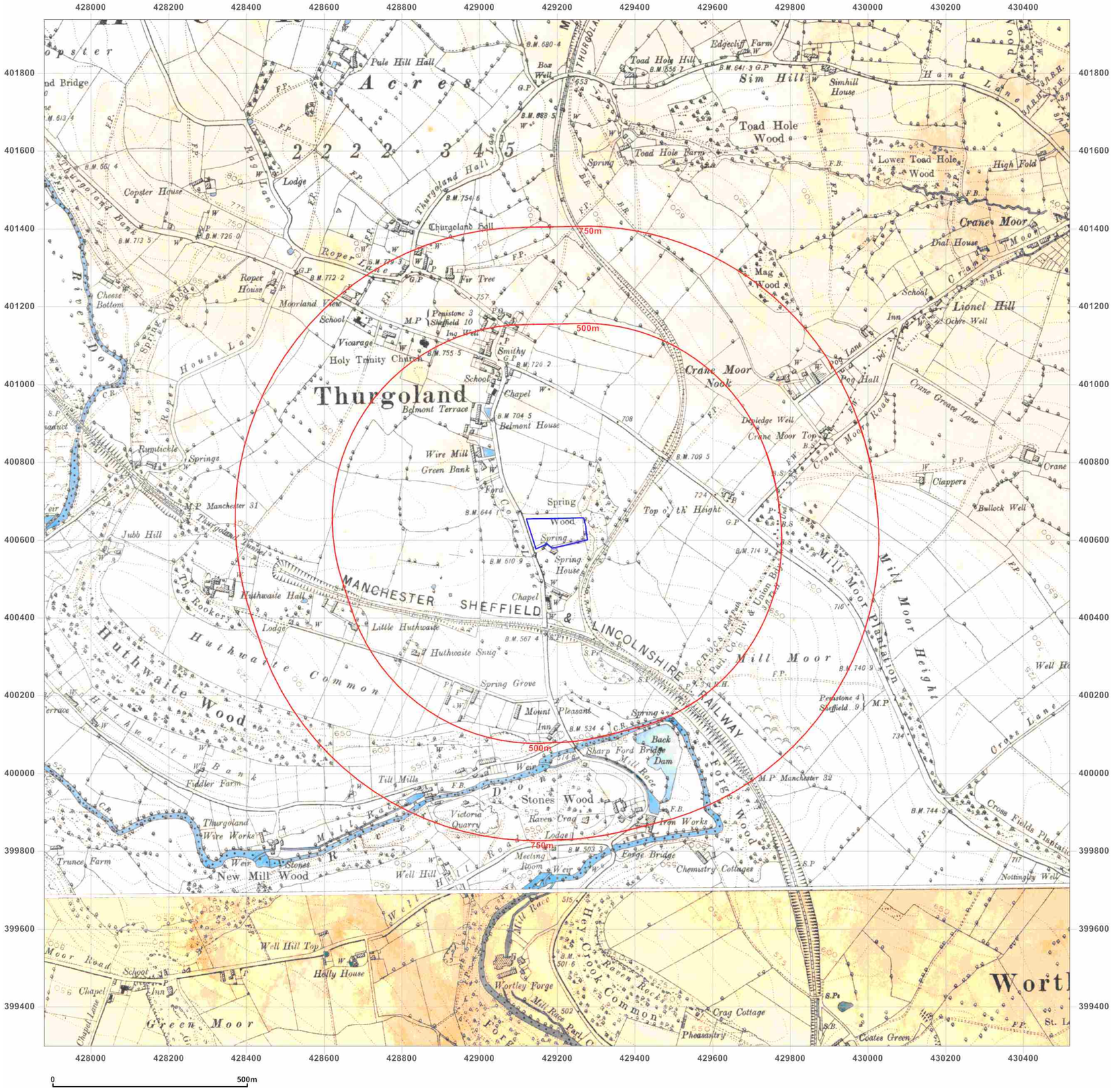
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*


428000
428200
428400
428600
428800
429000
429200
429400
429600
429800
430000
430200
430400
401800
401600
401400
401200
401000
400800
400600
400400
400200
400000
399800
399600
399400
500m
Thurgoland Bank
Thurgoland Hall
Thurgoland School
The Parsonage
Trinity Church
Thurgoland
Old Town School
Fir Tree
Spring Wood
Roper House
Cheese Bottom
Sandstone Quarry
California Colliery
Pale Hill Hall
Toad Hole Hill
Toad Hole Wood
Toad Hole
Lower Toadhole Wood
High Fold
Mag Wood
Crane Moor
Crane Moor Nook
Crane
Clappers
Cote Field
Spring Wood
Top O the Height
Spring House
Jubb Hill
The Rookery
Hathwaite Hall
Little Hathwaite
Hathwaite Quarry
Hathwaite Common
Hathwaite Wood
Fiddler Bank
New Mill
New Mill Wood
Well Hill Quarry
Stones Wood
River Don
Upper Forge
Chymical Works
Forge Bridge
Sharp Ford Bridge
Ramsdens Barn
Back Dam
Mill Moor
Mill Moor Plantation
Mill Moor Height
Cross Fields
Raven Rocks
Wortley Forge
Hey Crook Common
Green Moor Bottom
Green Moor
Brick & Tile Field
Coates Green
Moorhead
Moorhead Road
Halifax
Manchester
Sheffield
Coal Branch
Dunford Road
Bridge
Lane
Road
Hall
Wood
Common
Moor
Height
Plantation
Fields
Cross
Quarry
Mill
Dam
Forge
Bridge
Green
Coates
Hey
Crook
Raven
Rocks
Wortley
Stones
Upper
Chymical
Works
Sharp
Ford
Ramsdens
Barn
Back
Dam
Mill
Moor
Plantation
Height
Cross
Fields
Crane
Moor
Nook
Clappers
Toad
Hole
Wood
Lower
Toadhole
Wood
High
Fold
Mag
Wood
Pale
Hill
Hall
Toad
Hole
Hill
California
Colliery
Thurgoland
Bank
Thurgoland
Hall
Thurgoland
School
The
Parsonage
Trinity
Church
Old
Town
School
Fir
Tree
Spring
Wood
Roper
House
Cheese
Bottom
Sandstone
Quarry
Cote
Field
Top
O
the
Height
Spring
House
Jubb
Hill
The
Rookery
Hathwaite
Hall
Little
Hathwaite
Hathwaite
Quarry
Hathwaite
Common
Hathwaite
Wood
Fiddler
Bank
New
Mill
New
Mill
Wood
Well
Hill
Quarry
Stones
Wood
River
Don
Upper
Forge
Chymical
Works
Forge
Bridge
Sharp
Ford
Bridge
Ramsdens
Barn
Back
Dam
Mill
Moor
Mill
Moor
Plantation
Mill
Moor
Height
Cross
Fields
Raven
Rocks
Wortley
Forge
Hey
Crook
Common
Green
Moor
Bottom
Green
Moor
Brick
&
Tile
Field
Coates
Green
Moorhead
Moorhead
Road
Halifax
Manchester
Sheffield
Coal
Branch
Dunford



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1891**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

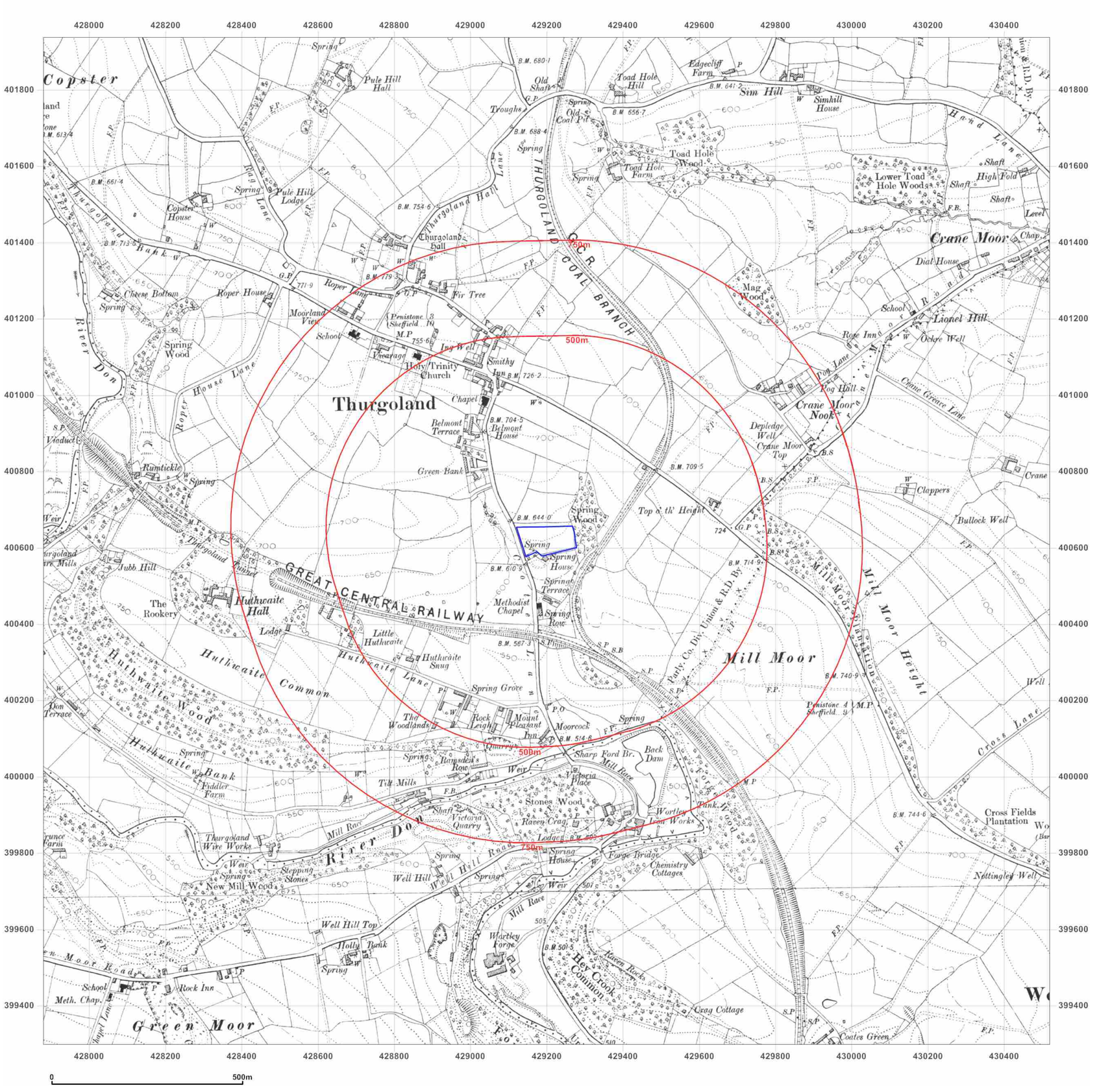
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1903**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1891
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

