



Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Road, Dewsbury, WF12 7BU

t 01924 464342 f 01924 450662 e martin@haighhuddleston.co.uk

Geo-environmental Ground Investigation Report

ON

PROPOSED RESIDENTIAL DEVELOPMENT

AT

DONCASTER ROAD, DARFIELD

FOR

SAUL CONSTRUCTION LTD

JUNE 2023

E18/7309/R002

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0.0 EXECUTIVE SUMMARY

- SITE**
- The site is irregularly shaped, with Doncaster Road and Barnsley Road forming the northern boundary and residential properties to the east. To the west and south the boundary is formed by an overgrown watercourse with fields beyond.
- The majority of the site consists of two grassed fields separated by an overgrown former sand pit with mature tree growth located centrally. Further tree growth is noted in the north east of the site.
- Overhead powerlines cross the site from north to south, with a pylon located north of the former sandpit, and an oil pipe is known to cross the north western corner of the site.
- The site falls from the north to the south.
- HISTORY**
- The site has generally been shown as open fields since 1854. A well was shown in the north east of the site from 1931 to 1966, and a quarry/sandpit was shown centrally from 1948 to 1966. The overhead powerlines were first shown in 1987. The only development immediately adjacent the site has been the residential properties to the east from 1966 to the present day.
- GEOLOGY**
- Superficial deposits of glaciofluvial sands and gravels are shown to overlie the central half of the site.
- The northern half of the site and the south western tip are underlain by sandstone of the Mexborough Rock Formation and Ackton Rock Formation respectively. Remainder of the site underlain by Pennine Middle Coal Measures consisting of Mudstone, Siltstone and Sandstone.
- Historical landfill recorded in north west of the site.
- Fault line recorded crossing southern half of site from west to east.
- The site investigation proved the site could be divided into three distinct areas. In the former sandpit and land immediately adjacent there was a thin layer of topsoil overlying made ground with a mudstone/sandstone bedrock. In the very north of the site, there was a thin layer of topsoil overlying sands with a sandstone/mudstone bedrock. For the majority of the site, there was a thin layer of topsoil overlying clays with a mudstone bedrock.
- Outside the areas of landfill and made ground, the bedrock was encountered at depths of 0.7-2.2m below existing ground levels.

MINING/QUARRYING	<p>The Coal Authority Report states that the surface area of the site could be affected by past underground mining in 14 seams of coal at 180 to 750m depth, last worked in 1990. Any movement in the ground due to coal mining activity should have stopped.</p> <p>There are two claims for subsidence within 50m of the site where the claims have been rejected. A third claim within 50m of the eastern boundary is noted but the action is not declared.</p> <p>A quarry was shown in the north west corner of the site from 1948-1966 and was subsequently used for landfill.</p>
HYDROLOGY	<p>The nearest open water features are the open watercourses on the eastern and western boundaries of the site that flow southwards.</p> <p>A small area of the site at the southern tip is shown to be within a Zone 2 floodplain.</p>
HYDROGEOLOGY	<p>The superficial strata and bedrock underlying the site are classified as Secondary (A) Aquifers.</p> <p>Groundwater was recorded within two of the trial pits during the site investigation work, one of these contained land drains.</p> <p>During the gas monitoring, water has been recorded up to the surface within the monitoring stations, with local flooding. Flooding has been recorded in the boreholes adjacent the watercourses in the south of the site, and within the re-engineered material in the north of the site, this is likely due to perched groundwater.</p>
HAZARDOUS GAS	<p>Basic Radon Protection Measures are required for the site.</p> <p>Carbon dioxide concentrations between 0.7% and 7.5% have been recorded on site, with all but one of the elevated readings occurring within or adjacent the former sandpit. It is likely that a preferential pathway has been formed from the gas generating material within the former sandpit through the highly weathered sandstone and sands and gravels and re-engineered material.</p> <p>Based on the maximum concentrations and gas flow rates measured, the gas regime found on this site can be currently classified as CS2 where the properties are founded onto the sands and gravels, sandstone, or on piles within the re-engineered material. Elsewhere on site it may be classified as CS1.</p> <p>Further gas monitoring could be undertaken on site to better determine the extent of site that requires CS2 protection measures.</p>

CONTAMINATION	<p>Only the samples of fill material from within the former sandpit proved elevated levels of contaminants including Chromium, Sulphide, PAH (Total), individual PAH compounds and a single sample proved positive for asbestos. The samples of natural strata outside the sandpit proved clean from contaminants.</p>
REMEDIATION	<p>Due to the presence of asbestos within the fill material, it is recommended that the topsoil capping recorded over the fill be increased to 1m in depth. The topsoil on site should be stockpiled and fenced off prior to developing the site to prevent cross contamination. Further testing will be required to provide a robust sample set confirming the topsoil is suitable to remain on site. The topsoil should be screened prior to being relaid in garden areas to remove any deleterious materials.</p>
FOUNDATIONS	<p>We would suggest that the proposed two storey residential constructions should be constructed on strip/trench fill footings founded entirely onto the clay or sand strata. Where mudstone/sandstone is encountered within the excavations, the foundations should be deepened to lie entirely onto the mudstone/sandstone strata to avoid differential settlement. The foundation widths will vary dependent upon the line loadings calculated.</p> <p>Due to the steep nature of the site, and the requirement to raise ground levels in the south and north west, piled foundations may be required. IN addition to this, piled foundations will be required where the properties overlie the re-engineered material adjacent the sandpit. A review of the foundation proposals should be undertaken following design of finalised plot levels.</p>

1.0 INTRODUCTION

- 1.1 As requested by Saul Construction, this practice carried out ground and contamination investigation works to the proposed development at Doncaster Road, Darfield.
- 1.2 The purpose of the report was to:-
- 1.2.1 Identify the nature of the near surface strata, in order to enable recommendations to be made as to the most economic foundation solution for the proposed residential development.
 - 1.2.2 To identify any areas of contaminated ground.
 - 1.2.3 Propose a suitable outline remediation strategy, which will enable the site to be developed safely, to the satisfaction of the overseeing regulators and in compliance with the current environmental standards.
 - 1.2.4 Determine if ground gas migration from landfills recorded in the vicinity would adversely affect the site.
- 1.3 Soil sampling was undertaken via trial pits to determine the near surface strata. Distributed samples were taken for testing to ascertain the nature of the soils and fills present.
- 1.4 The conclusions and recommendations made in this report are limited to the findings of the preliminary Geotechnical Survey. The report is made on condition that Haigh Huddleston Associates will not in any circumstances be liable for loss, arising directly or indirectly from ground conditions encountered between trial pits and boreholes, which have not been revealed by the investigation.
- 1.5 Any opinion given on the possible configuration of strata between trial pit and borehole locations and below maximum depth of the investigation is for guidance only. Any remarks on groundwater conditions made are based solely on observations made at the time of investigation. Kindly note that levels may differ from those reported due to seasonal variations or other influences.
- 1.6 Furthermore, there is the possibility that any trial pits or boreholes undertaken as part of the investigatory works may be within the influence of existing or proposed foundations or excavations. Haigh Huddleston Associates cannot be held responsible for any failure of any excavations, foundations or structures within the influence of the trial pits or boreholes.

2.0 THE SITE

- 2.1 The site is located to the south of Doncaster Road, Darfield. It is situated around Ordnance Survey grid reference 440215,404985. A site location plan is included in Appendix A.
- 2.2 The site is irregularly shaped, with boundaries formed by watercourses to the west and south-west, Doncaster road to the north and residential properties to the east. There is vehicular access from Doncaster road along the northern boundary of the site and pedestrian access on the Southern boundary. The overall site area is approximately 17.55ha.
- 2.3 The site primarily consists of two grassed fields separated by an overgrown former quarry area and small overgrown embankment which is partially tree-lined. The north-western corner of the site is an area of short grass. An occasionally tarmacked access track between the two grassed fields is present at the southern tip of the northern field. Several overhead electric lines cross the site from north to south and west to east with supporting poles located within the fields on site. An oil pipeline crosses the north western corner of the site.
- 2.4 Tree growth is noted in the former quarry area and along the embankment separating the northern and southern fields. Further tree growth is noted at the north eastern corner of the northern field at the boundary of the site and Barnsley Road. There is a hedgerow to the northern boundary.
- 2.5 Overgrown watercourses extend along the western boundary of the southern area of the site. These are occasionally bridged to connect the footpath links between the fields.
- 2.6 The site slopes from north to south at a grade of approximately 1 in 20. A high point of approximately 67.21m AOD is located approximately half way along the northern boundary of the site and a low point of approximately 35.08m in the south corner.

3.0 SITE HISTORY

A number of historical Ordnance Survey plans from 1854-2014 have been consulted. These are contained for reference within Appendix C to the rear of the report. Below is a brief description outlining the significant developments that may effect future construction of the site.

	Historical uses on site	Historical findings within 100m perimeter of the site	Historical findings further than 100m perimeter of the site
1854	<p>i). The site is shown as field divided into five, two in the northern half and three in the southern.</p> <p>ii). A drainage ditch follows the southern quarter of the hedge line between the two northernmost fields.</p> <p>iii). Tree growth shown in the two southernmost fields.</p>	<p>i). The site is surrounded by fields.</p> <p>ii). A pond ~100m long is shown to the east of the southern tip of the site extending to the east.</p>	<p>i). Old sandstone quarry ~650m to the west of the site</p> <p>ii) River Dove runs SE to NW ~700m to the SW of the site.</p> <p>iii). Another pond is shown at Netherwood Hall ~500m to the SSE of the site.</p> <p>iv). Narrow gauge railway connected to Old Quarry (~800m to SE) running to the S and SE of the site ~300m away.</p>
1894	<p>i) Fields now divided into 2, one in N and one in S.</p> <p>ii). Footpath now bisects the southern field and follows field partition to the NW.</p> <p>iii). Row of trees along previous hedge line no longer seen. New trees shown along SE boundary of the site, and approximately a quarter of the way along the new field partition.</p>	<p>i) No significant developments within 100m of the site.</p>	<p>i). Darfield Main Colliery shown ~500-700m south of the site.</p> <p>ii). Sandpit shown ~400m S of the site.</p>
1904	<p>i). The on-site features are similar to the previous sheet.</p>	<p>i) No significant developments within 100m of the site.</p>	<p>i). Railway lines shown ~250m S of the site extending to the SW.</p>
1931	<p>i). A well is shown in the ~50m from the W boundary of the site, and 150m from the N boundary.</p> <p>ii). A watercourse is shown to flow NW to SE along the SE boundary of the site for ~350m.</p> <p>iii). Wooded area is shown just south of the boundary between the N and S fields, extending ~50m to the S.</p>	<p>i). Building shown immediately to the W of the NW corner of the site</p> <p>ii) Another well is shown ~50m W of the NW corner of the site.</p>	<p>i) 7 new buildings shown to the N of Netherwood Hall ~300m from the S tip of the site</p>

	Historical uses on site	Historical findings within 100m perimeter of the site	Historical findings further than 100m perimeter of the site
1938	i). The on-site features are similar to the previous sheet.	i). New lane shown at road immediately north of the NE corner of the site.	i). New Residential development ~500 - 700m to the E of the site. ii) Housing developments expanded ~500m to the E of the site.
1948-1955	i). A quarry (~100m across) is shown in the NW quarter of the site	i). No significant developments within 100m of site.	i). Sandpit to the south of the site is shown to have been enlarged. ii) Housing developments ~500m to the E of the site expanded further.
1966-1967	i). Quarry appears to have been filled. Access lane remains shown. ii). Well is no longer shown.	i). Further residential developments in to the east of the site. ii). Railway lines to the S of the site extended, now ending ~50m from the southern tip of the site	i) Large scale excavation shown ~600m to the SW of the site. ii) Significant development of residential areas to the East of the site. iii). Refuse or slag heap shown ~300m to the SW of the site.
1987-1992	i). Fields comprising the site are joined, with an area enclosed in the central and western areas. ii). Overhead powerlines shown crossing the site from N to S with pylon shown north of filled sand pit.	i). Residential area to the E of the site expanded to the E boundary of the site.	i). Mine pits to the S of the site filled in/used as refuse tips. ii) Pond shown beside disused tip. iii). Large disused tip ~250m SW of the site, mine workings shown to be disuse however colliery buildings still shown.
2002	i). Water course along western boundary of site identified as drainage sinks. ii). More buildings shown immediately to the W of the NW corner of the site.	i). Disused tip no longer shown.	i). Darfield Main Colliery buildings no longer shown.
2010	i). The on-site features are similar to the previous sheet.	i). No significant developments within 100m of the site.	i). No significant developments further than 100m from the site.
2014	i). The on-site features are similar to the previous sheet.	i). Pond shown immediately to the W of the NW quarter of the site.	i). No significant developments further than 100m from the site.

4.0 SITE GEOLOGY & MINING

- 4.1 The BGS Digital Geological Map of Great Britain at 1:10,000 scale has been consulted and we would report as follows:-
- 4.2 The central half of the site is underlain by superficial deposits of glaciofluvial sand and gravel from the mid Pleistocene.
- 4.3 The northern half of the site is underlain by the Mexborough Rock Formation consisting of Sandstone from the Bolsovian Sub-age, with the Ackton Rock Formation of sandstone from the same Sub-age underlying the south western boundary. The central and southern area of the site is shown to be underlain by the Pennine Middle Coal Measures Formation consisting of Mudstone, Siltstone and Sandstone from the Bolsovian and Duckmantian Sub-ages. It is inferred that coal seams extend into the site from the west, intersecting approximately half way down the west boundary of the site.
- 4.4 A fault runs NW to SE across the site, intercepting ~200m from the southern tip of the site and separating the lower third of the site from the upper two thirds.
- 4.5 The Coal Authority Report is included in Appendix D and states that the site is located in a known mining area, suggesting that surface area of the site could be affected by past underground mining in 14 seams of coal at 180 to 750m depth, last worked in 1990. Any movement in the ground due to coal mining activity should have stopped.
- 4.6 The property is not in area where the Coal Authority has granted, or plans to grant, a licence to remove or otherwise work coal using underground methods.
- 4.7 There are no known coal mine entries within, or within 20 metres of, the boundary of the property.
- 4.8 There are two claims for subsidence within 50m of the site where the claims have been rejected. A third claim within 50m of the eastern boundary is noted but the action is not declared.

4.9 There are three BGS boreholes recorded within 70m of the northern boundary of the site. These generally show mudstone and siltstone to depths of 40m with bands of coal encountered at 2.4m, 4m 12-15m, 30-32 and 41m between them.

5.0 ENVIRONMENTAL CONSIDERATIONS

5.1 Radon

The property is in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level.

Basic Radon Protective Measures are necessary.

5.2 Landfill Sites

Historical landfill sites are shown in the north-western corner of the site, and to the west of the north-western corner of the site. In addition to this, there is possible infill material to the former pond 150m east of the site and former workings located 225m south west of the site.

5.3 Flood Risk

The site is almost entirely located outside of flood risk zones, however a small area at the southern tip of the site is within zone 2 floodplain, adjacent to the watercourses

5.4 Groundwater

Both the bedrock and superficial deposits underlying the site are classified as a Secondary (A) Aquifers. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flows to rivers. These are generally aquifers formerly classified as minor aquifers.

There are no recorded groundwater or surface water abstraction licences recorded within 250m of the site.

There are no recorded licensed discharge consents within 500m of the site.

There are no recorded pollution incidents in controlled waters within 500m of the site.

The site is not located in a Source Protection Zone.

7 surface water features are shown on the site. These are identified as the drainage watercourses at the eastern and western boundaries of the site which flow to the south.

6.0 **PRELIMINARY CONCEPTUAL SITE MODEL**

- 6.1 The initial stage in assessing the risks posed from contaminated land during the redevelopment of a site is to prepare a conceptual model. A generalised conceptual model can be developed highlighting the main pollutant linkages through a contaminant ► pathway ► receptor model for the construction of a residential development. In order to prepare the conceptual model for a particular site the following parameters need to be reviewed as discussed below.
- 6.2 Contamination of existing land can be caused by a number of factors, including:-
- i) Possible historical/current industrial activities.
 - ii) Disposal of waste materials.
 - iii) Storage of materials.
 - iv) A number of natural processes can also lead to hazardous gases and elevated heavy metals.
- 6.3 Potential pathways can include ground and surface water, permeable strata, existing services providing a conduit and voided ground. Potential receptors can include human health, ecosystems, controlled waters and building structures. There are a number of ways that a receptor can be exposed to the contaminant these include, inhalation, direct contact, ingestion, dermal contact and uptake.
- 6.4 Potentially contaminative historical uses of land around the site are noted, 7 of which are located within the site boundaries. These are identified as: two unspecified quarries, two refuse heaps, two unspecified workings and a single unspecified pit. The majority of these are potentially infilled sites originating from the area's mining history. There is a risk of contamination from the following:
- i. Possible contaminated material used as infill to quarry and disused pits on site.
 - ii. Possible contaminated material used as infill to former well in North East of site.
 - iii. Ground gas migration and leaching from refuse heaps onsite, disused tips 193 and 208m to the SW of the site.
 - iv. Material from historic quarrying/mining processes.

The potential for some contamination to exist on site is therefore considered to be low/moderate.

- 6.5 Considering the proposed residential end use of the site, there will be two possible human receptor groups exposed to the existing onsite contamination:-
- a) Site operatives during development.
 - b) End users, future site users (the critical receptor is a 6 year old female).
- 6.6 Human receptors may be exposed to site contamination by a number of possible pathways. These pathways are summarised in Table 1 below.

Table 1- Potential Human Exposure Pathways

<u>Human Exposure Pathway</u>	<u>Site Users</u>	<u>Construction Workers</u>
Soil Ingestion	YES	YES
Consumption of Home Grown Vegetables	YES	NO
Dermal Contact	YES	YES
Dust Inhalation	YES	YES
Gases/Vapours	YES	NO

- 6.7 The construction workers will come into contact with any contaminated soil to a far greater extent than future residents. The exposure pathways are generally through dermal contact and indirect ingestion. However their exposure will be for a limited time and the provision and correct use of personnel protective equipment and adequate welfare facilities during construction should restrict their risks to acceptable levels.
- 6.8 The risk of pollution to controlled waters by existing contamination is considered low. There has been no recorded historical usage of the site likely to cause heavy contamination to the ground. There are no licensed ground water or surface water abstractions within 250m of the development.
- 6.9 No specific areas of ecological importance have been identified in the initial desk top study. Therefore the site is considered to be in a low risk environmental setting.

7.0 FIELDWORK

- 7.1 Site investigation works were undertaken on the 23rd and 24th of September 2019. A total of thirty-nine trial pits were undertaken using a tracked 8-tonne excavator with 600mm wide bucket. In addition to this, twenty-seven rotary boreholes were undertaken, seven of which were installed with piezometers to enable gas monitoring.
- 7.2 Materials encountered in the trial pits and boreholes were examined and categorised. Trial pit and borehole logs are contained within Appendix B of the report.
- 7.3 The site investigation works were designed to achieve comprehensive site coverage within the proposed development area, in particular the former quarry and the potential fault line crossing the site. However, the presence of the existing oil pipelines and overhead powerlines restricted the investigation..
- 7.4 Soil samples were removed from the natural and made ground deposits within the trial pits. The samples were removed by operatives wearing gloves and placed into airtight clean plastic containers and glass bottles for transportation to the laboratory.
- 7.5 A total of twenty samples from the natural and made ground deposits were recovered from the trial holes for chemical analysis during the site investigations. The testing was carried out by a UKAS accredited laboratory to nationally or accredited in-house methods. The results of the contamination testing are contained within Appendix C of this report.
- 7.6 A suite of common potential contaminants consisting of heavy metals, phytotoxic metals, sulphates, sulphides and poly-aromatic hydrocarbons was analysed for, including a range of metals and inorganic substances, asbestos and extractable petroleum hydrocarbons.
- 7.7 All samples were stored in airtight containers within cool boxes at approximately 4°C until delivery to the laboratory within 48 hours.

8.0 RESULTS OF THE INVESTIGATION

8.1 GEOTECHNICAL INVESTIGATION

8.1.1 A copy of the trial hole and borehole logs providing a complete record of strata encountered beneath the proposed development is presented in Appendix B.

8.1.2 The site investigation proved the site could be divided into three distinct areas. In the former sandpit and land immediately adjacent there was a thin layer of topsoil overlying made ground with a mudstone/sandstone bedrock. In the very north of the site, there was a thin layer of topsoil overlying sands with a weathered sandstone/mudstone bedrock. For the majority of the site, there was a thin layer of topsoil overlying clays with a weathered mudstone bedrock.

8.1.3 NORTH OF THE SITE (TP01, TP10-TP13, TP20).

8.1.3.1 In the northern higher area of the site, TP10-TP13 proved short grass on 0.2-0.3m of topsoil overlying 0.8-1.7m of completely weathered sandstone excavated as sand and fine gravels. At the base of these trial pits a highly weathered sandstone excavated as angular gravels was encountered at 1.0-1.9m below existing ground levels.

8.1.3.2 In TP01 and TP20, slightly south of the above trial pits, 0.3m of topsoil was proved overlying a 0.7-0.9m thick layer of clayey sand with occasional clay pockets. At the base of these two trial pits, a firm brown/grey clay with mudstone/sandstone gravels was encountered at 1.0-1.2m below existing ground levels and extended to the base of the trial pit at 2.4-2.8m below existing ground levels.

8.1.4 FORMER SANDPIT AND INFILLED LAND (TP02-TP09, TP16, TP37-38)

8.1.4.1 TP02-TP05 were undertaken within the former sandpit and proved made ground to depths in excess of 4m. The made ground consisted of a loose mix of concrete slabs, bricks, gravels, sections of tarmac, plastic, clays and stone cobbles. In TP03 a former metal tank was encountered at 1.2m depth that exuded a hydrocarbon odour. TP02 and TP05 terminated in this strata at a depth of 4.0m below existing ground levels.

- 8.1.4.2 In TP04 and TP05, underlying the loose fill material, re-engineered sands and gravels were encountered at a depth of 2.3m and extended to the base of the trial pit at 2.9m below existing ground levels.
- 8.1.4.3 TP06-TP09 were undertaken to the north west of the former sand pit. These proved 0.3-0.4m of dark brown topsoil overlying re-engineered ground consisting of loose reddish brown clayey sands and gravels with occasional sandstone cobbles. TP06, TP08 and TP09 terminated in this strata at depths of 2.4-2.6m. In TP07, a highly weathered sandstone was encountered at a depth of 2.4m and extended to the base of the trial pit at 3.4m below existing ground levels.
- 8.1.4.4 TP37 and TP38 were undertaken to the south east of the former sand pit. Both of these trial pits proved 0.2m of topsoil overlying re-engineered sand with occasional clay pockets, sandstone cobbles and mudstone gravels to a depth of 3.1-4.8m below existing ground levels.

8.1.5 REMAINDER OF SITE (TP14, TP15, TP17-TP19 and TP21-TP36)

- 8.1.5.1 In the remainder of the site, the trial pits proved 0.2-0.4m of topsoil overlying a 0.5-2.0m thick layer of soft to stiff yellowish brown/grey clays. These were noted to be occasionally sandy with mudstone gravels encountered at depth. TP22 and TP28 were terminated in the clay strata at depths of 2.3m and 2.8m below existing ground levels respectively.
- 8.1.5.2 In TP33 immediately west of the sandpit, a 0.7m thick layer of sand was encountered at 0.3-1.0m below ground level. This was underlain by 1.6m of soft to firm brown/grey clay with
- 8.1.5.3 At the base of the remainder of the trial pits, a moderately weak highly weathered mudstone that was excavated as angular gravels was encountered. This was encountered at 0.7-2.2m below existing ground levels.
- 8.1.5.4 In TP24 in the south east of the site, a 0.2m thick layer of coal with clay and shale was encountered at 1.7-1.9m below existing ground levels. This was not encountered in any of the other trial pits or boreholes in the vicinity.

8.1.5.5 TT26 and TT31 were excavated to a depth of 1.5m and extended to a depth of 12m to locate the projected fault line from the geological plans. There was no evidence of a discontinuation in the trenches.

8.1.6 HISTORICAL WELL

8.1.6.1 The topsoil was scraped in a 10x10m area to expose the underlying clay strata for inspection of any features to confirm the presence of the historical well. No discolouration or features were identified that could be associated with the historical well.