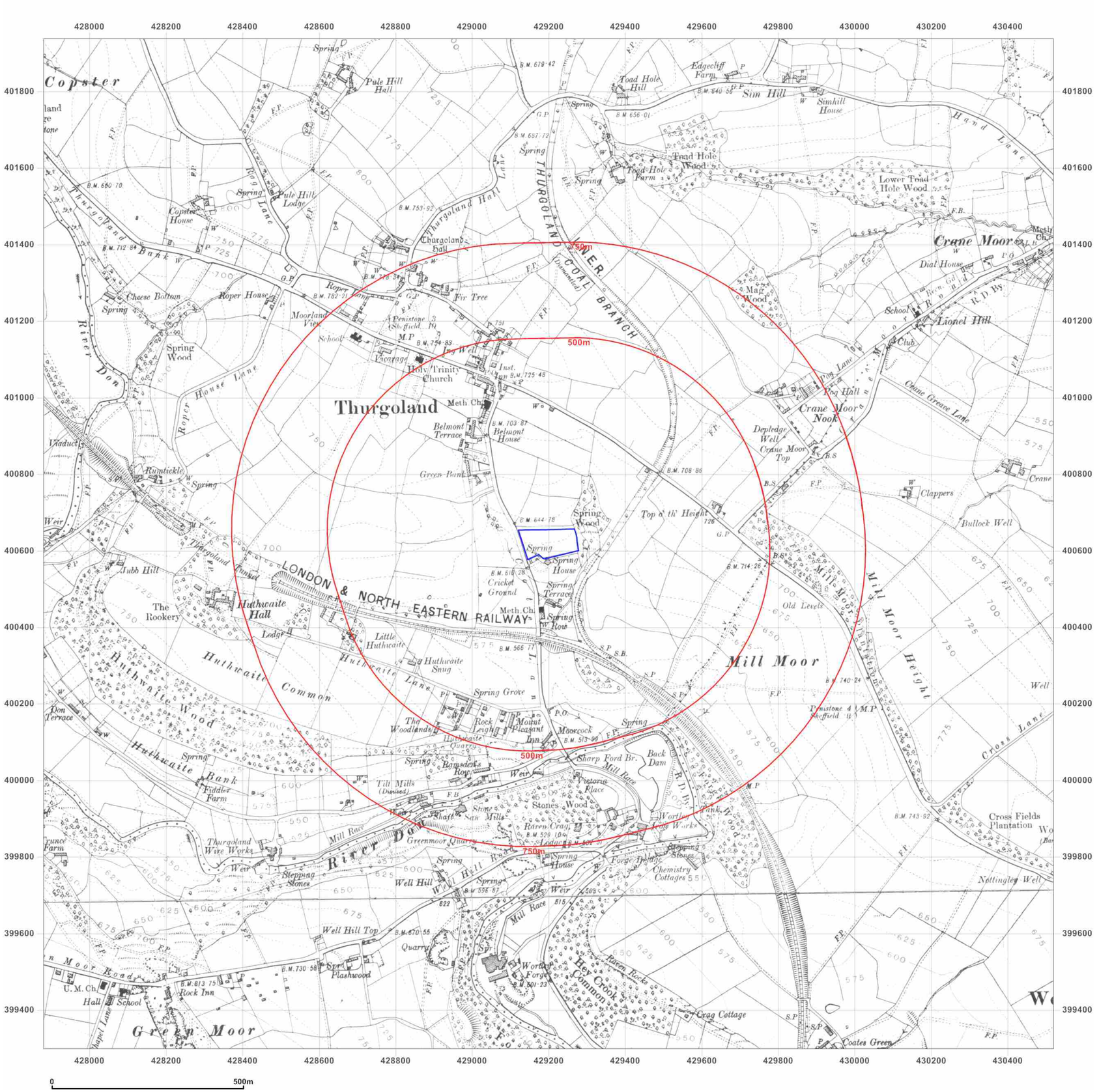
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: County Series

Map date: **1929-1932**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

~~Surveyed 1851~~
Revised 1932
Edition N/A
Copyright N/A
Levelled N/A

~~Surveyed 1851~~
Revised 1929
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

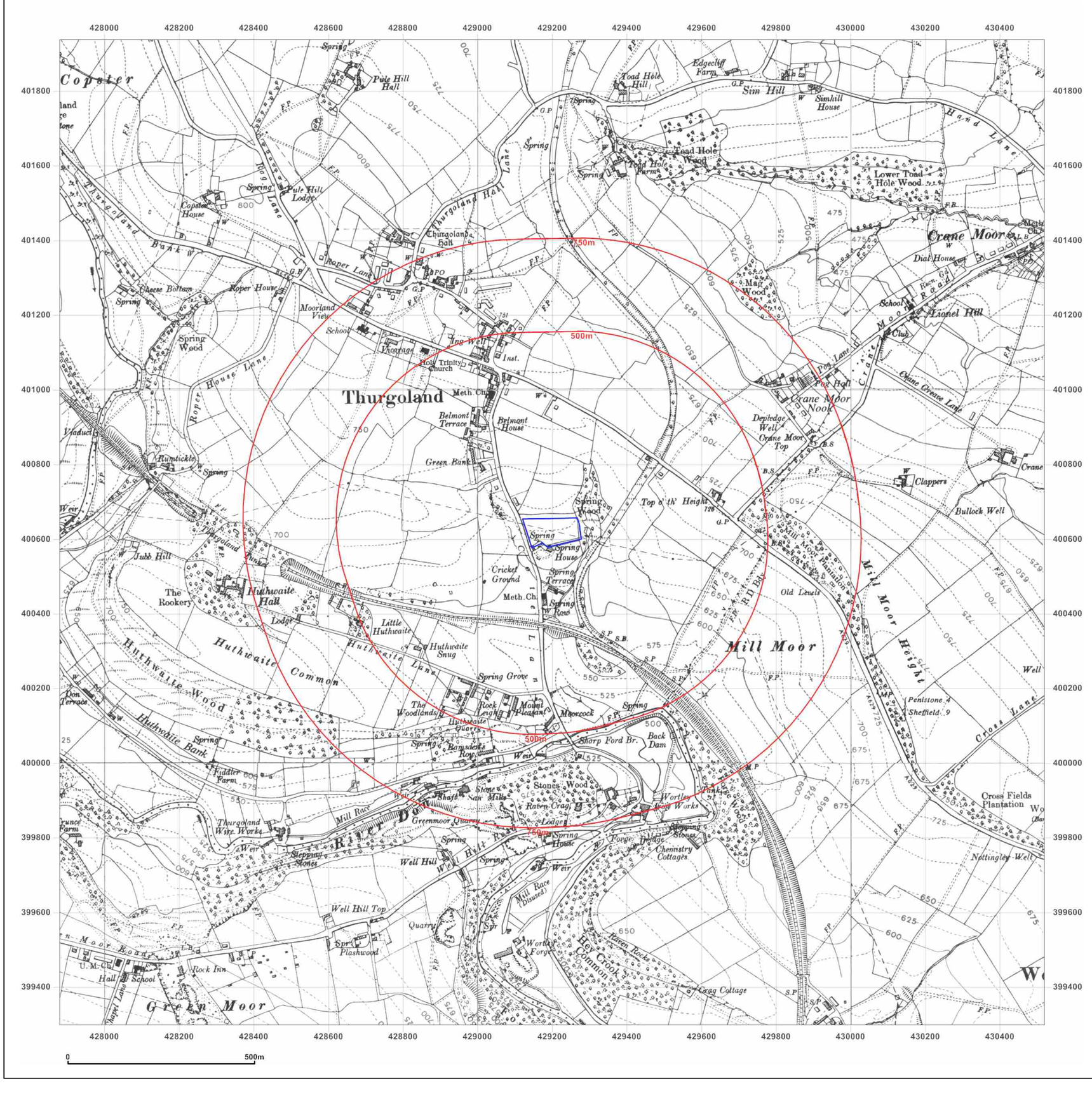
Powered by OS

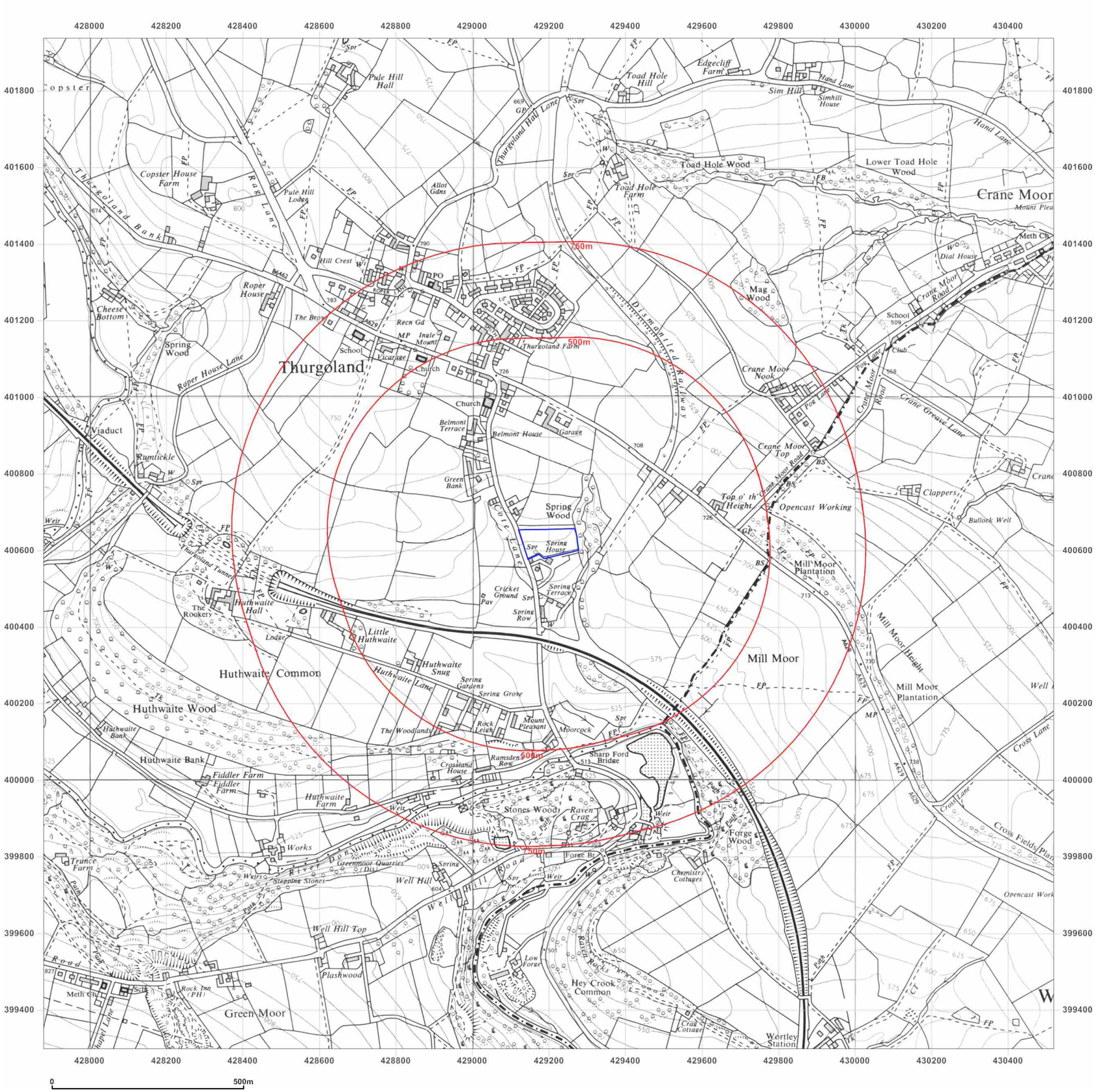
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*


Thurgoland
Copster
Pule Hill Hall
Pule Hill Lodge
Thurgoland Hall
Thurgoland Bank
Roper Lane
Roper House
Cheese Bottom
Spring Wood
Roper House Lane
Moorland View
School
Ing Well
Holy Trinity Church
Meth. Ch.
Belmont Terrace
Belmont House
Green Bank
Viaduct
Runtickle
Thurgoland Wire Works
Stepping Stones
Well Hill
Well Hill Top
Plashwood
Rock Inn
U.M.C.H.
Hall & School
Green Moor
Jubb Hill
The Rookery
Huthwaite Hall
Lodge
Little Huthwaite
Huthwaite Snug
Huthwaite Lane
Huthwaite Common
Huthwaite Wood
Huthwaite Bank
Fiddler Farm
Don Terrace
Spring Grove
The Woodlands
Rock Leigh
Mount Pleasant
Moorcock
Huthwaite Quarry
Bamsdens Row
Sharp Ford Br.
Back Dam
Stones Wood
Raven Crag
Greenmoor Quarry
Lodge
Mill Race
Mill Race (Disused)
Spring House
Forge
Bridge
Chemistry Cottages
Worsbro' Bridge Works
Worsbro' Forge
Raven Rocks
Crag Cottage
Hey Crook Common
Cricket Ground
Spring House
Spring Terrace
Row
Old Levels
R.D.B.
Mill Moor
Mill Moor Height
Penistone 4
Sheffield 9
Cross Lane
Cross Fields Plantation
Nottingley Well
Bullock Well
Clappers
Crane
Crane Moor Nook
Depledge Well
Crane Moor Top
Crane Grease Lane
Pog Lane
Pog Hall
Crane Moor Club
Lionel Hill
Dial House
Crane Moor
Lower Toad Hole Wood
Toad Hole Wood
Toad Hole Farm
Toad Hole Hill
Edgecliff Farm
Sun Hill
Sunhill House
Hand Lane
Map Wood
Chapel Lane
Top o' th' Height
Spring Wood
Spring House
Spring Terrace
Spring Grove
Well
Weir
Quarry
Shaft
Stepping Stones
Well Hill Road
Well Hill
Mill Race
Mill Race (Disused)
Worsbro' Forge
Worsbro' Bridge Works
Chemistry Cottages
Forge
Bridge
Stones