8.1.7 BOREHOLES

8.1.7.1 Outside the former sand pit, the boreholes generally proved up to 2.7m of soils and clays, with sandstone or mudstone bedrock encountered at 1.1-2.7m below existing ground levels and extending to the base of the borehole 12m below existing ground levels.

8.1.7.2 Within the former sandpit, the boreholes proved up to 8.5m of made ground. The boreholes indicated a gradual slope from the eastern boundary towards the west, but there is the potential for high wall features to the northern, southern and western boundaries of the former sandpit. A sandstone or mudstone bedrock was proven to the base of the former pit, with a loss of flush within the made ground meaning it was not possible to determine the underlying strata in some of the boreholes.

8.1.7.3 A summary of the materials encountered within the boreholes is presented in Table 2 below.

Table 2 Summary of Borehole Results

BH No.	SOIL	MADE GROUND	CLAY	NATURAL HARD STRATA	SANDSTONE	MUDSTONE	INSTALLATION
01	-	0.0-8.5	-	8.5-12.0	-	-	N
01A	-	0.0-3.0	-	-	-	-	Y
02	0.0-0.2	-	0.2-2.7	-	2.7-8.1	8.1-12.0	N
02A	0.0-0.2	-	0.2-2.7	-	2.7-3.0	-	Y
03	-	0.0-8.4	-	8.4-10.0	-	-	N
03A	-	0.0-3.0	-	-	-	-	Y
04	-	0.0-2.0	-	-	2.0-4.0	-	N
05	-	0.0-2.0	-	-	2.0-4.0	-	N
06	-	0.0-2.0	-	-	2.0-4.0	-	N
07	-	0.0-2.5	-	-	2.5-4.0	-	N
08	-	0.0-3.2	-	-	3.2-5.0	-	N
09	-	0.0-3.6	-	-	3.6-5.1	5.1-9.0	N
10	-	0.0-4.1	-	-	4.1-6.0	-	N
11	-	0.0-6.6	-	6.6-9.0	-	-	N
12	-	0.0-5.3	-	-	-	5.3-9.0	N
12A	-	0.0-3.0	-	-	-	-	Y
13	0.0-0.2	-	0.2-1.5	-	8.2-12.0	1.5-8.2	N
13A	0.0-0.2	-	0.2-1.5	-	-	1.5-3.0	Y
14	0.0-0.2	-	0.2-1.3	-	-	1.3-12.0	N
15	0.0-0.2	-	0.2-1.3	-	-	1.3-12.0	N
16	0.0-0.2	-	0.2-1.1	-	-	1.1-12.0	N
16A	0.0-0.2	-	0.2-1.1	-	-	1.1-3.0	Y
17	0.0-0.2	-	0.2-1.2	-	-	1.2-12.0	N
18	-	0.0-6.2	-	6.2-9.0	-	-	N
19	-	0.0-1.2	-	-	1.2-3.0	-	Y
20	0.0-0.2	0.2-2.6	-	-	2.6-6.1	6.1-9.0	N
20A	0.0-0.2	0.2-2.6	-	-	2.6-3.0	-	Y

8.1.8 The result of the geotechnical analysis undertaken on the samples of clayey soil indicates the clay to be of low plasticity (Plasticity Index 9-10%). If the modified results are calculated, taking into account the percentage of material retained on a 425micron sieve, the results correspond to a low shrinkage clay. The test certificates are contained in Appendix C.

8.2 GROUNDWATER

- 8.2.1 Groundwater was only encountered in two of the trial pits during the site investigation works. In TP15, two land drains were encountered at a depth of 0.8m which emptied into the trial pit. In TP18, there was ground water ingress in the base of the pit at 2.2m below existing ground levels.
- 8.2.2 No water strikes were recorded during the borehole drilling. During the gas monitoring, water has been recorded up to the surface within the monitoring stations, with local flooding. This was in BH13 and BH16 adjacent the watercourse on the southwestern boundary, and in BH19 and BH20 in the re-engineered ground and was most likely perched groundwater.
- 8.2.3 It should be recognised that ground water levels may vary throughout the year. During periods of heavy rainfall the groundwater levels may be substantially higher than the results revealed in these investigations.

8.3 GAS MONITORING

- 8.3.1 As discussed previously BH01, BH02, BH03, BH12, BH13, BH16, BH19 and BH20 were installed with gas standpipes and lockable covers. Gas testing was undertaken on seven separate occasions between 16th October 2019 and 5th May 2020.
- 8.3.2 A standard gas monitoring procedure has been followed in accordance with CIRIA guidance, including measurement of the following:-
- i) Methane, Oxygen and Carbon Dioxide concentrations.
 - ii) Atmospheric Pressure.
 - iii) Gas Flow Rate.
 - iv) Standing water level.
- 8.3.3 A complete set of the gas monitoring results are included in Appendix C to the rear of the report.
- 8.3.4 During the monitoring, it was not always possible to get a reading from every borehole. Due to the high water levels recorded, on occasion the monitoring stations were flooded preventing the monitor being attached. On one occasion, some of the monitoring stations had been tampered with preventing the readings being taken.

- 8.3.5 A methane concentration of 0.4% was recorded in BH12 within the former sand pit on the first round of gas monitoring. There has been no methane recorded in any of the boreholes since.
- 8.3.6 Carbon dioxide concentrations between 0.7% and 7.5% have been recorded on site, with all but one of the elevated readings occurring within or adjacent the former sandpit. BH13 at the south of the site recorded a single marginally elevated concentration of 5.6% of carbon dioxide.
- 8.3.7 Reduced oxygen levels as low as 0.2% were recorded during the gas monitoring and were associated with the higher carbon dioxide levels and the single methane concentration recorded. These were in boreholes BH1, BH2, BH3 and BH12 which were within, or immediately adjacent the former sand pit, indicating that there is still ground gas generation occurring.
- 8.3.8 Flow rates were only recorded in BH13 and BH16 on the first visit to site. The peak flow rates of 91.7 l/hr and 36.7 l/hr are likely the result of the air being compressed within the standpipe as the water levels were above the response zone. Hence it is likely that the flow rates are related directly to pressure / vacuum effects within the partly-flooded borehole, rather than relating to gas ingress / migration.

9.0 CONTAMINATION

9.1 HUMAN HEALTH RISK ASSESSMENT

9.1.1 The appraisal of contaminated land within the UK is based on a risk assessment approach. The method involves the principle of defining a source ► pathway ► receptor, linkage to establish a human health risk. For any risk to exist to a potential receptor from an identified contaminant there must be an unbroken source ► pathway ► target relationship.

9.1.2 In the first instance site data for the contaminant levels are compared against guidance such as the CLEA values published by DEFRA. Should the site values exceed the guidance criteria, the contamination levels are recognised to have the potential to pose a risk to human health. Two scenarios are then available:-

- a) To break or remove one of the source ► pathway ► receptor linkages, by specifying an appropriate level of remedial work. Examples of remedial action may include the removal of the contaminated material or alternatively specifying a sufficient capping layer.
- b) The alternative approach is to provide a more detailed human health site specific risk assessment. This will involve examining factors such as soil properties, exposure assumptions, groundwater flows and contamination composition.

9.2 CONTAMINATION RESULTS

9.2.1 As stated above, in order to put the analytical results into context, the data has in the first instance been assessed in relation to several sets of guidelines: -

9.2.2 The analytical results have been assessed via an initial screening assessment with regard to the current Contaminated Land Exposure Assessment model (CLEA UK) for human health, which has been produced for the Environment Agency and the Department of Environment, Food and Rural Affairs (DEFRA). The CLEA model provides Soil Guideline Values (SGVs) for a limited range of contaminants only, and these are based on risk to human health. As such they do not take into account potential risks to other receptors eg groundwater and third party land.

- 9.2.3 It is proposed to redevelop the site for residential properties with private garden areas. Soil results have therefore been assessed against Generic Assessment Criteria (GAC) based on guidelines from the Chartered Institute of Environmental Health (CIEH) and Land Quality Management Ltd (LQM) S4UL document. Where there is no GAC, guidance limits have been adopted from sources referenced in the table below.
- 9.2.4 In addition to the above, the calculation of SGVs based on an acceptably low level of risk is currently being undertaken. These Category 4 Screening Levels (C4SL) have been calculated for six substances to date by modifying the toxicological/exposure parameters within CLEA. C4SLs have been used as tier 1 trigger levels within this assessment, superseding the previous CIEH and LQM SGVs.
- 9.2.5 Assessment of risk is considered as a tiered approach. Assessment based on non intrusive means is considered Tier 1 assessment, comparison against SGVs and GACs is a Tier 2 assessment, and the generation of and comparison with Site Specific Assessment Criteria (SSAC) is a Tier 3 assessment and is conducted where deemed appropriate following the Tier 2 assessment.
- 9.2.6 The sulphate and acid concentrations have been compared against the BRE digest "Concrete in Aggressive Ground" parts 1-4. This will enable the concrete class to be specified in relation to possible contact with aggressive soils.
- 9.2.7 The results of the chemical analysis are presented on the laboratory analysis sheets with Appendix C. A summary of the significance of the results is presented in Table 3.

Table 3**Comparison of contaminant against accepted guidance values for residential use with plant uptake**

<u>CONTAMINANT</u>	<u>SGV</u> <u>MG/KG</u>	<u>CONCENTRATION IN</u> <u>ALL SOILS.</u> <u>MG/KG</u>	<u>No. OF</u> <u>SAMPLES</u> <u>EXCEEDING</u> <u>GUIDANCE</u> <u>VALUES</u>	<u>PERCENTAGE</u> <u>OF SAMPLES</u> <u>EXCEEDING</u> <u>GUIDELINE</u> <u>VALUE</u>
Arsenic	37 (4)	7.9-35	0/20	
Cadmium	22 (4)	<0.1-0.5	0/20	
Chromium (Total)	130 (2)	13-1400	3/20	15%
Lead	200 (4)	18-72	0/20	
Mercury (Total)	40 (1,5)	<0.05-0.12	0/20	
Selenium	250 (1)	<0.5-4.6	0/20	
Copper	2400 (1)	14-300	0/20	
Nickel	180 (1)	12-110	0/20	
Zinc	3700 (1)	56-330	0/20	
Sulphate	0.24 (3)	0.02-0.35	3/20	15%
Thiocyanate	50	<0.6-1.5	0/20	
Sulphide	250	<10-560	1/20	5%
Naphthalene	2.3 (1)	<0.1-17	3/20	15%
Benzo(a)pyrene	5 (4)	<0.1-29	0/20	
Benzo(a)anthracene	7.2(1)	<0.1-33	3/20	15%
Benzo(b)fluoroanthene	2.6(1)	<0.1-14	5/20	25%
Chrysene	15(1)	<0.1-32	2/20	10%
Dibenzo(ah)anthracene	0.24(1)	<0.1-3.1	5/20	25%
PAH (Total)	40	<1.6-410	5/20	25%
EPH (Total)	250	260-1500	5/5	100%
Phenols	760 (1)	<0.3-1.4	0/20	
Asbestos	No fibres	Bundle of Chrysotile fibres present	1/18	5.5
pH	6-8	6.1-11.8	5/20	25%

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(2) DEFRA CLR SGV's withdrawn used for initial comparison

(3) BS 8110 1985 Table 6.1

(4) Category 4 Screening Levels

(5) Unless there is considered to be historical site usage that would result in elemental and methylmercury compounds to be present, the inorganic mercury SGV is used as this is the most prevalent for of mercury present in the natural environment.