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: Provisional

Map date: **1965-1966**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1965
Revised 1965
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1965
Revised 1965
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

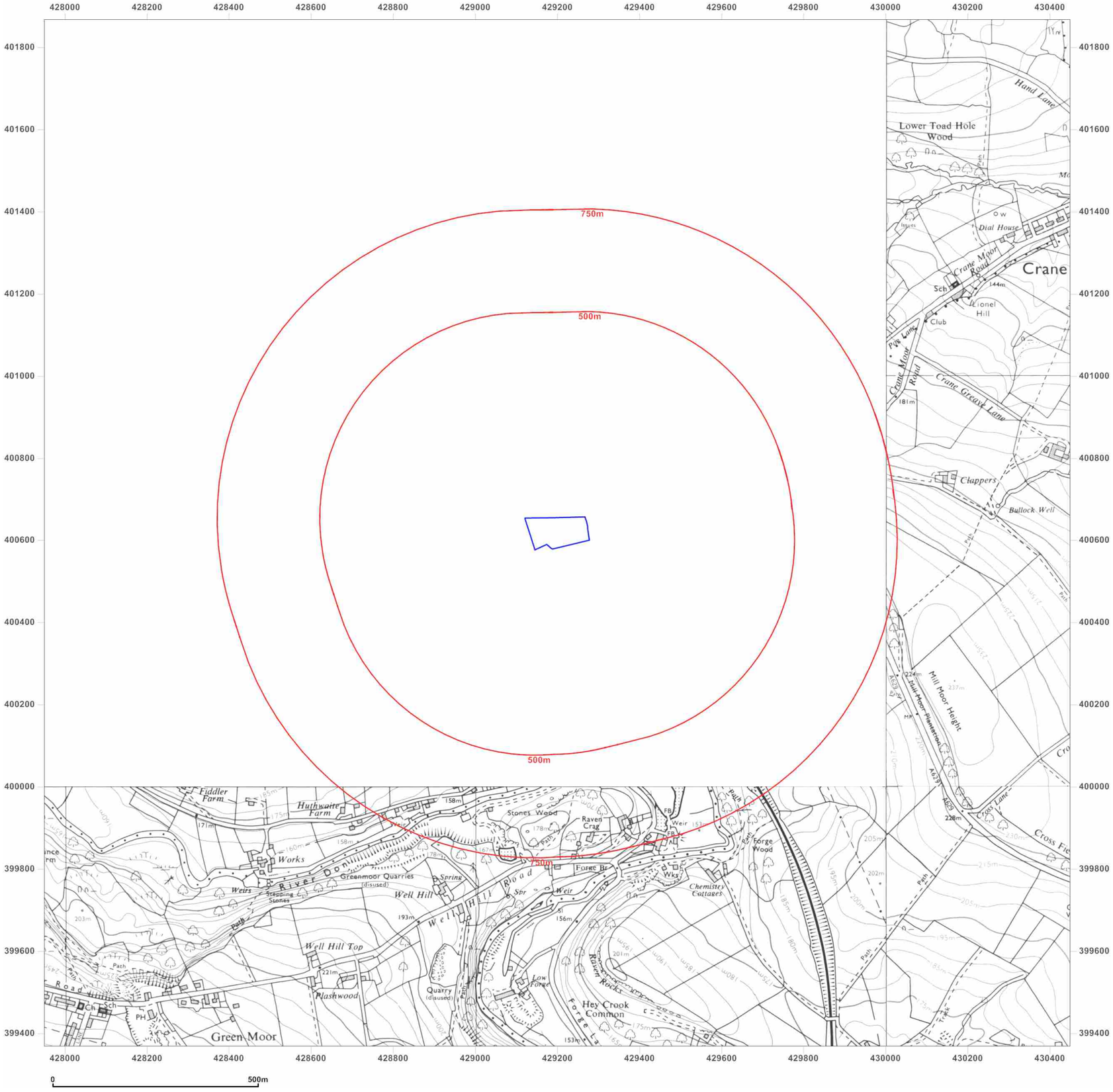
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1977-1980**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1973
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1974
Revised 1978
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1980
Revised 1980
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

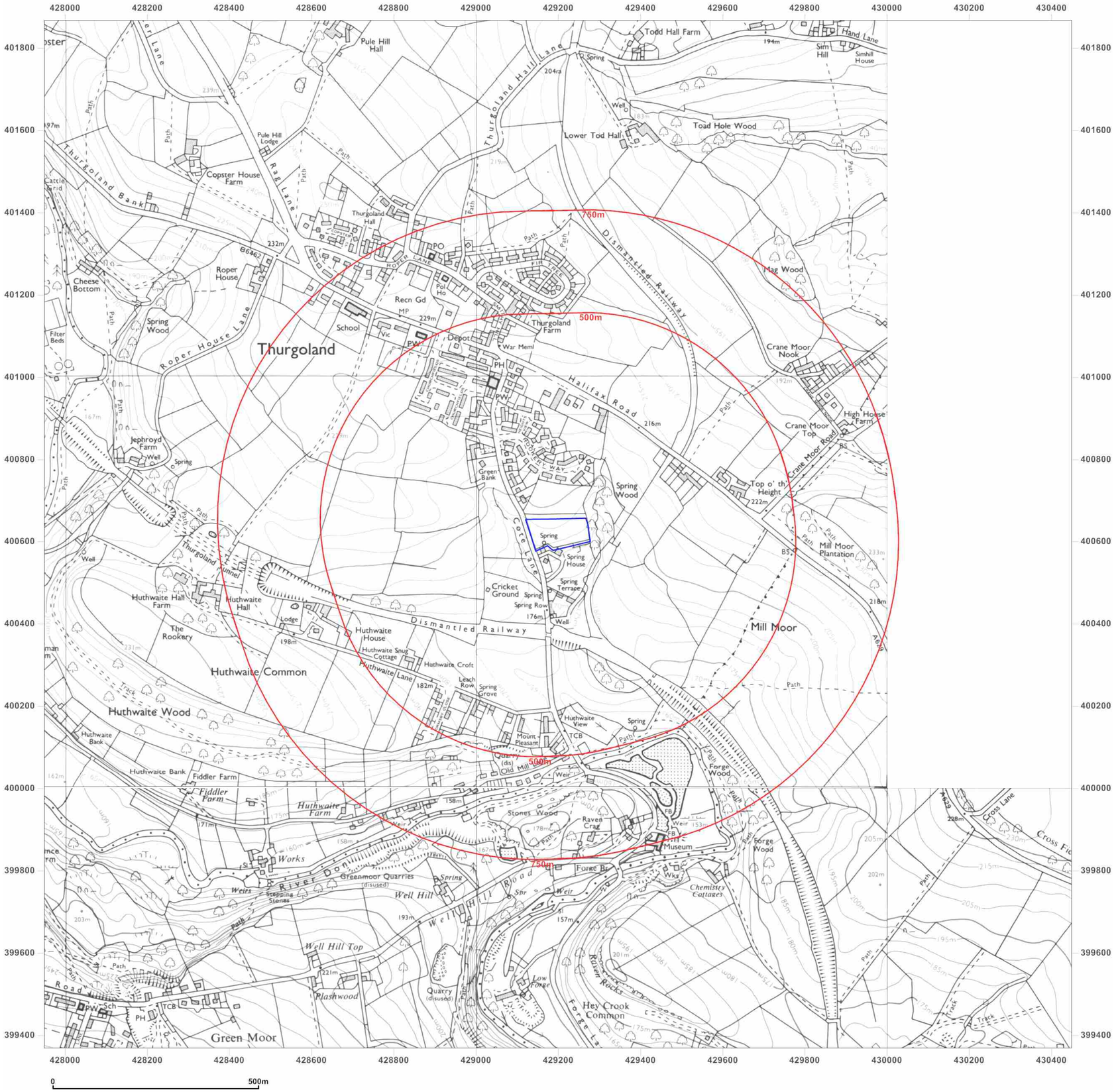
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **1987-1992**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1984
Revised 1987
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1981
Revised 1990
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1991
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Groundsure INSIGHTS

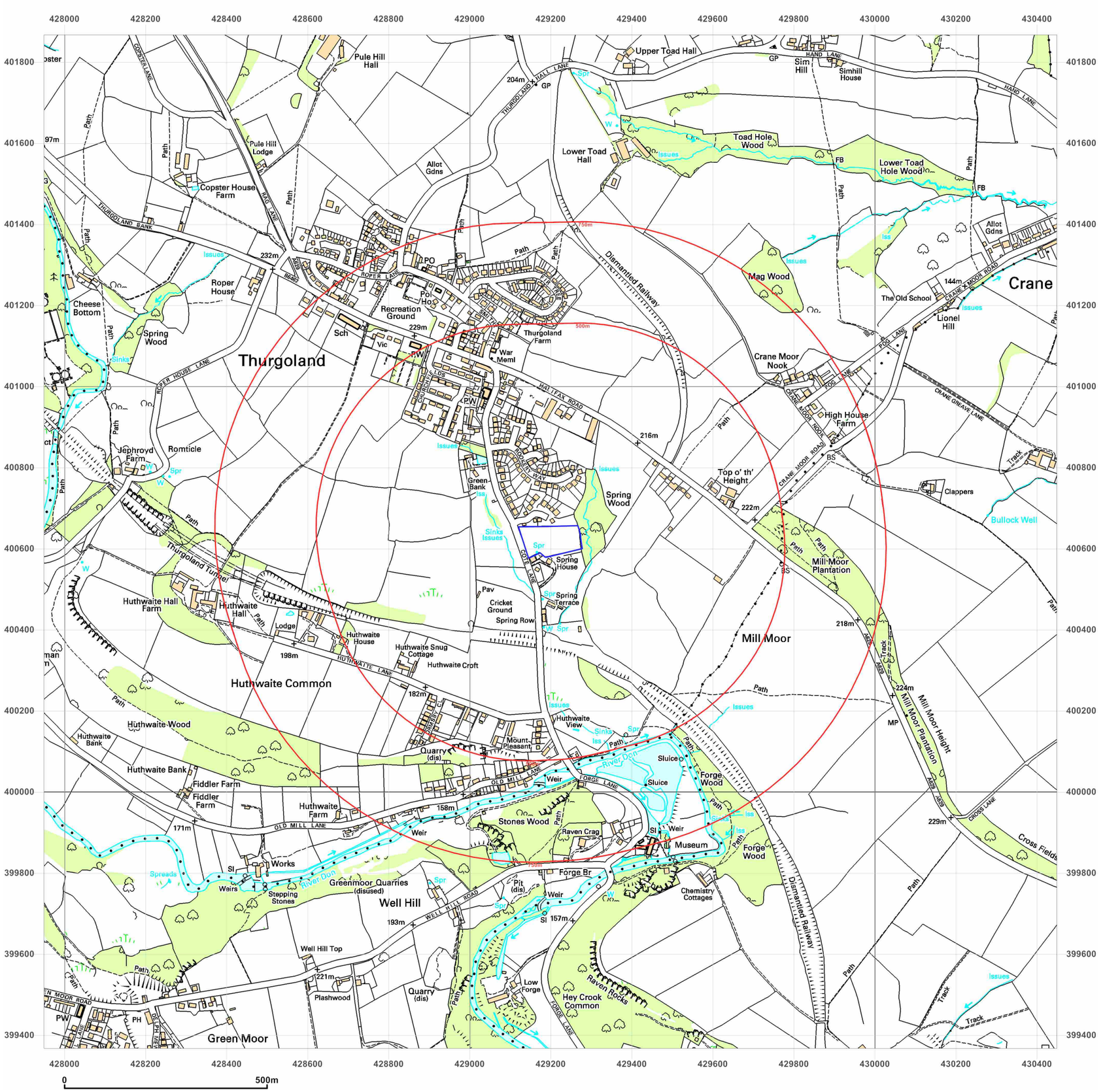
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2002

Groundsure INSIGHTS

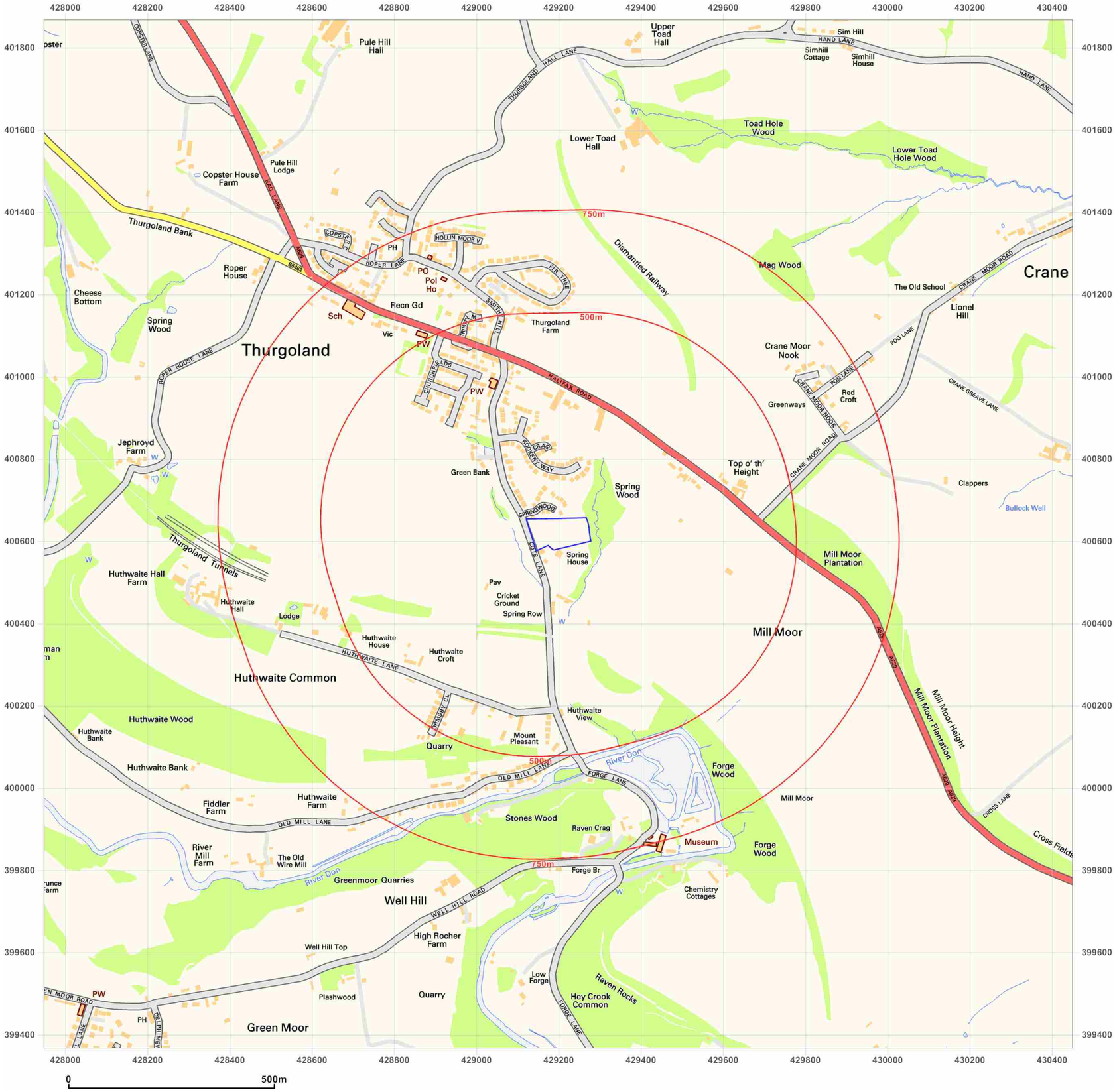
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2010

Groundsure INSIGHTS

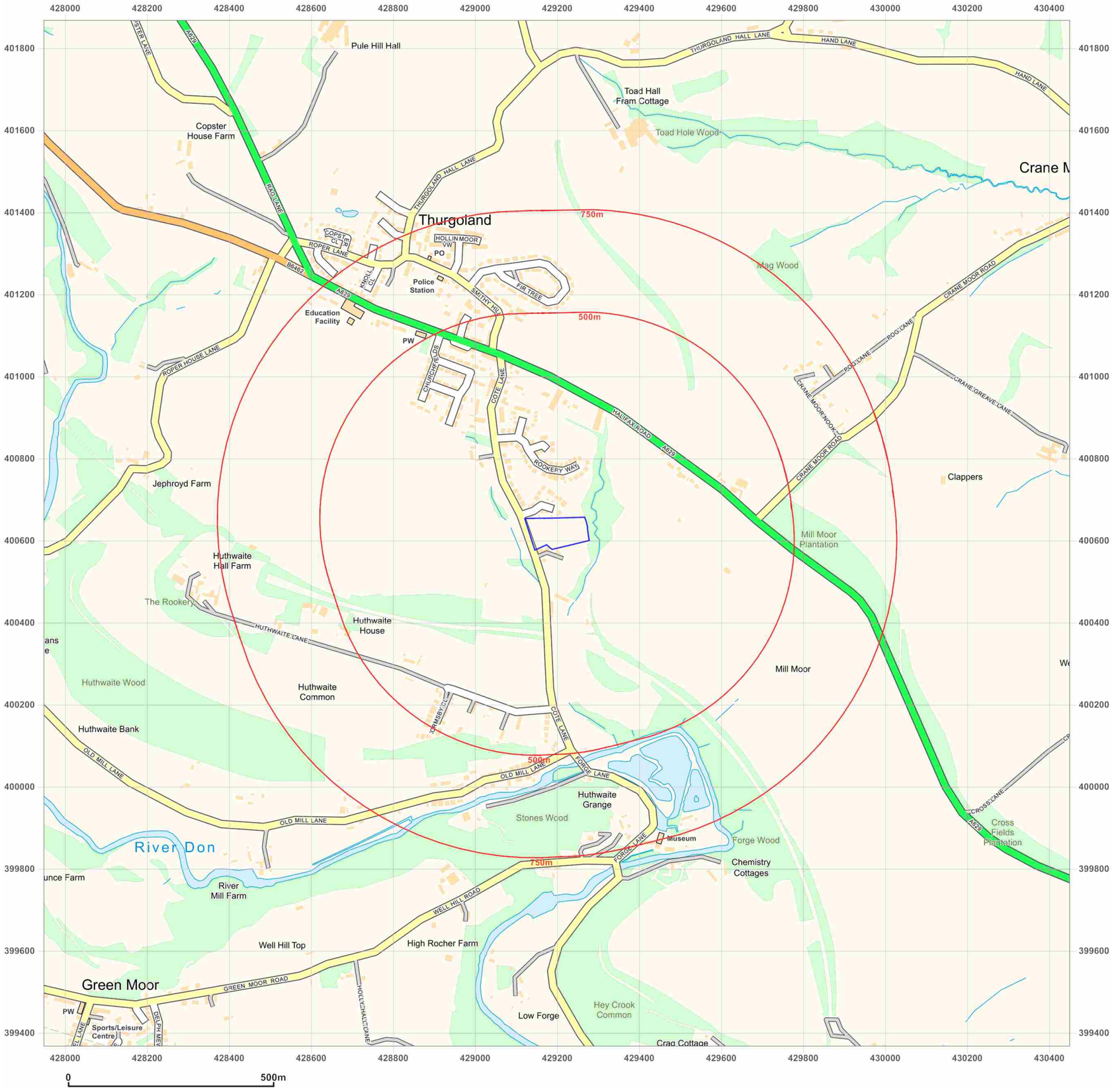
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*



mdja

Site Details:

429222, 400661

Client Ref: Cote_Lane_-_Thurgoland
Report Ref: HMD-354-4038825
Grid Ref: 429199, 400617

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2014

Groundsure INSIGHTS

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2015 Ordnance Survey 100035207

Production date: 03 July 2017

To view map legend click here *Legend*

APPENDIX 6

Coal Authority Mining Report

The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





COTE_LANE
429222, 400661 SOUTH YORKSHIRE



Date of enquiry:	03 July 2017
Date enquiry received:	03 July 2017
Issue date:	03 July 2017
Our reference:	51001495988001
Your reference:	HMD-354-4038826

CON29M Non-Residential Mining Report

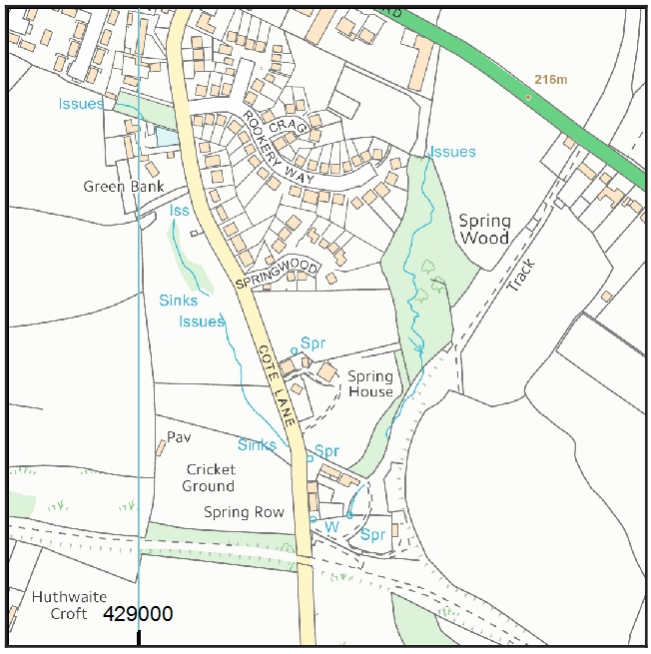
This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

GROUNDSURE LIMITED

Enquiry address

COTE_LANE, 429222, 400661, SOUTH YORKSHIRE



Approximate position of property

Map data

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	No
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is not within a surface area that could be affected by past underground mining.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

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

The property is not in an area likely to be affected from any planned future underground coal mining.

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

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

4. Mine entries

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

5. Coal mining geology

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

6. Past opencast coal mining

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

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

8. Future opencast coal mining
There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

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.

9. 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 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.

10. Mine gas
The Coal Authority has no record of a mine gas emission requiring action.

11. 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.

12. Withdrawal of support
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.

13. Working facilities order
The property is not in an area where 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.

14. 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.

15. 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.