9.2.9 Only the samples of made ground from TP01-TP05 within the former sand pit proved elevated levels of contaminants, these included:

- Elevated levels of Chromium (160-1400mg/kg) in TP02 and TP05
- Elevated levels of Sulphide (560mg/kg) in TP04
- Elevated levels of PAH (Total) (51-410mg/kg) in TP01-TP05
- Elevated levels of Naphthalene (4.4-17mg/kg) in TP02-TP04
- Elevated levels of Benzo(a)pyrene (5.1-29mg/kg) in TP01-TP04
- Elevated levels of Benzo(a)anthracene (13-33mg/kg) in TP02-TP04
- Elevated levels of Benzo(b)fluoranthene (3.6-23mg/kg) in TP01-TP05
- Elevated levels of Chrysene (20-32mg/kg) in TP02 and TP03
- Elevated levels of Dibenzo(ah)anthracene (0.4-3.1mg/kg) in TP01-TP05

9.2.10 Elevated levels of EPH (Total) of 260-1500 mg/kg were recorded in five of the samples from the former sandpit.

9.2.11 Due to the level of EPH (Total) exceeding 260 mg/kg, speciated analysis has been undertaken on two of the samples showing the highest elevated levels of EPH (Total) and the results are shown in Table 4 below :-

Table 4**Comparison of recorded contaminant levels against speciated EPH LQM S4UL screening values for residential use with plant uptake**

Petroleum Hydrocarbons	LQM S4UL Screening Values (mg/kg)	Recorded Concentrations	No. of samples exceeding Screening Values
Aliphatics			
C5-C6	42	<0.01	0/2
C6-C8	100	<0.01	0/2
C8-C10	27	<0.01	0/2
C10-C12	130 (38)	<1.5	0/2
C12-C16	1100 (24)	<1.2-9.2	0/2
C16-C35	65000 (8.48)	12.5-178	0/2
Aromatics			
C5-C7	70	<0.01	0/2
C7-C8	130	<0.01	0/2
C8-C10	34	<0.01	0/2
C10-C12	74	<0.9	0/2
C12-C16	140	<0.5-7.0	0/2
C16-C21	260	<0.6-51	0/2
C21-C35	1100	36-320	0/2

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9.2.12 The speciated analysis proves that the individual carbon bands are below their respective tier 1 trigger levels.

9.2.13 Only the sample of made ground at 1.5m from TP04 within the former sandpit proved positive for asbestos. This was a bundle of Chrysotile fibres.

9.2.14 The samples of natural strata from outside the former sand pit submitted for analysis proved clear of contaminants.

9.2.15 Elevated levels of sulphate of 0.29-0.35% and a minimum pH of 6.5 were recorded in the fill material in TP03-TP05. Based on these levels, in the former sandpit a design sulphate class of DS-2, ACEC class AC-2 should be adopted. No elevated levels of sulphate were recorded outside the made ground/fill areas, however a minimum pH

of 6.1 was recorded. Therefore a design sulphate class DS-1, ACEC class AC-1, should be adopted for the remainder of the site when compared against the BRE Special Digest 1 “Concrete in aggressive ground”.

9.3 **QUALITATIVE RISK ASSESSMENT**

9.3.1 The Qualitative Risk Assessment is based upon the previously discussed source ► pathway ► receptor principle. In relation to the proposed site these may be described as follows:-

9.3.2 **SOURCE**

- i) Elevated levels of CO₂ up to 7.5%.
- ii) Elevated levels of contaminants within the former sand pit area.

9.3.3 **PATHWAYS**

- i) Ingestion of contamination material.
- ii) Inhalation of contaminated particles.
- iii) Dermal contact with the known contamination.
- iv) Leaching to controlled waters.

9.3.4 **RECEPTORS**

- i) Residential site users.
- ii) Construction and maintenance workers.
- iii) Controlled waters.
- iv) The building structure.

9.3.5 Each of the receptors will now be appraised and attribute the likely risks involved.

i) Residential site users.

Based on the elevated levels of contaminants listed in paragraphs 9.2.9-9.2.13 there is currently a **low** risk to end users from contamination on-site.

The elevated levels of contamination, including asbestos fibres, are restricted to the former sandpit that has been infilled on site. Due to the volume of fill material, it is likely that this will be retained on site. Due to the presence of asbestos within the fill material, it is recommended that the topsoil capping recorded over the fill be increased to 1m in depth.

The topsoil on site should be stockpiled and fenced off prior to developing the site to prevent cross contamination. Further testing will be required to provide a robust sample set confirming the topsoil is suitable to remain on site. The topsoil should be screened prior to being re-laid in garden areas to remove any deleterious materials.

Carbon dioxide concentrations between 0.7% and 7.5% have been recorded on site, with all but one of the elevated readings occurring within or adjacent the former sandpit. BH13 at the south of the site recorded a single elevated concentration of 5.6% of carbon dioxide. This borehole was noted to be regularly flooded and the elevated carbon dioxide recorded is likely the result of dissolved gases within the groundwater becoming trapped in the headspace rather than as a result of ground gas migration.

Reduced oxygen levels as low as 0.2% were recorded during the gas monitoring and were associated with the higher carbon dioxide levels and the single methane concentration recorded. These were in boreholes BH1, BH2, BH3 and BH12 which were within, or immediately adjacent the former sand pit, indicating that there is still ground gas generation occurring.

It is likely that a preferential pathway has been formed from the gas generating material within the former sandpit through the highly weathered sandstone and sands and gravels recorded primarily to the north east of the sandpit. We would therefore recommend that where the foundations are to be formed on the sand or weathered sandstone strata, or where piled through the re-engineered ground adjacent the sand pit, that the site can be classified as **CS2** by BS 8485:2015 Table 2. Alternatively, further gas monitoring can be undertaken to determine the extent of the ground gas migration through the sands/sandstone and reduce the area requiring gas protection measures.

Elsewhere on site, the overlying clays and mudstone strata will restrict the ground gas migration. We would therefore recommend that where the foundations are formed on the underlying clay or mudstone strata, that the site can be classified as **CS1** by BS 8485:2015 Table 2.

ii) Construction and Maintenance Workers.

It is considered that there is a **low** risk to construction and maintenance workers from the redevelopment of the site.

Construction workers should always wear PPE including overalls, boots and gloves when handling the contaminated materials onsite. In addition eating, drinking and smoking should be restricted to designated areas where the above hygiene facilities are available.

iii) Controlled Waters

The chemical analysis undertaken on samples of the natural strata from site have proved a limited area of contaminated made ground on site. The excavation work undertaken has proven the site downhill of the infilled sandpit to consist of relatively impermeable clays. It is therefore considered that there is a negligible risk to groundwater and controlled waters from existing contamination on site.

Due to the presence of the watercourse on the southern boundary of the development site, a temporary works plan should be prepared to ensure no surface water run-off during development on site causes pollution to the watercourse.

iv) Building Structures.

Elevated levels of sulphate of 0.29-0.35% and a minimum pH of 6.5 were recorded in the fill material in TP03-TP05. Based on these levels, in the former sandpit a design sulphate class of DS-2, ACEC class AC-2 should be adopted. No elevated levels of sulphate were recorded outside the made ground/fill areas, however a minimum pH of 6.1 was recorded. Therefore a design sulphate class DS-1, ACEC class AC-1, should be adopted for the remainder of the site when compared against the BRE Special Digest 1 "Concrete in aggressive ground".

Service providers should be forwarded the final validated chemical levels in order for them to provide an accurate specification for the apparatus to be provided. New services should be surrounded and backfilled with clean material to afford some protection to the apparatus and allow any future maintenance work to be undertaken in clean material.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 GEOTECHNICAL ASSESSMENT

- 10.1.1 Except in the former sandpit, which is not proposed for building on and the re-engineered materials immediately adjacent the sandpit, the fieldwork generally proved sands or clays overlying a sandstone or mudstone bedrock. For initial design purposes we would envisage a safe bearing capacity of 100kN/m² where foundations are cited onto the clay or sand strata and 150kN/m² where foundations are extended onto the weathered mudstone or sandstone strata.
- 10.1.2 We would therefore initially suggest that the proposed two/three storey residential constructions should be constructed on strip/trench fill footings founded entirely onto the sand and clay strata. Where mudstone/sandstone is encountered within the excavations, the foundations should be deepened to lie entirely onto the mudstone/sandstone strata to avoid differential settlement. The foundation widths will vary dependent upon the line loadings calculated.
- 10.1.4 However, it should be noted that due to the existing slope of the site and final highway design, that a cut/fill exercise will need to be undertaken and in places, the ground will be raised above existing ground levels. In particular it is noted that ground levels will need to be raised above the existing pipe line recorded in the north west of the site. In this instance, piling or other methods, may be the better foundation option. We would recommend that the final foundation design is to be determined following detailed examination of the final site levels and required foundation depths.
- 10.1.5 In addition to this, adjacent the sandpit there was in excess of 2.4m of re-engineered ground that would not be a suitable founding strata. It is recommended that in these areas piled foundations will be required that extend into the underlying bedrock.
- 10.1.6 All foundations should be placed below a line of 45° drawn up from the base of any services or other structures.
- 10.1.7 Where existing foundations or structures are encountered during construction, these should be totally removed from the excavations to enable the new foundations to be constructed without obstructions.

- 10.1.8 At present it is not expected that excessive ground water control measures will be required during winter months. It should be noted however that there is likelihood of perched groundwater within the re-engineered material adjacent the former sandpit, and that elevated groundwater levels were recorded adjacent the watercourse on the south western boundary. Please note that ground water flows can vary throughout the year and a further assessment should be undertaken if construction work is proposed following a prolonged rainfall event.
- 10.1.9 Elevated levels of sulphate of 0.29-0.35% and a minimum pH of 6.5 were recorded in the fill material in TP03-TP05. Based on these levels, in the former sandpit a design sulphate class of DS-2, ACEC class AC-2 should be adopted. No elevated levels of sulphate were recorded outside the made ground/fill areas, however a minimum pH of 6.1 was recorded. Therefore a design sulphate class DS-1, ACEC class AC-1, should be adopted for the remainder of the site when compared against the BRE Special Digest 1 "Concrete in aggressive ground".
- 10.1.10 Wherever any foundations are located near existing or proposed new trees, their foundations must be sited below the root growth zone. Reference should be made to the NHBC standards Chapter 4.2 "Building Near Trees" which provides guidance on foundation criteria, depths and construction. All services should be similarly protected. Plasticity testing of the clays on site has shown them to be of low volume change potential.

10.2 GROUND FLOOR SLAB – GAS MEASURES

- 10.2.1 As discussed previously, gas monitoring stations were installed in eight of the borehole locations on site due to the presence of the infilled sandpit in the centre of the site.
- 10.2.2 Carbon dioxide concentrations between 0.7% and 7.5% have been recorded on site, with all but one of the elevated readings occurring within or adjacent the former sandpit. BH13 at the south of the site recorded a single marginally elevated concentration of 5.6% of carbon dioxide. This borehole was noted to be regularly flooded and the elevated carbon dioxide recorded is likely the result of dissolved gases within the groundwater becoming trapped in the headspace rather than as a result of ground gas migration.

10.2.3 Reduced oxygen levels as low as 0.2% were recorded during the gas monitoring and were associated with the higher carbon dioxide levels and the single methane concentration recorded. These were in boreholes BH1, BH2, BH3 and BH12 which were within, or immediately adjacent the former sand pit, indicating that there is still ground gas generation occurring.

10.2.4 It is likely that a preferential pathway has been formed from the gas generating material within the former sandpit through the highly weathered sandstone and sands and gravels, and re-engineered material recorded primarily in the vicinity of the sandpit. We would therefore recommend that where the foundations are to be formed on the sand or weathered sandstone strata, or where piled through the re-engineered ground adjacent the sandpit, that the site can be classified as **CS2** by BS 8485:2015 Table 2. Alternatively, further gas monitoring can be undertaken to determine the extent of the ground gas migration through the sands/sandstone and reduce the area requiring gas protection measures.

10.2.5 Elsewhere on site, the overlying clays and mudstone strata will restrict the ground gas migration. We would therefore recommend that where the foundations are formed on the underlying clay or mudstone strata, that the site can be classified as **CS1** by BS 8485:2015 Table 2.