Disclaimer

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

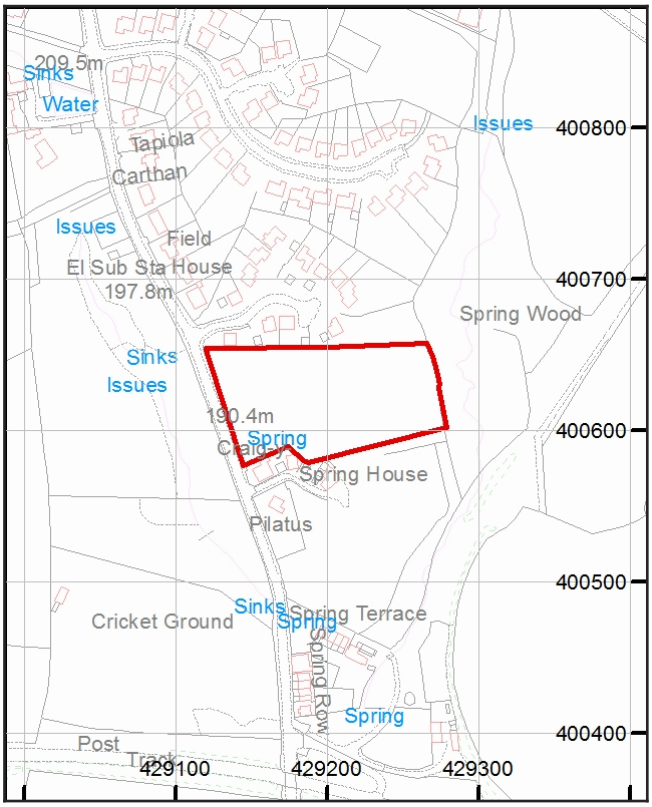
Alternative formats

If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown



Map data

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

Standard Appendices

A and B

STANDARD APPENDIX A

NOTES ON SITE INVESTIGATION PROCEDURE

1. **GENERAL.** The ground investigation has been carried out in accordance with the requirements of Eurocode 7, in particular BS EN 1997-2: 2007 Eurocode 7 – Geotechnical Design, Part 1 and BS EN 1997:2004 Eurocode 7 – Geotechnical Design, Part 2. It is also in accordance with British Standards BS EN ISO 14688-1 and 2 "Geotechnical Investigation and testing – Identification and Classification of Soil" Parts 1 and 2 and BS EN ISO 14689-1 "Geotechnical Investigation and Testing – Identification and Classification of Rock". BS 5930 the Code of Practice for Site Investigation is partly superseded. This appendix briefly describes the nature of the work carried out. It also gives a brief description of the more important tests, which are made for engineering purposes on rocks and soils (see also BS 1377). By its very nature, any ground investigation only samples a small percentage of the ground. Consequently, changes in ground conditions and soil properties can occur between any two exploratory points, for example local features such as soft ground, pockets of contamination and faults. This is also true of the exploration of mineworkings and such features can extend beneath parts of the site not investigated. Unrecorded bell pits and shafts can also exist between exploratory points. The ground investigation is designed to minimise such risks but they cannot be eliminated.

2. **GROUND INVESTIGATION.**

2.1 **BOREHOLE AND TRIAL PIT RECORDS.** These illustrate the ground conditions only at the location of the particular borehole or trial pit. Correlation between boreholes is for guidance only and its accuracy cannot be guaranteed.

2.2 **SHELL AND AUGER BORING.** This technique uses a tripod winch and an essentially percussive action using a variety of tools. Disturbed and undisturbed samples can be taken. This is the most suitable method for soft ground investigation, enabling the maximum amount of information to be obtained. However, minor changes in lithology may be overlooked unless continuous undisturbed sampling is used.

2.3 **GROUNDWATER**. Groundwater levels vary seasonally and the details given on the borehole logs relate only to the dates and the conditions described in the borehole records. The rate of boring may not have allowed an equilibrium water level to be established and the use of casing may seal off certain seepages.

2.4 **SAMPLING.** Disturbed samples of soils are taken for identification and classification purposes. In cohesive soils 'undisturbed' samples 100mm in diameter are taken by open drive sampler for laboratory testing of strength, permeability and consolidation characteristics.

2.5 **STANDARD PENETRATION TESTS**. S.P.T tests are used in granular and cohesive materials and in soft or weathered rocks. Difficulties in obtaining true 'N' values mean they must only be used as a guide and not as an absolute value in foundation design.

2.6 **ROTARY DRILLING.** Two main types of rotary drilling are carried out in rock. Rock coring using diamond or tungsten carbide tipped core bits provides samples and information on rock types, fissuring and weathering. Openhole drilling only produces small particles for identification purposes and the information gained is therefore limited. The latter is, however, useful as a quick method for detecting major strata changes and for the location of coal seams and old workings. Water, air, foam or drilling muds may be used as the flushing medium in either case.

2.7 **PERMEABILITY TESTS.** These can be carried out in boreholes or trial pits and gives a good indication of in-situ permeability.

2.8 **TRIAL PITTING.** This enables soil conditions to be closely examined at any specific point and samples taken. It also gives useful information on the stability of excavations and ingress of water.

2.9 **WINDOW SAMPLING**. Window sampling consists of driving a series of 1m-long tubes into the ground using a dropping weight. On completion of each 1m run, the tube is withdrawn. The next tube is then inserted and the process repeated to provide a continuous profile of the ground. On each run the tube diameter is reduced in order to assist in its recovery.

2.10 **GAS MONITORING.** This is routinely carried out in trial pits or probe holes to check for elevated levels of methane and carbon dioxide or oxygen deficiency, particularly since risks can exist from natural gases, landfill sites and rising groundwater levels in mine workings below ground. Longer term monitoring is carried out with gas monitoring standpipes.

3. **SOIL DESCRIPTION.** Samples from borings or trial pits are described as specified in the standard procedure outlined in the British Standards. The description includes colour, consistency, structure, weathering, lithological type, inclusions and origin. All descriptions are based on visual and manual identification.

Fire Soils (Cohesive Soils)

The following field terms are used:

Soil Type	Description
Very soft	Exudes between fingers
Soft	Moulded by light finger pressure
Firm	Cannot be moulded by the fingers but can be rolled in hand to 3mm threads.
Stiff	Crumbles and breaks when rolled to 3mm threads but can be remoulded to a lump.
Very stiff	No longer moulded but crumbles under pressure. Can be indented with thumbs.

The following terms are used in accordance with the results of laboratory and field tests.

Description	Undrained Shear Strength Cu (kPa)
Extremely Low	<10
Very Low	10 - 20
Low	20 - 40
Medium	40 - 75
High	75 - 150
Very High	150 - 300
Extremely High	>300

Fine soils can also be classified according to their sensitivity, which is the ratio between undisturbed and remoulded undrained shear strength.

Sensitivity	Ratio
Low	8
Medium	8 - 30
High	>30
Quick	>50

Granular Soils (Non-Cohesive)

The following descriptions are used for granular soils.

Description	Normalised Blow Count (N_1) 60
Very Loose	0 - 3
Loose	3 - 8
Medium	8 - 25
Dense	25 - 42
Very Dense	42 - 58

4. **NATURAL OR IN-SITU MOISTURE CONTENT**. The natural or in-situ moisture content of a soil is defined as the weight of water contained in the pore space, expressed as a percentage of the dry weight of solid matter present in the soil. Soil properties are greatly affected by the moisture content and the test can help to give an indication of likely engineering behaviour.

5. **LIQUID AND PLASTIC LIMITS**. Two simple classification tests are known as the liquid and plastic limits. If a cohesive soil is remoulded with increasing amounts of water, a point will be reached at which it ceases to behave as a plastic material and becomes essentially a viscous fluid. The moisture content corresponding to this change is arbitrarily determined by the liquid limit test. 'Fat' clays, which have high contents of colloidal particles, have high liquid limits; 'lean' clays, having low colloidal particle contents have correspondingly low liquid limits. An increase in the organic content of a clay is reflected by an increase in the liquid and plastic limits.

   If a cohesive soil is allowed to dry progressively, a point is reached at which it ceases to behave as a plastic material, which can be moulded in the fingers, and it becomes friable. The moisture content of the soil at this point is known as the 'plastic limit' of the soil.

   The range of water content over which a cohesive soil behaves plastically, i.e. the range lying between the liquid and plastic limits, is defined as the plasticity index.

   A cohesive soil with a natural water content towards its liquid limit will, in general, be an extremely soft material whereas a cohesive soil with a natural water content below its plastic limit will tend to be a stiff material.

6. **PARTICLE-SIZE DISTRIBUTION.** A knowledge of particle-size distribution is used to classify soils and to indicate likely engineering behaviour. British Standards define soils in relation to their particle-size as shown below:-

Boulders	>200mm	Coarse Sand	2.0 to 0.63mm
Cobbles	200 to 63mm	Medium Sand	0.63 to 0.2mm
		Fine Sand	0.2 to 0.063mm
Coarse Gravel	63 to 20mm	Coarse Silt	0.063 to 0.02mm
Medium Gravel	20 to 6.3mm	Medium Silt	0.02 to 0.0063mm
Fine Gravel	6.3 to 2mm	Fine Silt	0.0063 to 0.002mm
		Clay	<0.002mm

7. **BULK DENSITY.** The bulk density of a material is the weight of that material per unit volume and includes the effects of voids whether filled with air or water. The 'dry density' of a soil is defined as the weight of solids contained in a unit volume of the soil.

8. **PERMEABILITY.** The permeability of a material is defined as the rate at which water flows through it per unit area of soil under unit hydraulic gradient.

9. **CONSOLIDATION CHARACTERISTICS.** When subjected to pressure, a soil tends to consolidate as the air or water in the pore space is forced out and the grains assume a denser state of packing. The decrease in volume per unit of pressure is defined as the 'compressibility' of the soil, and a measure of the rate at which consolidation proceeds is given by the 'coefficient of consolidation' of the soil. These two characteristics Mv and Cv are determined in the consolidation test and the results are used to determine settlement of structures or earthworks.

10. **STRENGTH CHARACTERISTICS.** The strength of geological materials is generally expressed as the maximum resistance that they offer to deformation or fracture by applied shear or compressive stress. The strength characteristics of geological materials depend to an important degree on their previous history and on the conditions under which they will be stressed in practice. Consequently, it is necessary to simulate in the laboratory tests the conditions under which the material will be stressed in the field.

In general, the only test carried out on hard rocks is the determination of their compressive strength but consideration must be given to fissuring, jointing and bedding planes.

The tests at present in use for soils and soft rocks fall into two main categories. Firstly, those in which the material is stressed under conditions of no moisture content change, and secondly those in which full opportunity is permitted for moisture content changes under the applied stresses. Tests in the first category are known as undrained (immediate or quick) tests, while those in the second category are known as drained (slow or equilibrium) tests. The tests are normally carried out in the triaxial compression apparatus but granular materials may be tested in the shear box apparatus.

The undrained triaxial test gives the apparent cohesion C_u and the angle of shearing resistance $\emptyset_u$. In dry sands, $C_u = 0$ and $\emptyset_u$ is equal to the angle of internal friction whereas with saturated non-fissured clays $\emptyset u$ tends to 0 and the apparent cohesion C_u is equal to one-half the unconfined compression strength qu. On site the vane test gives an approximate measure of shear strength.

For some stability problems use is made of a variant of the undrained triaxial test in which the specimen is allowed to consolidate fully under the hydrostatic pressure and is then tested to failure under conditions of no moisture content change. This is known as the consolidated undrained triaxial test. Pore water pressures may be measured during this test or a fully drained test may be carried out. In either case the effective shear strength parameters C' and $\emptyset$' can be obtained which can be used to calculate shear strength at any given pore water pressure.

11. **COMPACTION.** The density at which any soil can be placed in an earth dam, embankment or road depends on its moisture content and on the amount of work which is used in compaction. The influence of these two factors can be studied in compaction tests, which can determine the maximum dry density (MDD) achievable at a certain optimum moisture content (OMC).

12. **CALIFORNIA BEARING RATIO TEST.** In flexible pavement design a knowledge of the bearing capacity of the subgrade is necessary to enable the thickness of pavement for any particular combination of traffic and site conditions to be determined. The quality of the subgrade can be assessed by means of the California Bearing Ratio Test or approximately by the MEXE cone penetrometer.

13. **ROCK DESCRIPTION.** This is based on;

i. Colour (minor then principal colour).
ii. Grain Size.

Description	Predominate Grain Size (mm)
Very Coarse - grained	>63
Coarse - grained	63 - 2
Medium - grained	2 - 0.063
Fine - grained	0.063 - 0.002
Very Fine - grained	<0.002

iii. Matrix.
iv. Weathering.

Term	Description
Fresh	No visible sign of weathering/alteration of the rock material.
Discoloured	The colour of the original fresh rock material is changed and is evidence of weathering/alteration. The degree of change from the original colour should be indicated. If the colour change is confined to particular mineral constituents, this should be mentioned.
Disintegrated	The rock material is broken up by physical weathering, so that bonding between grains is lost and the rock is weathered/altered towards the condition of a soil in which the original material fabric is still intact. The rock material is friable but the grains are not decomposed.
Decomposed	The rock material is weathered by the chemical alteration of the mineral grains to the condition of a sol in which the original material fabric is still intact; some or all of the grains are decomposed.

v. Carbonate Content.
vi. Stability of Rock Material.