10.2.6 Basic Radon Protection measures are required for the site.

10.2.7 Where the properties are to be founded on the underlying sand or sandstone strata, or piled within the re-engineered material adjacent the sandpit, we would recommend the following construction details based on a **CS2** classification to achieve a score of 4.5 in accordance with BS 8485:1015 tables 5-7:

- Fully vented minimum 150mm deep void below suspended slab. To be increased to 250mm where the proximity of trees affect the foundation construction. 2.5 Points
- Continuous membrane across the cavity/party walls. 0 Points
- Cavity tray in the external walls. 0 Points
- Fully sealed service entries and ducts to manufactures specification. 0 Points
- Beam and block floor slab 0 Points
- A Visqueen Gas Barrier meeting all of the following criteria: 2.0 Points
 - Sufficiently impervious to gasses with a methane gas Transmission rate <40.0ml/day/m2/atm (average) for sheets and joints (tested in accordance with BS ISO 15105-1 manometric method).
 - Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas Emissions.
 - Sufficiently strong to withstand in-service stresses (eg. Settlement if placed below a flood slab).
 - Sufficiently strong to withstand the installation process And following trades until covered (eg. Penetrations From steel fibres in fibre reinforced concrete, Penetration from reinforcement ties, tearing due to Working above it, dropping tools etc.)
 - Capable, after installation, of providing a complete Barrier to the entry of the relevant gas.
 - Verified in accordance with CIRIA C735 [N1]

Total **4.5 Points**

10.3 CONTAMINATION ASSESSMENT

- 10.3.1 The elevated levels of contamination listed in paragraphs 9.2.9-9.2.13, including asbestos fibres, are restricted to the former sandpit that has been infilled on site. Due to the volume of fill material, it is likely that this will be retained on site. Due to the presence of asbestos within the fill material, it is recommended that the topsoil capping recorded over the fill be increased to 1m in depth.
- 10.3.2 The samples of natural strata from outside the former sand pit submitted for analysis proved clear of contaminants.
- 10.3.3 The topsoil on site should be stockpiled and fenced off prior to developing the site to prevent cross contamination. Further testing will be required to provide a robust sample set confirming the topsoil is suitable to remain on site. The topsoil should be screened prior to being relaid in garden areas to remove any deleterious materials
- 10.3.4 Should any suspected areas of contamination be exposed during site strip/construction, an engineer should be contacted to determine if additional chemical testing should be undertaken. The on-site staff should maintain a photographic record and dates of any exposed contaminated material.
- 10.3.5 It is not currently anticipated that any topsoil will be required to be imported to site based on the currently available information. However, should any material need to be imported, all imported material should be tested for the range of contaminants listed previously in Table 3. Only material found to be below published trigger levels should be deemed uncontaminated and accepted for use on site.
- 10.3.6 If the imported material is from a Greenfield site, a minimum of 3 samples or 1 per 250m³ of imported material should be taken for testing, whichever is greater. If it is from a brownfield site, a minimum of 6 samples, or 1 per 100m³ of imported material should be taken for testing, whichever is greater. Material provided by a commercial supplier should be certified to the same level of testing, with the certificate less than two months old.
- 10.3.7 All imported certified material should be placed immediately. If this is not possible, or the material is not certified and sampling is to be carried out prior to being laid, it

should be securely stored on site prior to use to prevent possible contamination from any materials on site.

- 10.3.8 If any areas of made ground are removed off site, they should be taken to a licensed waste site and full documentation should be obtained. Any material to be taken off-site should be suitably quarantined prior to removal to prevent cross contamination. Any relevant chemical test results should be given to the landfill operator, so that they can determine if this material is suitable to be disposed of in their licensed landfill.

11.0 SUGGESTED FURTHER WORK

- 11.1 Further testing to be undertaken on topsoil following stockpiling to confirm its suitability for use.
- 11.2 Temporary works to be agreed to prevent surface water run-off from site during development contaminating the watercourse on the southern boundary of the site.
- 11.3 Further investigation works to be undertaken to determine the location of the recorded historical well.
- 11.4 Further investigation works to be undertaken to locate fault line recorded southern half of the site.
- 11.5 Further gas monitoring to be undertaken to better establish the extent of site requiring gas protection measures.

12.0 APPROVALS

12.1 Proposals for the remediation of contaminated land may require the approval of numerous bodies.

These include:

- a) Barnsley MBC Environmental Health Department as required by the building and planning regulations.
- b) The NHBC or similar as they will provide the insurance costs to cover the property.
- c) The Environment Agency if there are risks of contamination to ground or surface water systems. They will also require notification if material is removed from site and taken to an appropriate tip.
- d) Relevant highways and drainage authorities and other service companies may also wish to know about the level of contaminants.

Prepared by



M. Dean. BSc(Hons) HND

Checked by



M. Huddleston. MEng

June 2023

This report is subject to the provisions of the Copyright Acts and is for the sole benefit of Saul Construction in respect of the proposals described.

APPENDIX A

Site Location Plan

Trial Pit Location Plan

Typical Site Conceptual Model

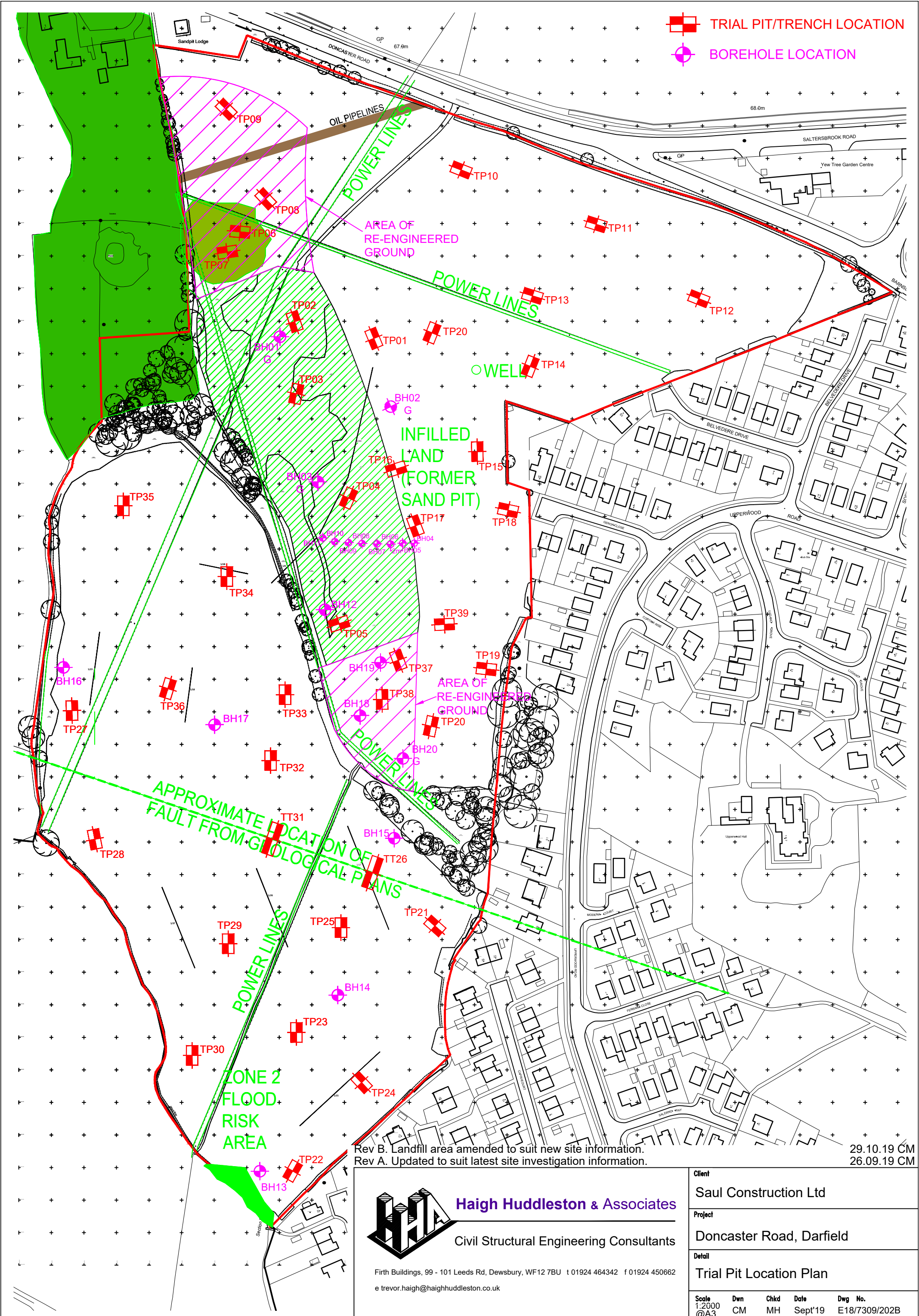
Enviro Insight

Address: DONCASTER ROAD, DARFIELD, S71 5EZ
Date: 25 Jul 2018
Reference: GS-5269510
Client: Haigh Huddleston & Associates



Aerial Photograph Capture date: 07-Jun-2013
Grid Reference: 440215,404985
Site Size: 17.55ha

Report Reference: GS-5269510
Client Reference: SAUL_7309



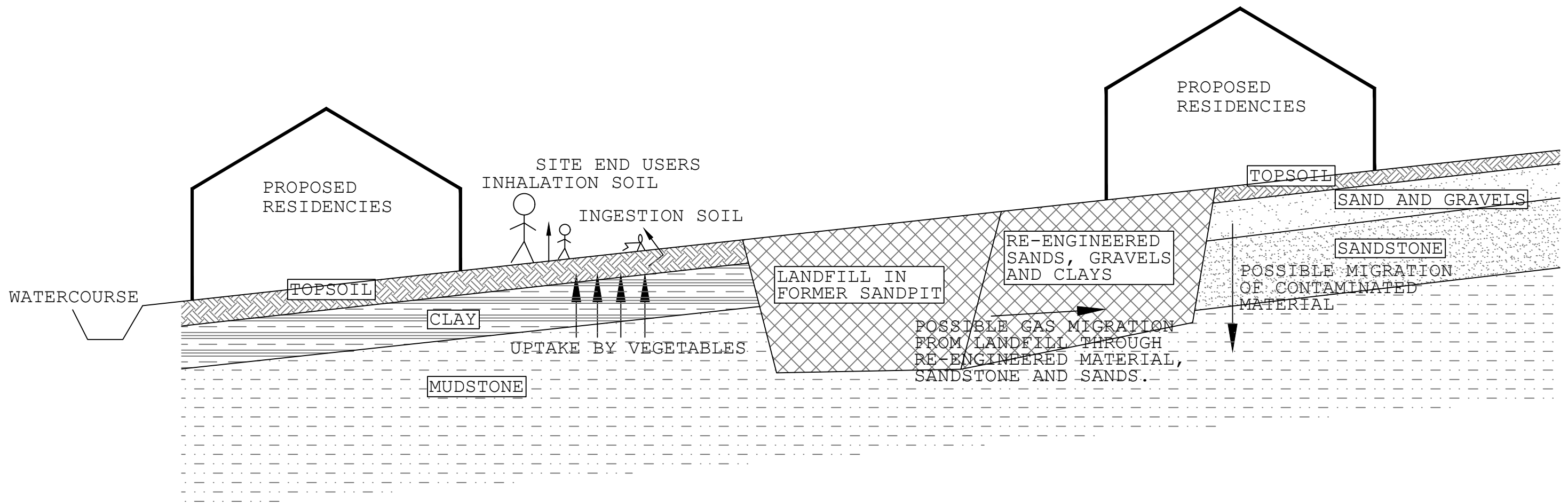
Rev B. Landfill area amended to suit new site information.
 Rev A. Updated to suit latest site investigation information.


29.10.19 CM
 26.09.19 CM

HHA **Haigh Huddleston & Associates**
 Civil Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Rd, Dewsbury, WF12 7BU t 01924 464342 f 01924 450662
 e trevor.haigh@haighhuddleston.co.uk

Client	Saul Construction Ltd			
Project	Doncaster Road, Darfield			
Detail	Trial Pit Location Plan			
Scale	Dwn	Chkd	Date	Dwg No.
1:2000 @A3	CM	MH	Sept'19	E18/7309/202B



 Haigh Huddleston & Associates Civil Structural Engineering Consultants Firth Buildings, 99 - 101 Leeds Rd, Dewsbury, WF12 7BU t 01924 464342 f 01924 450662 e trevor.haigh@haighhuddleston.co.uk	Client	Saul Construction Ltd		
	Project	Doncaster Road, Darfield		
	Detail	Typical Site Conceptual Model		
	Scale	Dwn	Chkd	Date
NTS	MD		Jun'23	E18/7309/32

APPENDIX B

Trial Hole Logs

Borehole Logs



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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 1

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Brown loamy topsoil. Sample taken at 0.2m.
0.5		Medium dense light brown sand with occasional clay pockets.
1.0		
	1.2	Firm brown/grey very sandy clay with numerous sandstone gravels.
1.5		
2.0		
	2.4	
2.5		
3.0		
3.5		
	4.0	

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES @ 0.2m
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 2

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
0.5		
1.0		
1.5		Sample taken at 1.5m.
2.0		
2.5		
3.0		
3.5		
4.0	4.0	End of trial pit

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES @ 1.5m
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 3

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.1	Made ground consisting of fill gravel, concrete, brickwork & tarmac scalpings (landfill waste).
0.5		
1.0		
1.5		
2.0		
2.5	2.5	Large section of brickwork fill and concrete sections from 2.5m. (landfill waste)
3.0		
3.5		
4.0	4.0	End of Trial Pit.