Stable indicates no changes when sample left in water for 24 hours. Fairly stable indicates fissuring and crumbling of surfaces. Unstable indicates complete disintegration of the sample.

vii. Unconfined Compressive Strength.

Term	Field Identification	Unconfined Compressive Strength (MPa)
Extremely Weak[a]	Indented by thumbnail.	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, can be peeled by a pocket knife.	1 to 5
Weak	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 to 25
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with single firm blow of geological hammer.	25 to 50
Strong	Specimen required more than one blow of geological hammer to fracture it.	50 to 100
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100 to 250
Extremely Strong	Specimen can only be chipped with geological hammer.	Greater than 250

[a] Some extremely weak rocks will behave as soils and should be described as soils.

viii. Structure.

Sedimentary	Metamorphic	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flowbanded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	
Graded	Gneissose	
	Folded	

ix. Discontinuities.
x. Discontinuity Spacing, persistence and roughness, infilling and seepage.
xi. Weathering of the Rock Mass.

Term	Description	Grades
Fresh	No visible sign of rock material weathering; perhaps slight discolouration on major discontinuity surfaces.	0
Slightly weathered	Discolouration indicates weathering of rock material and discontinuity surfaces.	1
Moderately weathered	Less than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	2
Highly weathered	More than half of the rock material is decomposed or disintegrated. Fresh or discoloured rock is present either as a continuous framework or as core stones.	3
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	4
Residual soil	All rock material is converted to soil. The mass structure and material fabric are destroyed. There is a large change in volume, but the soils has not been significantly transported.	5

xii. Rock Mass Permeability

14. **CHEMICAL TESTS.** A knowledge of total soluble sulphate content and pH of soils and groundwater is important in determining the protection required for concrete or steel in contact with the ground. Other specialist tests may be carried out on sites suspected of being contaminated by toxic materials (see standard appendix B).

15. **REFERENCES**

CIRIA: Asbestos in Soil and Made Ground: a guidance to understanding and managing risks, 2014
The Coal Authority: Guidance on Managing the Risk of Hazardous Gases when Drilling or Piling Near Coal, 2013
Site Investigation Practice by Michael D Joyce; E & F N Spon 1982.

BRITISH STANDARDS
BS EN 1997-1: 2004 "Eurocode 7 – Geotechnical Design – Part 1: General Rules"
BS EN 1997-2: 2007 "Eurocode 7 – Geotechnical Design – Part 2: Ground Investigation and Testing"
BS ISO 14688-1:2002 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 1"
BS ISO 14688-2:2004 "Geotechnical Investigation and Testing – Identification and Classification of Soil – Part 2"
BS ISO 14689-1:2003 "Geotechnical Investigation and Testing – Identification and Classification of Rock – Part 1"
BS 5930 Codes of Practice for Site Investigation 1999 (partly superseded)
BS 1377 Methods of Test for Soils for Civil Engineering Purposes 1990 (Parts 1 to 8)

© July 2014

STANDARD APPENDIX B

NOTES ON CONTAMINATION INVESTIGATION PROCEDURE

1. **GENERAL.** The desk study and/or intrusive ground investigation is typically carried out in accordance with the requirements of BS5930 and BS10175. In relation to contamination the desk study is referred to as the preliminary investigation in BS10175 and the intrusive ground investigation is referred to as the Exploratory Investigation. This appendix briefly describes the nature of the work carried out and explains the standards against which contamination data has been assessed. The nature of any contamination investigation is such that only a small percentage of the ground, and therefore potential contamination, is sampled. Consequently variations in both ground conditions and contaminant levels can occur between any two sampling positions. The contamination investigation is designed to minimise such risks, but they cannot be eliminated.

2. **REVIEW OF CONTAMINATION ISSUES -** The National Planning Policy Framework (NPPF) and Part 2A of the Environmental Protection Act 1990 create a new regime for the identification and remediation of contaminated land. It introduced a definition of contaminated land described in Section 78A(2) of the Act of:

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused or there is a significant possibility of such pollution being caused:

Both Part 2A and the planning regime embrace the "suitable for use" approach. In the context of Part IIA, action is necessary only where there are unacceptable risks to health or to the environment, taking into account the current use of the land and its environmental setting.

For humans, significant harm is defined as "death, disease, serious injury ". Specifically, disease is taken to mean an unhealthy condition of the body or part of it. "Significant possibility of significant harm" is described as health effects arising from the intake of a contaminant or other direct bodily contact with the contaminant where the intake or exposure is unacceptable. The assessment should also take into account the total intake from all sources, the relative contribution of the pollutant linkage in question, and the duration of intake or exposure. The various statutory definitions are given overleaf.

The presence of unnatural substances does not automatically constitute a risk unless there is a link or pathway between the contamination (the hazard) and the receptor (the target) be it humans, the environment or property. Therefore the assessment needs to determine whether a hazard is present and whether the necessary pathway exists the so-called "pollution linkage" or “conceptual site model”.

The effect of any hazard on a site depends primarily on the site use and groundwater conditions since these determine who and what may be at risk and the routes by which they may be exposed to the hazard. Site uses can include allotments, domestic gardens on residential developments, amenity and recreational areas, public open space and industrial and commercial buildings. On any site, the potential contaminants have to be identified together with the potential receptors. The pathway for that contaminant to reach its target has then to be considered”.

3. **PRELIMINARY INVESTIGATION.** The preliminary Phase I Geoenvironmental Assessment (desk study) report normally considers the following key sections:

Introduction	
The Site	Contaminated Land
Site History	Radon
Geology and Mining	Geoenvironmental Risk Assessment
Hydrogeology	Geotechnical Assessment
Landmark Envirocheck	Ground Investigation (Recommendations)

The report will summarise the findings and also relate our opinions to the potential for a site to be geoenvironmentally impaired, at levels likely to warrant mitigation or further consideration appropriate to the current or future use.

Findings are based on information obtained and described during the desk study and site inspection without intrusive ground investigation. It is possible that further information exists. The absence of indicators of impairment does not mean that such impairment does not exist. Additional investigation including intrusive methods can reduce the risks but cannot eliminate them and may not be cost effective. We can advise on the additional research opportunities, their cost and their possible impact on mitigating risk. Recommendations are normally given based on the redevelopment proposals for the site.

Type of Receptor	Description of harm that is to be regarded as significant harm	Conditions For There Being A Significant Possibility Of Significant Harm
1. Human beings	Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.	If the amount of the pollutant in the pollutant linkage represents an unacceptable intake or direct bodily contact, assessed on the basis of relevant information on the toxicological properties of that pollutant. Such an assessment should take into account: • the likely total intake of, or exposure to, the substance or substances which form the pollutant, from all sources including that from the pollutant linkage in question; • the relative contribution of the pollutant linkage in question to the likely aggregate intake of, or exposure to, the relevant substance or substances; and • the duration of intake or exposure resulting from the pollutant linkage in question. The question of whether an intake or exposure is unacceptable is independent of the number of people who might experience or be affected by that intake or exposure. Toxicological properties should be taken to include carcinogenic, mutagenic, teratogenic, pathogenic, endocrine-disrupting and other similar properties.
2. All other human health effects (particularly by way of explosion or fire)		If the probability, or frequency, of significant harm of that description is unacceptable. The pollutant linkage might cause "significant harm which" • would be irreversible or incapable of being treated; • would affect a substantial number of people; • would result from a single incident such as a fire or an explosion; or • would be likely to result from a short-term (lees than 24-hour) exposure to the pollutant.
3. Any ecological system, or living organism forming part of such a system, within a location which is protected.	For any protected location: • harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or • harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.	If either: • significant harm of that description is more likely than not to result from the pollutant linkage; or • there is a reasonable possibility of significant harm of that description being caused, and if that harm were to occur, it would result in such a degree of damage to features of special interest at the location in question that they would be beyond any practicable possibility of restoration.
4. Property in the form of: • crops, including timber; • produce grown domestically, or on allotments, for consumption; • livestock; • other owned or domesticated animals; • wild animals which are the subject of shooting or fishing rights.	For crops, a substantial diminution in yield or other substantial loss in the value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.	If significant harm of that description is more likely than not to result from the pollutant linkage in question.
5. Property in the form of buildings.	Structural failure, substantial damage or substantial interference with any right of occupation.	If significant harm of that description is more likely than not to result from the pollutant linkage in question during the expected economic life of the building.
6. Controlled waters.		

4. **INTRUSIVE INVESTIGATION.** BS10175 describes this as an exploratory investigation. Intrusive ground investigation is described in Standard Appendix A. During the investigation representative or indicative samples are obtained for testing by an accredited laboratory. The aim is to determine (with a degree of confidence appropriate to the objectives), the presence, concentration and distribution of contaminants in respect of those points investigated. The extent of any necessary intrusive investigation will depend on the size of the site and any hazards, either known or suspected.

5. **ASSESSMENT OF CONTAMINATION.** The assessment of contaminated land under the terms of Part II A of the Environmental Protection Act 1990 is based upon pollution linkage (source - pathway - receptor model).

The Contaminated Land Report (CLR) series of documents have been produced by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency, to provide regulators with "relevant, appropriate, authoritative and scientifically based information and advice on the assessment of risk from contamination in soils".

The Environment Agency has issued a number of Soil Guideline Values (SGVs), which whilst non-binding, may be used as guidance in the assessment of land and in setting remediation targets. They should only be applied to human health assessments, and it should be noted that these have officially been withdrawn.

The SGVs have been derived using the Contaminated Land Exposure Assessment Model (CLEA) and are based on assumptions relating to soil conditions, pollutant type and behaviour, land use patterns and the availability of receptors. SGVs are also subject to statistical assessment. The CLR documentation requires that the results of laboratory testing are subject to statistical analysis to remove uncertainty over a so-called 'averaging area'.

To date only selective SGVs have been issued for the following land-uses

- Residential with and without plant uptake
- Allotments
- Commercial/Industrial

Soil Guideline Values (mg/kg)(1)			
Analyte	**Residential**	**Allotments**	**Commercial**
Arsenic	32 (37)	43	640
Cadmium	10 (17)	1.8	230
Chromium (total)	130		5000
Mercury	170	80	3600
Nickel	130	230	1800
Selenium	350	120	13000
Lead (3)	450 (82)		750
Toluene	610	120	4400
Ethylbenzene	350	90	2800
Phenol	420	280	3200
Benzene	0.33 (0.42)	0.07	95
o-xylene	250	160	2600
m-xylene	240	180	3500
p-xylene	230	160	3200
Copper (2)	2330	524	71,700
Zinc (2)	3750	618	665,000
Benzo(a)pyrene (2)	1.0 (2.4)	2.1	14
Naphthalene (2)	8.7	23	1100
Fluorene (2)	780	160	71,000

(1) Now officially withdrawn
(2) Generic Assessment Criteria (mg/kg) derived by LQM / CIEH
(3) Geometric mean value across site
(4) The figures in brackets are the latest C4SLs (see later in text)

DEFRA previously issued "Outcome of the Way Forward Exercise on Soil Guideline Values". This document was intended to provide guidance to determine if there is a Significant Possibility of Significant Harm (SPOSH) i.e. whether land meets the legal trigger of being contaminated land.

In the context of Part 2A, a risk assessor using an SGV would conclude the following (DEFRA, 2008).

- At a representative average soil concentration at or below an SGV, it is very unlikely that there will be a *significant possibility of significant harm (SPOSH)*.

- At a representative average soil concentration above an SGV, there *might* be a *significant possibility of significant harm* with the significance linked to the margin of exceedance, the duration and frequency of exposure, and other site-specific factors that the enforcing authority may wish to take into account. Further investigation and/or detailed evaluation will usually be required.

It should be stressed that where there is any uncertainty as to whether or not there is a SPOSH, it was the policy of this practice to adopt a conservative approach, particularly in the adoption of clean cover systems.

In April 2012, Defra both published new Statutory Guidance which forms a major part of their contaminated land regimes under Part 2A of the Environment Protection Act 1990. The regime provides a means of dealing with contaminated land which poses a significant risk to human health or the environment where there is no alternative solution. It also works alongside planning rules and building regulations to help ensure that affected land is made suitable for use when it is redeveloped.