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES @ 1.0m.
Sides of excavation remained stable	YES
Level

NOTES:

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t 01924 464342
f 01924 450662
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FORM HHA 5

TRIAL HOLE NO. 4

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
		Made ground containing brickworks, gravels, clays (landfill waste).
0.5		Note former metal tank located at 1.2m. hydrocarbon odour.
1.0		
1.5		Sample taken at 1.5m.
2.0		
2.3		
2.5		Firm yellowish brown very sandy clay (possible made ground).
2.9		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES @ 1.5m.
Sides of excavation remained stable	YES
Level

NOTES:

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f 01924 450662
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FORM HHA 5

TRIAL HOLE NO. 5

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
		<p>Made ground fill material consisting of gravels, sands, soils and larger stone cobbles. (Possibly inert material)</p> <p>Sample taken at 0.8m.</p>
0.5		
1.0		
1.5		
2.0		
	2.3	
2.5		
	2.9	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES @ 0.8m.
Sides of excavation remained stable	YES
Level

NOTES:

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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 6

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.4	Short grass over dark brown topsoil.
0.5	2.4	Made ground – Very loose reddish brown clayey sands and gravels with occasional large sandstone cobbles
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable NO – collapsing from 1.0m.
Level

NOTES:

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f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 7

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
		Short grass over dark brown topsoil.
0.5		
	0.6	
		Made ground – loose reddish brown clayey sands and gravels with occasional large sandstone cobbles
1.0		
1.5		
2.0		
	2.4	
2.5		Highly weathered light brown sandstone excavated as fine angular gravels.
3.0		
	3.4	
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	NO
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 8

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Short grass over dark brown topsoil.
0.5		Made ground – loose reddish brown clayey sands and gravels with occasional large sandstone cobbles
1.0		
1.5		
2.0		
2.5	2.5	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	NO
Sides of excavation remained stable	YES
Level

NOTES:

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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 9

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Short grass over dark brown topsoil. Sample taken at 0.2m.
0.5		Made ground – loose reddish brown clayey sands and gravels with occasional large sandstone cobbles
1.0		
1.5		
2.0		
2.5	2.6	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.2m.
Sides of excavation remained stable	YES
Level

NOTES:

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Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 10

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short grass over dark brown topsoil. Sample taken at 0.1m.
0.5		Completely weathered light brown sandstone excavated as sand and fine gravels.
1.0		
1.5		
	1.9	
2.0		Highly weathered light brown sandstone excavated as angular gravels.
	2.1	
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.1m.
Sides of excavation remained stable	YES
Level

NOTES:

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FORM HHA 5

TRIAL HOLE NO. 11

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		Short grass over dark brown topsoil.
	0.2	
		Completely weathered light brown sandstone excavated as sand and fine gravels.
0.5		
1.0		
1.5		
	1.9	
2.0		Highly weathered light brown sandstone excavated as angular gravels.
	2.1	
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	NO
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 12

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short grass over dark brown topsoil. Sample taken at 0.1m.
0.5		Completely weathered light brown sandstone excavated as sand and fine gravels.
1.0	1.0	
1.5		Highly weathered light brown sandstone excavated as angular gravels.
2.0	2.1	
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.1m.
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 13

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Short grass over dark brown topsoil.
0.5	1.4	Completely weathered light brown sandstone excavated as sand and fine gravels.
1.0		
1.5	2.1	Highly weathered light brown sandstone excavated as angular gravels.
2.0		
2.5	4.0	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.1m.
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 14

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0	
0.3	Short grass over dark brown topsoil.
0.5	Clay land drain at 0.4m. Firm light grey clay.
0.8	
1.0	Weak weathered light grey mudstone excavated as angular gravels.
1.5	
2.0	
2.1	
2.5	
3.0	
3.5	
4.0	

REMARKS:

Ground water encountered during excavation	NO
Sample taken	NO
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 15

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short vegetation over dark brown topsoil.
		Soft/firm light grey clay. 2 No. clay land drains at 0.8m.
0.5		
1.0	1.0	
		Weak weathered light grey mudstone excavated as angular gravels.
1.5		
2.0		
	2.4	
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	NO
Sides of excavation remained stable	Water ingress from land causing sides to become unstable.
Level

NOTES:

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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 16

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short vegetation over dark brown topsoil. Sample taken at 0.2m.
0.5	1.1	Made Ground - Soft light brown/orange sandy clay containing numerous sandstone gravels.
1.0		
	1.6	Sample taken at 1.2m. Made Ground - Soft dark grey/black clay.
1.5		
2.0	2.8	Weak weathered light grey mudstone excavated as angular gravels.
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.2 & 1.2m.
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 17

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short vegetation over dark brown topsoil.
0.5		Soft light brown/orange sandy clay containing numerous gravels.
	0.8	
1.0		Firm light grey clay.
1.5		
2.0	2.0	
		Weak weathered light grey mudstone excavated as angular gravels.
	2.4	
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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99-101, Leeds Road,
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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 18

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Short vegetation over dark brown topsoil.
	0.5	Soft/firm light brown/orange sandy clay.
	0.7	
	1.0	Weak weathered light grey mudstone excavated as angular gravels.
	1.5	
	2.0	
	2.2	
	2.5	
	3.0	
	3.5	
	4.0	

REMARKS:

Ground water encountered during excavation	Water ingress at base
Sample taken	NO
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 19

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.2	Dark brown topsoil.
		Soft/firm light brown very sandy clay.
0.5		
1.0		
1.5		
	1.6	
		Firm light brown clay (completely weathered mudstone).
2.0		
	2.2	
		Moderately weak dark grey mudstone excavated as angular shale.
2.5	2.5	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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FORM HHA 5

TRIAL HOLE NO. 20

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Dark brown topsoil.
0.5	1.0	Medium dense reddish brown slightly clayey sand.
1.0	2.8	Firm dark grey clay with gravels of weak shaley mudstone.
1.5		
2.0		
2.5		
3.0	4.0	
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 21

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.4	Dark brown topsoil. Sample taken at 0.3m.
0.5	0.8	Firm yellowish brown sandy clay.
1.0	1.1	Firm/stiff light grey clay.
1.5	1.8	Firm grey/brown clay.
2.0	2.2	Weak grey mudstone excavated as angular weak grey clay.
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation	NO
Sample taken	YES at 0.3m.
Sides of excavation remained stable	YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 22

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Dark brown topsoil.
0.5	0.8	Firm orange brown very sandy clay.
1.0	1.9	Firm grey clay with sandy gravels.
1.5		
2.0	2.3	Firm light/dark grey clay with mudstone gravels.
2.5	4.0	
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 23

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0	
0.3	Dark brown topsoil.
0.5	Firm light brown very sandy clay.
1.0	
1.5	Moderately weak brown/grey mudstone with occasional clay excavated as angular gravels.
1.7	
2.0	
2.5	
3.0	
3.5	
4.0	

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 24

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Dark brown topsoil.
0.5	0.8	Firm yellowish brown sandy clay.
1.0	1.7	Very weak brown grey mudstone. Excavated as completely weathered clay with sandstone angular gravels.
1.5		
	1.9	Weak black coal with clay and shale.
2.0	2.4	Moderately weak grey mudstone excavated as angular gravels.
2.5	3.0	
3.5	4.0	

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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FORM HHA 5

TRIAL HOLE NO. 25

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Dark brown topsoil.
0.5	1.2	Firm light brown sandy clay.
1.0		
1.5	1.9	Weak brown/grey clay with numerous small mudstone gravels.
2.0		
2.2	2.2	Moderately weak light grey mudstone excavated as angular gravels.
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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Civil Structural Engineering Consultants

Firth Building,
99-101, Leeds Road,
Dewsbury, WF12 7BU

t 01924 464342
f 01924 450662
e martin@haighhuddleston.co.uk

FORM HHA 5

TRIAL HOLE NO. 26 – (12m long)

Client :	SAUL CONSTRUCTION	Job No :	7309
Site :	DONCASTER RD, DARFIELD	Date :	25 SEPTEMBER 2019

0.0		
	0.3	Dark brown topsoil.
0.5	1.2	Firm yellowish brown very sandy clay.
1.0		
1.5	1.5	Very weak light grey mudstone excavated as completely weathered clay with mudstone gravels.
2.0		
2.5		
3.0		
3.5		
4.0		

REMARKS:

Ground water encountered during excavation NO
Sample taken NO
Sides of excavation remained stable YES
Level

NOTES:

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Ground Support Services (UK) LTD

Geotechnical and ground support foundation specialists

Unit D2B Bryans Close, Harworth Industrial Estate, Harworth, South Yorkshire, DN11 8RY
Phone: 01302 744 322 Email: thomas@groundsupportservices.co.uk

Site Investigation Drillers log		Site: <u>Darfield</u>		Sheet: <u>1 of 2</u>						
Rig: <u>Soilmec 400</u>		Crew: <u>G Pilkington J Fraggit</u>		Date: <u>25-9-19</u>						
Hours on site:			Travelling Time:							
Equipment used:										
BH	Depth	Strata Description	BH	Depth	Strata Description					
1	000-8.50	made ground	3A	000-3.00	made ground					
	8.50-12.00	Hard strata								
					Install 200 mt slotted pipe					
2	000-0.20	Soil			1.00 mt plain pipe					
	0.20-2.70	Clay			Gravel 3.00 mt to 1.00 mt					
	2.70-8.10	Sandstone brown			Bentonite 1.00 mt to 0.00 mt					
	8.10-9.40	mudstone dark			1 end cap 1 gas tap.					
	9.40-12.00	mudstone grey			Concrete in 1 cover					
2A	000-0.20	Soil	4	000-2.00	made ground					
	0.20-2.70	Clay		2.00-4.00	Sandstone brown					
	2.70-3.00	Sandstone brown								
			5	000-2.00	made ground					
				2.00-4.00	Sandstone brown					
					Install 200 mt slotted pipe					
					1.00 mt plain pipe					
					Gravel 3.00 mt to 1.00 mt					
					Bentonite 1.00 mt to 0.00 mt					
					1 end cap 1 gas tap					
					Concrete in 1 cover.					
3	000-8.40	made ground	6	000-2.00	made ground					
	8.40-10.00	Hard strata		2.00-4.00	Sandstone brown					
			7	000-2.50	made ground					
				2.50-4.00	Sandstone brown					
			8	000-3.20	made ground					
				3.20-5.00	Sandstone brown					
Casing / Water level details										
BH	Casing Die	Depth	Strike	Water Rise	Sealed	Totals	BH's	Drill	Case	Core
						Today				
						Previous				
						To date				

Signed:  Driller



Ground Support Services (UK) LTD

Geotechnical and ground support foundation specialists

Unit D2B Bryans Close, Harworth Industrial Estate, Harworth, South Yorkshire, DN11 8RY
 Phone: 01302 744 322 Email: thomas@groundsupportservices.co.uk

Site Investigation Drillers log			Site: <u>Darfield</u>			Sheet: <u>2 of 2</u>				
Rig: <u>Soilmec 400</u>			Crew: <u>G Pilkington J Frogget</u>			Date: <u>25-9-19</u>				
Hours on site:				Travelling Time:						
Equipment used:										
BH	Depth	Strata Description	BH	Depth	Strata Description					
9	000-3.60	made ground	1A	000-3.00	made ground					
	3.60-5.10	Sandstone brown								
	5.10-6.30	mudstone dark				Install 2.00 mt slotted pipe				
	6.30-9.00	mudstone grey				1.00 mt plain pipe				
						Gravel 3.00 mt to 1.00 mt				
10	000-4.10	made ground				Bentonite 1.00 mt to 0.00 mt				
	4.10-6.00	Sandstone brown				1 end cap 1 gas tap				
						Concrete in 1 cover				
11	000-6.60	made ground								
	6.60-9.00	Hard strata								
12	000-5.30	made ground								
	5.30-6.70	mudstone dark								
	6.70-9.00	mudstone grey								
12A	000-3.00	made ground								
						Install 2.00 mt slotted pipe				
						1.00 mt plain pipe				
						Gravel 3.00 mt to 1.00 mt				
						Bentonite 1.00 mt to 000 mt				
						1 end cap 1 gas tap				
						Concrete in 1 cover				
Casing / Water level details										
BH	Casing Die	Depth	Strike	Water Rise	Sealed	Totals	BH's	Drill	Case	Core
						Today	16	100		
						Previous	-	-		
						To date	16	100		