Since the regime was introduced in 2000 there has been considerable uncertainty over how to decide when land is, and is not contaminated land on grounds of the legal test of *significant possibility of significant harm to human health or the environment*.

To help address this, one of the main changes set out in the new Statutory Guidance, is the introduction of a new four category test to help decide when land is, and is not, contaminated land on grounds of *significant possibility of significant harm to human health*. Under the new four category test:

- Category 1 describes land that is clearly contaminated land, for example because similar land is known to have caused significant harm in the past.

- Categories 2 and 3 cover less straightforward land where more detailed consideration is needed before the regulator can decide either: (a) that there is a strong case for regulatory action, in which case the land would be in Category 2 and be classified as contaminated land under Part 2A; or (b) that such a case does not exist, in which case the land would be in Category 3 and not be classified as contaminated land under Part 2A.

- Category 4 describes land that is clearly not contaminated land, as discussed below.

One of the main purposes of including the Categories in the Statutory Guidance is to provide a legal framework against which new technical tools can be developed by the land contamination sector to describe the Categories in more detail with regard to specific substances and/or situations.

The new Category 4 test is particularly important in terms of reducing uncertainty over when land is definitely not caught by the regime.

The new Statutory Guidance makes clear what land should be placed into Category 4, for example:

(a) Land where no relevant contaminant linkage has been established.

(b) Land where there are only normal levels of contaminants in soil (as explained in Section 3 of the guidance), unless there is a particular reason to consider otherwise. In other words land with normal background concentrations in the soil.

(c) Land that has been excluded from the need for further inspection and assessment under Part 2A because contaminant levels do not exceed relevant generic assessment criteria in accordance with Section 3 of the guidance, or relevant technical tools or advice that may be developed in accordance with paragraph 3.30 of the guidance, e.g. Category 4 Screening Levels.

(d) Land where estimated levels of exposure to contaminants in soil are likely to form only a small proportion of what a receptor might be exposed to anyway through other sources of environmental exposure (e.g. in relation to average estimated national levels of exposure to substances commonly found in the environment, to which receptors are likely to be exposed to in the normal course of their lives).

The guidance clarifies how generic assessment criteria (including the currently available SGVs/GACs) should and should not be used. It states that:

3.27 It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work may be warranted.

3.28 Local authorities may use GACs and other technical tools to inform certain decisions under the Part 2A regime, provided: (i) they understand how they were derived and how they can be used appropriately; (ii) they have been produced in an objective, scientifically robust and expert manner by reputable organizations; and (iii) they are only used in a manner that is in accordance with Part 2A and this Guidance.

3.29 GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regard to such GACs:

(a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.

(b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.

(c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risks to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.

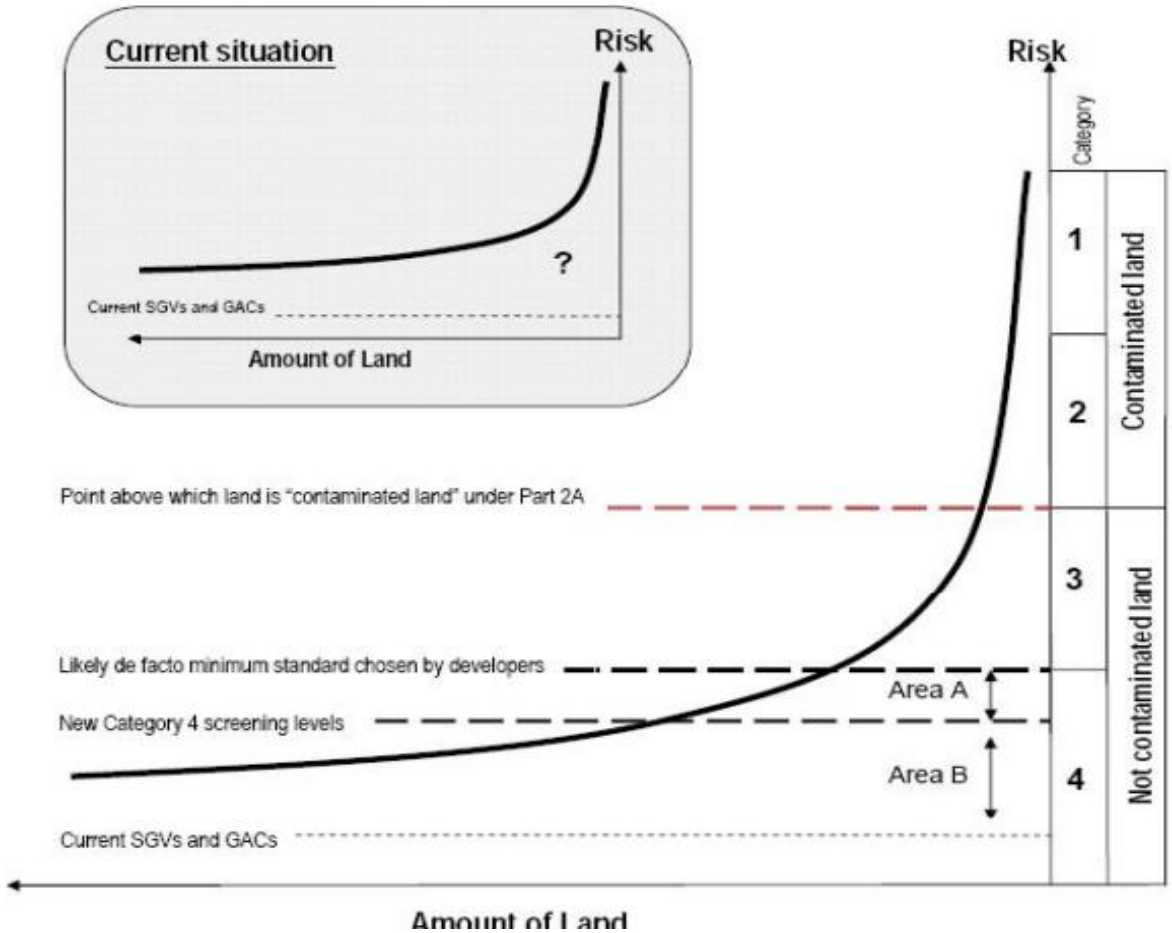
(d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.

(e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.

The way in which the new four category system is intended to operate and the place of the C4SLs within that system, was explained in detail in the Impact Assessment which accompanied the Statutory Guidance. Please note that although the detail of the Impact Assessment is included here to provide clarity on the job expected of C4SLs, the Statutory Guidance, itself, sets out the regime that needs to be delivered under Part 2A.

Paragraph 47 of the Impact Assessment describes the diagram in detail. Of particular relevance to this project is the description of the overall diagram (sub-paragraph a), description of category 4 (sub-paragraphs c (part iv) and h) and the description of how the monetised benefits of the new system will be realised (sub-paragraph h). These sub-paragraphs are reproduced below.

Diagram showing the new Category 1-4 system (compared to current situation)



The diagram above seeks to illustrate, in a simplified manner, broadly what the changes to the statutory guidance on significant possibility of significant harm to human health are intended to achieve. To explain:

(a) The curved line and axes illustrate the spectrum of risk presented by land contamination. The idea is to show that a very large amount of land is low risk, and only a small amount of land would pose sufficient risk to be contaminated land in the legal sense. The axes and lines in the diagrams are not to scale, and they have been compressed for the purposes of illustration (in reality the risks on Category 1 land would probably be orders of magnitude above Category 4 risks, and vastly more land would be in Category 4 compared to the other Categories).

(b) The smaller diagram summarizes the current situation. In the area below the SGV/GACs there is near certainty that land is not contaminated land, however, above the line there is increasing uncertainty. As explained above, currently remediation usually occurs to just below the SGV/GAC level because they are perceived as offering the only cast-iron guarantee of when land is definitely not contaminated land. Sometimes consultants are employed to justify remediating to levels above the SGV/GACs, however the further they go away from the SGV/GACs the more legal risk they and their clients are exposed to.

(c) The new statutory guidance will end the current situation, and it would not be legally possible e.g. for individual regulators to ignore the changes being made. For example, as explained above, the new statutory guidance will specifically say:

(i) that Part 2A cannot be used to force remediation to below a point where it ceases to be contaminated land in the legal sense i.e. the Category 2/3 border in terms of the diagram), although responsible parties can choose to go further;

(ii) that SGV/GACs cannot be used as one size fits all remediation thresholds under either Part 2A of the planning system;

(iii) that normal background levels of contamination are not caught by Part 2A; and

(iv) that SGV/GACs are well into Category 4, sometimes by only a few times and sometimes by orders of magnitude. These changes and others also provide the legal backing for the development e.g. of Category 4 screening levels, as discussed below.

(d) The new Category 1-4 system divides the spectrum of risk posed by contaminated land into four different categories, and the statutory guidance will explain how to decide when land falls into each Category. This is more sophisticated than the current statutory guidance, which in effect has only two categories (contaminated land or not) and does not explain how to decide which category land falls into. The new Category 1-4 system reflects what assessors find when they investigate real sites i.e. some are clearly contaminated land (Category 1) ; some clearly are not (Category 4) and some are less-straightforward and need some level of detailed assessment before a decision can be taken as to whether or not they are contaminated land (Categories 2 and 3).

(e) In the case of Category 2 and 3 sites, the regulator will have flexibility to take decisions within the parameters set by the new Guidance. There would be less flexibility for Category 2 and 3 sites that clearly pose either a high or low risk. However, the regulator will have considerable flexibility for sites closer to the Category 2/3 border to judge which side of the border a site would fall (e.g. taking account of their understanding of the risks, uncertainties and the interests of the local community). These are often complex decisions which need to be taken case-by-case given the many factors involved.

(f) In the case of Categories 1 and 4 the regulator will have far less flexibility. For example, if a regulator claimed that a site matching the Category 1 description was not contaminated land, or that a site matching the Category 4 description was contaminated land, they would be acting directly against the statutory guidance which the Act requires that they follow, and decisions could be challenged (e.g. in a law court) with a high chance that the challenge would be successful. Among other things, the intention of doing this is to create far more legal certainty around when land is definitely not contaminated land in the legal sense. With the specific wording of the new statutory guidance, and the supporting tools such as the new Category 4 screening levels, it would be very difficult for a regulator e.g. to threaten landowners with the Part 2A regime, and if they tried to determine land as contaminated land they would be operating in direct opposition to the statutory guidance.

(g) In the many consultation meetings held in developing the Category 1-4 system, all the developers, landowners and consultants we spoke to were strongly of the view that they would want the ensure their land is safely within Category 4 (even though in theory they could remediate to a level within Category 3 and still satisfy Part 2A and planning rules). They would do this for various reasons, including the fact that the flexibility granted to regulators in Categories 2 and 3 means that the further into Category 3 a site gets, the greater the risk that the regulator might decide it is in Category 2. Also they would want to be in Category 4 for reasons of marketability, future proofing etc. So developers and others would have a strong incentive to seek the regulatory certainty of being safely within Category 4. Thus, as far as development taking place under the planning system is concerned, Category 3 would, in effect, normally be a buffer which provides added reassurance that development falling within Category 4 will not be caught by the Part 2A regime.

(h) The new statutory guidance will bring about a situation where the current SGV/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land. Above the C4SLs, in Area A on the diagram, there will be much stronger legal backing for experts to use their judgement to make sensible and precautionary decisions on when land should be considered to be towards the top end of Category 4, without fear that land may be caught as contaminated land. This recognizes that the generic C4SLs will not be able to describe the Category 3/4 border itself because they are generic and would therefore have to err on the side of caution whilst a detailed site specific assessment would be able to push further by looking at specific circumstances relating to a specific site.