Signed  Driller



Ground Support Services (UK) LTD

Geotechnical and ground support foundation specialists

Unit D2B Bryans Close, Harworth Industrial Estate, Harworth, South Yorkshire, DN11 8RY
 Phone: 01302 744 322 Email: thomas@groundsupportservices.co.uk

Site Investigation Drillers log			Site: <u>Darfield</u>			Sheet: <u>1 of 2</u>				
Rig: <u>Soilmec 400</u>			Crew: <u>G Pilkington J Frugget</u>			Date: <u>26-9-19</u>				
Hours on site:				Travelling Time:						
Equipment used:										
BH	Depth	Strata Description	BH	Depth	Strata Description					
13	000-0.20	Soil		4.80-12.00	mudstone grey					
	0.20-1.50	Clay								
	1.50-2.80	mudstone brown weathered	15	000-0.20	Soil					
				0.20-1.30	Clay					
	2.80-8.20	mudstone grey		1.30-5.60	mudstone brown					
	8.20-12.00	Sandstone brown		5.60-12.00	mudstone grey					
13A	000-0.20	Soil	16	000-0.20	Soil					
	0.20-1.50	Clay		0.20-1.10	Clay					
	1.50-3.00	mudstone brown		1.10-2.90	mudstone brown					
				2.90-4.00	mudstone grey					
				4.00-4.10	mudstone black					
				4.10-12.00	mudstone grey					
Install 200 mt slotted pipe										
1.00 mt plain pipe										
Gravel 300 mt to 1.00 mt										
Bentonite 1.00 mt to 0.00 mt			16A	000-0.20	Soil					
1 end cap 1 gas tap				0.20-1.10	Clay					
Concrete in 1 cover				1.10-3.00	mudstone brown					
14	000-0.20	Soil		Install 200 mt slotted pipe						
	0.20-1.30	Clay		1.00 mt plain pipe						
	1.30-3.20	mudstone brown weathered		Gravel 300 mt to 1.00 mt						
				Bentonite 1.00 mt to 0.00 mt						
	3.20-4.70	mudstone grey		1 end cap 1 gas tap						
	4.70-4.80	mudstone black		Concrete in 1 cover						
Casing / Water level details										
BH	Casing Die	Depth	Strike	Water Rise	Sealed	Totals	BH's	Drill	Case	Core
						Today				
						Previous				
						To date				

Signed Driller



Ground Support Services (UK) LTD

Geotechnical and ground support foundation specialists

Unit D2B Bryans Close, Harworth Industrial Estate, Harworth, South Yorkshire, DN11 8RY
Phone: 01302 744 322 Email: thomas@groundsupportservices.co.uk

Site Investigation Drillers log			Site: <u>Daxfield</u>			Sheet: <u>2 of 2</u>				
Rig: <u>Soilmec 660</u>			Crew: <u>G Pilkington J Fragget</u>			Date: <u>26-9-19</u>				
Hours on site:					Travelling Time:					
Equipment used:										
BH	Depth	Strata Description	BH	Depth	Strata Description	BH	Depth	Strata Description		
17	0.00 - 0.20	Soil	20	0.00 - 0.20	Soil					
	0.20 - 1.20	Clay		0.20 - 2.60	made ground					
	1.20 - 3.40	mudstone brown		2.60 - 6.10	Sandstone brown					
	3.40 - 8.70	mudstone grey		6.10 - 7.80	mudstone grey					
	8.70 - 8.90	mudstone black		7.80 - 8.00	mudstone black					
	8.90 - 12.00	mudstone grey		8.00 - 9.00	mudstone grey					
18	0.00 - 6.20	made ground	20A	0.00 - 0.20	Soil					
	6.20 - 9.00	Hard strata		0.20 - 2.60	made ground					
				2.60 - 3.00	Sandstone brown					
19	0.00 - 1.20	made ground		Install 2.00 mt slotted pipe						
	1.20 - 3.00	Sandstone brown		1.00 mt plain pipe						
				Gravel 300 mt to 1.00 mt						
				Bentonite 1.00 mt to 0.00 mt						
				1 end cap 1 gas tap						
				Concrete in 1 cover.						
<u>Casing / Water level details</u>										
BH	Casing Die	Depth	Strike	Water Rise	Sealed	Totals	BH's	Drill	Case	Core
						Today	11	90		
						Previous	16	100		
						To date	27	190		

Signed:  Driller

APPENDIX C

Chemical Analysis of Samples

Geotechnical Analysis of Samples

Gas Monitoring Results



DETS

Certificate of Analysis

Certificate Number 19-19673-1

25-Oct-19

Client Haigh Huddleston & Associates Ltd
Firth Buildings
99-101 Leeds Road
Dewsbury
WF12 7BU

Our Reference 19-19673-1

Client Reference E18/7309

Order No (not supplied)

Contract Title Dorfield

Description 20 Soil samples.

Date Received 02-Oct-19

Date Started 02-Oct-19

Date Completed 25-Oct-19

Test Procedures Identified by prefix DETSn (details on request).

Notes This test supersedes 19-19673, extra testing.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. 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 By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Matrix Descriptions

Our Ref 19-19673-1

Client Ref E18/7309

Contract Title Dorfield

Sample ID	Depth	Lab No	Completed	Matrix Description
TP01	0.2	1574414	14/10/2019	Dark brown gravelly, clayey SAND
TP02	1.5	1574415	14/10/2019	Dark brown gravelly, clayey SAND
TP03	1	1574416	14/10/2019	Dark brown gravelly, clayey SAND
TP04	1.5	1574417	14/10/2019	Dark brown gravelly, clayey SAND
TP05	0.8	1574418	14/10/2019	Dark brown gravelly, clayey SAND including some rootlets
TP07	0.2	1574419	14/10/2019	Dark brown gravelly, clayey SAND including some rootlets
TP09	0.2	1574420	14/10/2019	Dark brown gravelly, clayey SAND including some rootlets
TP12	0.1	1574421	14/10/2019	Dark brown gravelly, clayey SAND including some rootlets
TP16	0.2	1574422	14/10/2019	Dark brown gravelly, clayey SAND including some rootlets
TP16	1.2	1574423	14/10/2019	Brown gravelly, sandy CLAY
TP30	1	1574424	14/10/2019	Brown sandy CLAY
TP32	0.3	1574425	14/10/2019	Dark brown gravelly, clayey SAND
TP34	0.2	1574426	14/10/2019	Dark brown gravelly, clayey SAND
TP36	0.2	1574427	14/10/2019	Dark brown gravelly, clayey SAND
TP37	2.5	1574428	14/10/2019	Brown gravelly SAND
TP21	0.3	1574429	14/10/2019	Brown gravelly SAND
TP22	0.6	1574430	14/10/2019	Brown sandy CLAY
TP25	0.1	1574431	14/10/2019	Brown sandy CLAY
TP27	0.2	1574432	14/10/2019	Brown sandy CLAY
TP29	0.2	1574433	14/10/2019	Brown sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574414	1574415	1574416	1574417	1574418	1574419
Sample ID	TP01	TP02	TP03	TP04	TP05	TP07
Depth	0.20	1.50	1.00	1.50	0.80	0.20
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	23/09/19	23/09/19	23/09/19	23/09/19	23/09/19	23/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	12	9.6	16	7.9	13	10
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.5	0.3	0.5	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	15	1400	86	470	160	44
Copper	DETSC 2301#	0.2	mg/kg	22	300	37	51	44	24
Lead	DETSC 2301#	0.3	mg/kg	29	71	39	72	41	27
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.06	< 0.05	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	17	110	23	18	18	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	4.6	1.2	4.6	1.3	0.9
Zinc	DETSC 2301#	1	mg/kg	67	330	75	110	71	78
Inorganics									
pH	DETSC 2008#		pH	6.5	11.8	8.9	11.8	11.2	9.9
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.0	< 0.6	1.1	< 0.6	< 0.6	0.9
Sulphide	DETSC 2024*	10	mg/kg	28	240	190	560	190	76
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.05	0.12	0.35	0.32	0.29	0.06
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5		< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2		9.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		< 1.5		18		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		11		160		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		11		190		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01		< 0.01		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9		< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5		7.0		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		< 0.6		51		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		36		320		
Aromatic C5-C35	DETSC 3072*	10	mg/kg		36		370		
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg		48		560		
EPH (C10-C40)	DETSC 3311#	10	mg/kg	800	1100	650	1500	260	
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	17	6.5	4.4	0.4	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.2	1.8	2.1	0.8	0.7	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	0.6	7.2	3.1	7.0	0.7	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	0.6	12	4.8	5.5	0.7	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	5.4	58	24	20	3.7	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	1.6	17	8.4	6.2	1.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	12	66	36	38	8.3	0.2

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574414	1574415	1574416	1574417	1574418	1574419
Sample ID	TP01	TP02	TP03	TP04	TP05	TP07
Depth	0.20	1.50	1.00	1.50	0.80	0.20
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	23/09/19	23/09/19	23/09/19	23/09/19	23/09/19	23/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Pyrene	DETSC 3301	0.1	mg/kg	11	59	34	32	7.6	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	5.5	33	20	13	4.7	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	5.0	32	20	13	4.5	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	3.8	23	14	9.8	3.6	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	2.6	14	8.6	6.1	2.2	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	5.1	29	18	12	4.8	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	3.8	19	12	9.3	3.9	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.4	3.1	2.1	1.5	0.7	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	4.3	18	9.1	9.2	3.4	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	62	410	220	190	51	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.4	0.6	1.4	0.4	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574420	1574421	1574422	1574423	1574424	1574425
Sample ID	TP09	TP12	TP16	TP16	TP30	TP32
Depth	0.20	0.10	0.20	1.20	1.00	0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	23/09/19	23/09/19	23/09/19	23/09/19	24/09/19	24/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	17	9.5	20	15	9.6	31
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.3	0.4	0.3	< 0.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	21	13	17	23	25	17
Copper	DETSC 2301#	0.2	mg/kg	24	22	27	69	14	33
Lead	DETSC 2301#	0.3	mg/kg	34	27	38	41	13	50
Mercury	DETSC 2325#	0.05	mg/kg	0.06	0.09	0.10	0.13	< 0.05	0.11
Nickel	DETSC 2301#	1	mg/kg	24	12	21	73	19	21
Selenium	DETSC 2301#	0.5	mg/kg	1.2	< 0.5	< 0.5	2.1	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	78	56	87	69	62	84
Inorganics									
pH	DETSC 2008#		pH	7.9	6.9	6.8	6.1	6.9	7.1
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.1	1.2	1.3	11	0.8	1.4
Sulphide	DETSC 2024*	10	mg/kg	44	< 10	< 10	< 10	< 10	< 10
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.06	0.05	0.06	0.17	0.02	0.07
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg						
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg						
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg						
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg						
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg						
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg						
Aliphatic C5-C35	DETSC 3072*	10	mg/kg						
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg						
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg						
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg						
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg						
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg						
Aromatic C5-C35	DETSC 3072*	10	mg/kg						
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg						
EPH (C10-C40)	DETSC 3311#	10	mg/kg						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.1	0.2	0.1	< 0.1	< 0.1	0.2

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574420	1574421	1574422	1574423	1574424	1574425
Sample ID	TP09	TP12	TP16	TP16	TP30	TP32
Depth	0.20	0.10	0.20	1.20	1.00	0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	23/09/19	23/09/19	23/09/19	23/09/19	24/09/19	24/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Pyrene	DETSC 3301	0.1	mg/kg	0.1	0.2	0.1	< 0.1	< 0.1	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.5	0.5	< 0.3	< 0.3	0.4