(i) The very large majority of the monetized benefits of the changes to the regime discussed in this Impact Assessment manifest themselves in Category 4, and in particular in Areas A and B on the diagram. The main effects of moving to the new system would include Low risk land falling within Area B (pre-development) on the diagram would no longer have to be remediated because it would fall below the new C4SLs. Similarly land which is in Area A pre-development would no longer need to be remediated if justified by a detailed site-specific assessment. For these sites the cost of remediation would be removed altogether. The cost of remediating land which is initially in Categories 3, 2 or 1 would fall because it would be remediated to the new C4SL levels (or somewhere within Area A if there has been a detailed assessment) rather than the SGV/GAC level. This will have the overall effect of reducing the cost of remediation, with the effect varying according to specific site circumstances, the type of remediation etc. Generally the cost of remediation would fall for many affected brownfield land sites. This would have the general effect of making such land more economically viable for development. It would also mean that some land that is not currently economically viable to develop becomes reduce pressure to develop Greenfield land in some cases. The C4SLs will also speed up regulatory decisions on the reuse of brownfield land by providing a simple remediation standard.

The C4SLs are intended as "*relevant technical tools*" (in relation to Paragraph 4.2.1(c)) provides to help local authorities and others when deciding to stop further assessment of a site, on the grounds that it falls within Category 4 (Human Health).

The Impact Assessment (IA), which accompanied the revised SG (Defra, 2012b) provides further information on the nature and potential role of the C4SLs. Paragraph 47(h) of the IA states that:

> *"The new statutory guidance with bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land".*

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

> *"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soils that, unless stated otherwise, are tolerable or pose a minimal risk to human health".*

C4SLs, therefore, should not be viewed as "SPOSH levels" and they should not be used as a legal trigger for the determination of land under Part 2A.

CL:AIRE (Contaminated Land: Application in Real Environments) has published "*Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*". In it a series of C4SLs were proposed as follows;

Analyte	Residential (with home grown produce) (mg/kg)	Residential (without home grown produce) (mg/kg)	Allotments (mg/kg)	Commercial (mg/kg)	POS (mg/kg)
Arsenic	37	40	49	640	79
Benzene	0.87	3.3	0.18	98	140
Benzo(a)Pyrene	5.0	5.3	5.7	77	10
Cadmium	22	150	3.9	410	880
Chromium (vi)	21	21	170	49	21
Lead	200	310	80	2300	630

6. GEOENVIRONMENTAL RISK ASSESSMENT

6.1 **Potential Hazard Sources.** Ground contamination can occur through several causes, particularly from historical use of the site and is often linked to the processes of waste disposal, underground storage, open storage, process pipework, leaks, spillages, tanks, site filling and various other reasons. The contamination can either arise from site sources or be the result of migration from other sources off site.

6.2 **Potential Migratory Pathways.** The primary pathways are considered to be laterally or vertically downward through underlying strata or upward to the ground surface. Such pathways also provide the potential for contaminants to migrate towards local watercourses and groundwater.

6.3 **Potential Targets At Risk.** Potential environmental liabilities related to current legislation associated with contaminated land with regard to existing ownership and redevelopment are summarised.

The probability of a hazard, linked with its consequences, can be used to assess risk in accordance with the tables below for use in decision making.

Consequence of Pollution Linkage

Severe	Damage to human health. Substantial pollution of controlled waters. Significant change in ecosystem population. Irreparable damage to property.
Moderate	Non-permanent damage to human health. Minor pollution of controlled waters. Change in ecosystem. Damage to property.
Mild	Short term health effects. Slight pollution of controlled waters. Slight effect on ecosystem. Minor repairable damage to property.
Near Zero	No noticeable effect on human health. No significant pollution to controlled waters. No measurable effect on ecosystem densities. Non-structural cosmetic damage to property.

Decision Making

Probability of a hazard and an associated linkage	Consequences of a pollution linkage (hazard-pathway-target)			
	Severe	Moderate	Mild	Near Zero
High	High	High	Medium/low	Negligible
Medium	High	Medium	Low	Negligible
Low	High/medium	Medium/low	Low	Negligible
Unlikely	High/medium/low	Medium/low	Low	Negligible

Final overall risk is based on an assessment of probability of a hazard and its consequences. Risk categories are shown shaded in the table above and defined below.

Risk	Description
High	Site probably or certainly unsuitable for present use or environmental setting. Contamination probably or certainly present and likely to have an unacceptable impact on key targets. Urgent action needed.
Medium/ Moderate	Site may not be suitable for present use or environmental setting. Contamination may be present, and likely to have unacceptable impact on key targets. Action may be needed on the medium term.
Low	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. Action unlikely to be needed in present use.
Negligible	Site considered suitable for present use and environmental setting. Contamination may be present but unlikely to have unacceptable impacts on key targets. No action needed while site remains in present use.

The review of the information from the exploratory investigation may be such that a decision is made that there is no need for further investigation. Alternatively, it may be necessary to carry out a further main investigation.

7. SITE WASTE MANAGEMENT PLANS (SWMPs)

In England, the SWMP Regulations 2008 came into force on 6th April 2008. They apply to 'construction projects', and to the whole life of a construction project, from design all the way through to completion. As well as including actual construction works, they include renovation projects, site preparation works, the installation of services, and all kinds of demolition. If you carry out a construction project where the value of the materials plus labour exceeds £300,000, it becomes a criminal offence (for both the project manager and the main contractor) not to produce a SWMP.

The Plans must include basic elements like who prepared it, who's in charge of the project, who's the main contractor, what's the location, and what's the estimated value. But it must also include details of the decisions taken at the outset on (1) the design of the project, (2) the methods employed and (3) the materials employed in order to MINIMISE the quantity of waste produced on site. It will therefore be crucial to have evidence of that thought process. The SWMP must describe each type of waste that will be produced, and estimate the volume. Then, you must identify the particular waste management 'action' that will apply to the waste. Is it to be dumped, sent for recycling, or perhaps recovered through use for land treatment under an exemption?

8. WASTE MANAGEMENT LICENSING

The Environment Agency has set out guidance as to the classification of waste arising from construction sites in its document "The Definition of Waste" dated April 2006. This document outlines how waste is to be handled

The following activities are not regarded as a waste management activity requiring licensing.

1) Construction activities carried out for the purpose of producing a suitably engineered soil e.g. lime stabilisation, vibro-replacement and piling.

2) Uncontaminated materials produced on site (including excavated soils and materials from demolition) which can be reused without further treatment. Examples include site regrading and footing excavations.

   These must be done in accordance with the Planning Permission. Demolition material must be used in accordance with the quality protocols for the production of aggregates from inert waste, subject to appropriate testing and the lack of any harmful constituents. Uses include pipe bedding, backfill and sub-base.

3) Contaminated soils can be moved on-site providing they do not require treatment or containment. There should be no risk to the environment i.e. non-leachable and in accordance with Planning Permission. Relevant activities can include site regrading and use of materials below clean cover systems, capping, buildings and hardstanding.

Where contaminated materials have to be placed in an engineered cell to prevent pollution, then this would be classed as landfilling and require PPC permits. Any material taken off site is considered to be waste. However, this is under review. If material is waste, then there is a duty of care including ensuring material is transported by a registered carrier. The destination of material leaving the site should be regularly checked and Waste Transfer Notes kept.

Clean Covers Systems

According to the Environment Agency's Remediation Position Statements of May 2006, the placement of a cover system using "clean" material is not treatment of waste. Consequently, no licensing/permitting position statements are applicable to this type of remediation. If the cover system uses 'waste materials' in its construction, waste management licensing exemption paragraph 9A may be applicable to its installation. If the installation of the proposed cover system does not meet the criteria for registration of this exemption, the activity may be regulated through a waste management site licence.

9. WASTE ACCEPTANCE CRITERIA (WAC)

The main objective of the Landfill Directive is to prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It is intended to reduce the disposal of waste materials to landfills and to encourage more sustainable approaches to dealing with wastes. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and provides for the classification of landfills as sites for inert, hazardous or non-hazardous waste and prohibits co-disposal.

It sets out procedures for waste acceptance at landfills and the types of waste for each class of landfill as specified by Waste Acceptance Criteria (WAC). The WAC are predominantly lists of "limit values" for certain parameters obtained from standard leaching tests of wastes going to landfills. WAC are set out in the Landfill Directive itself. Full details can be found in the Environment Agency document "Guidance for waste destined for disposal in landfills" Version 2 June 2006.

10. GAS MONITORING

In March 2007, the NHBC issued a report entitled "Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present".

The document recommends that a Conceptual Site Model is produced at the desk study stage. This can be used to produce a Preliminary Risk Assessment (PRA), with a view to assessing whether a ground gas investigation is necessary. The NHBC guidance suggests that the production of a PRA is a preliminary tool only and "cannot remove

the need entirely for ground gas monitoring data ..". This suggests that gas monitoring is needed in all circumstances. This would normally comprise the use of gas monitoring wells over a suitable time period in order to establish maximum gas concentrations and flow rates.

Our view however, and it may not be the view of the NHBC or the Local Authority, is that if there is no evidence of any gas producing source and if spike testing or on-site testing shows no evidence of landfill gases, then we regard the risk of hazardous gas production to be minimal such that further on-going monitoring would not be required. This is in line with the concept of there being no significant risk of significant harm i.e. no contamination. If there is any element of doubt, basic gas protection measures can be installed at minimal cost and each site dealt with individually.

11. MAIN REFERENCES

British Standards Institution	BS3882: British Standard Specification for Topsoil, 2015 BS5930: British Standard Code of Practice for Site Investigations, 1999 BS8485: British Standard Code of Practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings, 2015 BS10175: British Standard Code of Practice for the Investigation of Potentially Contaminated Sites, 2001
BRE	Radon: Guidance on protective measures for new dwellings, BR211, 2015 Protective measures for housing on gas-contaminated land, BR414, 2015 Cover systems for land regeneration, 2004 Concrete in aggressive ground. Special Digest SD1, 3rd Edition, 2005
Cairney T	Reclaiming Contaminated Land, 1987 Contaminated Land, Problems and Solutions, 1993
CIEH	The LQM / CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
CIRIA	Assessing risks posed by hazardous ground gases to buildings, CIRIA C665 Asbestos in Soil and Made Ground: a guide to understanding and managing risks, CIRIAC733, 2014
CL:AIRE	Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, SP1010, 2013

DOE	CLR reports 1-4 Waste Management Paper No. 26A "Landfill completion: A technical memorandum…" Waste Management Paper No. 27 "Landfill Gas: A technical memorandum…"
DEFRA	Contaminated Land Report CLR 11, 2002 (7-10 withdrawn) R & D Publications TOX 1 – 12, 14, 16 – 25 R & D Publications SGV 1, 3, 4, 5, 7, 8, 9, 10, 15 and 16 (withdrawn) Improvements to Contaminated Land Guidance - "Outcome of the "Way Forward", 2008 Exercise on Soil Guideline Values. July 2008 Guidance on the Legal Definition of Contaminated Land. July 2008 Simplification of the Contaminated Land Regime Impact Assessment No: Defra 1133
DETR	Circular 02/2000. Contaminated Land, 2000 Guidelines for Environmental Risk Assessment and Management, 2000
Environment Agency	Guidance for the Safe Development of Housing on Land Affected by Contamination, 2000 Guidance for waste destined for disposal in landfills, Version 2, June 2006 Protective measures for housing on gas-contaminated land Remediation Position Statements, May 2006 Guidance and monitoring of landfill leachate, groundwater and surface water Human health toxicological assessment of contaminants in soil (Science Report SC050021/SR2) 2008 Updated technical background in the CLEA model (Science Report SC0520021/SR3)
HMSO	Part 2A of the Environmental Protection Act Part 2A Statutory Guidance – April 2012 Contaminated Land (England) Regulations 2006 The contaminated Land (England) (Amendment) Regulations 2012 The Water Act 2003 (Commencement No. 11) Order 2012 Welsh Government Statutory Guidance on Contaminated Land
Institution of Civil Engineers	Contaminated Land: Investigation, Assessment and Remediation, 2nd Edition
Joyce M D	Site Investigation Practice, 1982
NHBC	Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present, 2007
OPDM	Planning Policy Statement 23: Planning and Pollution Control Annex 2: Development on Land Affected by Contamination

This list is not intended to be exhaustive.

© February 2017



Michael D Joyce Associates LLP

Geotechnical and Geoenvironmental Consultants

Charnock Court 6 South Parade Wakefield West Yorkshire WF1 1LR

Tel: 01924 360458

Web: www.geoenvironmental.co.uk Email: mdja@geoenvironmental.co.uk