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574426	1574427	1574428	1574429	1574430	1574431
Sample ID	TP34	TP36	TP37	TP21	TP22	TP25
Depth	0.20	0.20	2.50	0.30	0.60	0.10
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	24/09/19	24/09/19	24/09/19	24/09/19	24/09/19	24/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	31	34	12	31	18	33
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.4	0.2	0.4	< 0.1	0.4
Chromium	DETSC 2301#	0.15	mg/kg	16	22	14	20	24	26
Copper	DETSC 2301#	0.2	mg/kg	31	39	22	35	21	43
Lead	DETSC 2301#	0.3	mg/kg	49	57	21	51	18	54
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.12	< 0.05	0.11	< 0.05	0.10
Nickel	DETSC 2301#	1	mg/kg	19	23	31	25	23	30
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.2	< 0.5	0.8	0.6	1.0
Zinc	DETSC 2301#	1	mg/kg	73	96	60	87	86	110
Inorganics									
pH	DETSC 2008#		pH	6.7	7.1	6.1	6.9	7.1	7.2
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.5	1.3	1.2	1.6	< 0.6	1.4
Sulphide	DETSC 2024*	10	mg/kg	36	< 10	< 10	< 10	< 10	16
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.07	0.08	0.03	0.08	0.06	0.08
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg						
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg						
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg						
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg						
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg						
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg						
Aliphatic C5-C35	DETSC 3072*	10	mg/kg						
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg						
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg						
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg						
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg						
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg						
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg						
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg						
Aromatic C5-C35	DETSC 3072*	10	mg/kg						
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg						
EPH (C10-C40)	DETSC 3311#	10	mg/kg						
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	0.3	< 0.1	0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574426	1574427	1574428	1574429	1574430	1574431
Sample ID	TP34	TP36	TP37	TP21	TP22	TP25
Depth	0.20	0.20	2.50	0.30	0.60	0.10
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	24/09/19	24/09/19	24/09/19	24/09/19	24/09/19	24/09/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	0.2	< 0.1	0.3
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	0.6	< 0.3	0.6	< 0.3	0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 19-19673-1
 Client Ref E18/7309
 Contract Title Dorfield

Lab No	1574432	1574433
Sample ID	TP27	TP29
Depth	0.20	0.20
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	24/09/19	24/09/19
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	29	35
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	19	23
Copper	DETSC 2301#	0.2	mg/kg	32	42
Lead	DETSC 2301#	0.3	mg/kg	47	57
Mercury	DETSC 2325#	0.05	mg/kg	0.09	0.11
Nickel	DETSC 2301#	1	mg/kg	20	26
Selenium	DETSC 2301#	0.5	mg/kg	1.0	0.7
Zinc	DETSC 2301#	1	mg/kg	78	95
Inorganics					
pH	DETSC 2008#		pH	7.2	7.2
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.1	1.5
Sulphide	DETSC 2024*	10	mg/kg	< 10	12
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.07	0.09
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		
Aromatic C5-C35	DETSC 3072*	10	mg/kg		
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg		
EPH (C10-C40)	DETSC 3311#	10	mg/kg		
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.1	0.2

Summary of Chemical Analysis Soil Samples

Our Ref 19-19673-1

Client Ref E18/7309

Contract Title Dorfield

Lab No	1574432	1574433
Sample ID	TP27	TP29
Depth	0.20	0.20
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	24/09/19	24/09/19
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Pyrene	DETSC 3301	0.1	mg/kg	0.2	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.4

Summary of Asbestos Analysis

Soil Samples

Our Ref 19-19673-1

Client Ref E18/7309

Contract Title Dorfield

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1574414	TP01 0.20	SOIL	NAD	none	Jordan Eadington
1574415	TP02 1.50	SOIL	NAD	none	Jordan Eadington
1574416	TP03 1.00	SOIL	NAD	none	Jordan Eadington
1574417	TP04 1.50	SOIL	Chrysotile	Bundles of Chrysotile fibres present	Jordan Eadington
1574418	TP05 0.80	SOIL	NAD	none	Jordan Eadington
1574419	TP07 0.20	SOIL	NAD	none	Jordan Eadington
1574420	TP09 0.20	SOIL	NAD	none	Jordan Eadington
1574421	TP12 0.10	SOIL	NAD	none	Jordan Eadington
1574422	TP16 0.20	SOIL	NAD	none	Jordan Eadington
1574423	TP16 1.20	SOIL	NAD	none	Jordan Eadington
1574425	TP32 0.30	SOIL	NAD	none	Jordan Eadington
1574426	TP34 0.20	SOIL	NAD	none	Jordan Eadington
1574427	TP36 0.20	SOIL	NAD	none	Jordan Eadington
1574428	TP37 2.50	SOIL	NAD	none	Jordan Eadington
1574429	TP21 0.30	SOIL	NAD	none	Jordan Eadington
1574431	TP25 0.10	SOIL	NAD	none	Jordan Eadington
1574432	TP27 0.20	SOIL	NAD	none	Jordan Eadington
1574433	TP29 0.20	SOIL	NAD	none	Jordan Eadington

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 19-19673-1

Client Ref E18/7309

Contract Dorfield

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Holding time exceeded for tests	Inappropriate container for tests
		Sampled	Containers Received		
1574414	TP01 0.20 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574415	TP02 1.50 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574416	TP03 1.00 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574417	TP04 1.50 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574418	TP05 0.80 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574419	TP07 0.20 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574420	TP09 0.20 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574421	TP12 0.10 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574422	TP16 0.20 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574423	TP16 1.20 SOIL	23/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574424	TP30 1.00 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574425	TP32 0.30 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574426	TP34 0.20 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574427	TP36 0.20 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574428	TP37 2.50 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574429	TP21 0.30 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574430	TP22 0.60 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574431	TP25 0.10 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574432	TP27 0.20 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	
1574433	TP29 0.20 SOIL	24/09/19	GJ 250ml, PT 1L	pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETS 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETS 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.



STRUCTURAL SOILS LTD

TEST REPORT



Report No. 784137 r1

1774

Date 11-October-2019 Contract Darfield

Client Haigh Huddleston Associates
Address Firth Building
99-101 Leeds Road
Dewsbury
WF12 7BU

For the Attention of Martin Huddleston

Samples submitted by client	30/09/2019	Client Reference	784137
Testing Started	03/10/2019	Client Order No.	
Testing Completed	11/10/2019	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2 (superseded)**
Liquid Limit (definitive method) BS1377:Part 2:1990,clause 4.3
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.

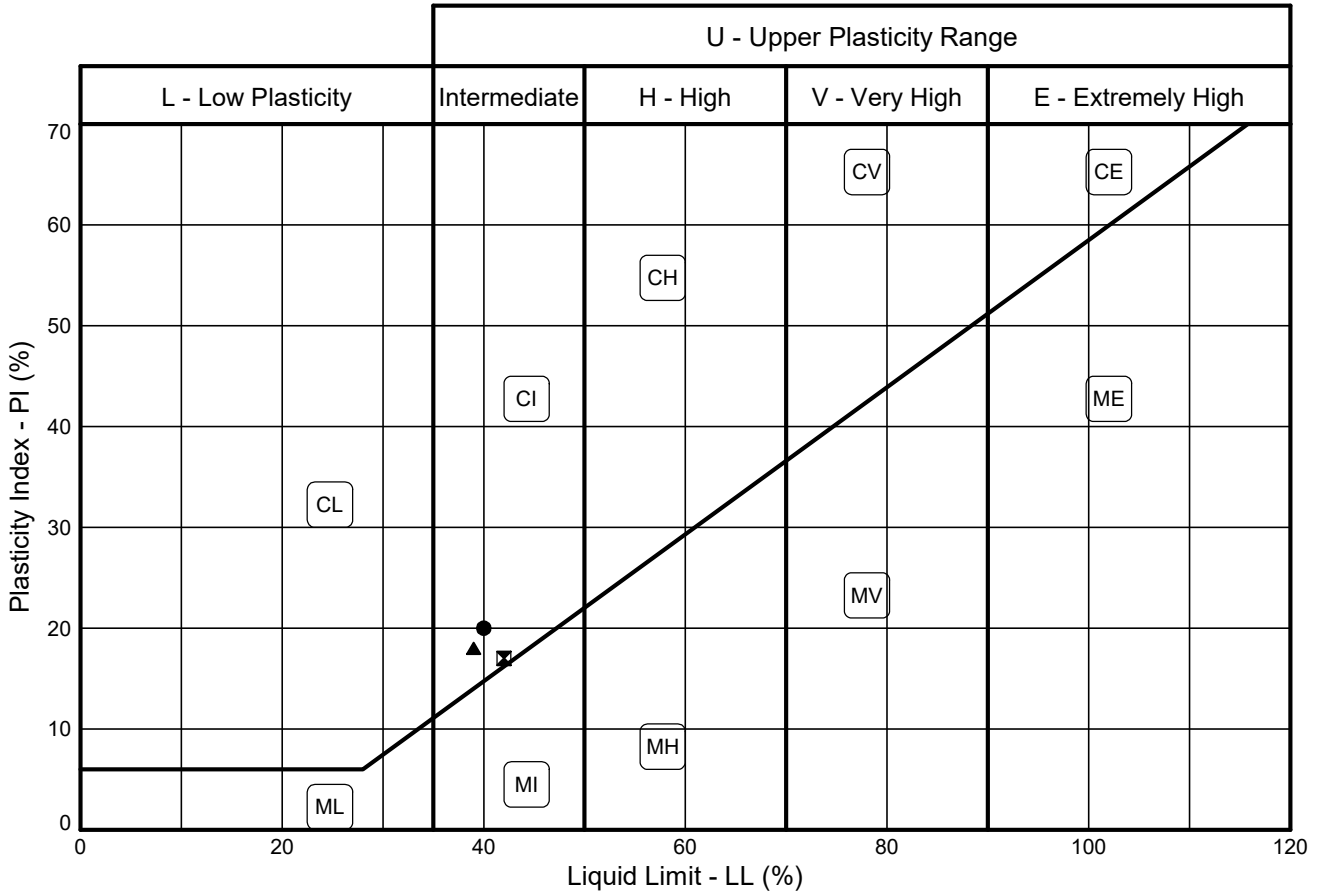
Test were undertaken on samples 'as received' unless otherwise stated.

Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail mark.athorne@soils.co.uk

PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990

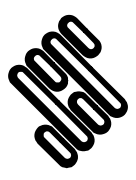


Sample Identification			BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location	
Exploratory Position ID	Sample	Depth (m)									
●	TP27	D	0.60	3.2/4.3/5.3/5.4	4.2.4	21	40	20	20	96	C
⊠	TP33	D	1.20	3.2/4.3/5.3/5.4	4.2.4	23	42	25	17	92	C
▲	TP39	D	1.20	3.2/4.3/5.3/5.4	4.2.4	19	39	21	18	87	C

Tested in accordance with the following clauses of BS1377-2:1990.
3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.
4.2.3 - Natural State
4.2.4 - Wet Sieved
Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By		Date
		11/10/19
Contract		Contract Ref:
Darfield		784137



GINT_LIBRARY_v8_07.GLB LibVersion: v8_07_001 ProjVersion: v8_07 | Graph L - ALINE STANDARD - A4P | 784137 - DARFIELD.GPJ - v8_07. Structural Soils Ltd, Branch Office - Castleford: The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ, Tel: 01977-552255, Fax: 01977-552299, Web: www.soils.co.uk, Email: ask@soils.co.uk | 11/10/19 - 15:32 | LWS5 |

TESTING VERIFICATION CERTIFICATE



1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **11/10/2019 15:43:15**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory
Luke Fisher (Materials Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU



**STRUCTURAL
SOILS LTD**

Contract:

Darfield

Job No:

784137





Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Road, Dewsbury, WF12 7BU

t 01924 464342 f 01924 450662 e trevor.haigh@haighhuddleston.co.uk

SITE:	Darfield	
CLIENT:	Saul Construction	
JOB NO:	7309	
SHEET NO:	1	

GAS MONITORING RESULTS

Monitoring Point	GAS CONCENTRATIONS												FLOW DATA				Qhg per borehole		WELL AND WATER DATA			A Pressure (mB)	Comments			
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Oxygen (%v/v)		H2S (ppm)	CO (ppm)	Hex (%)	PIDCf ()	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Response Zone					
	Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady					Steady	Peak												
Ambient Air	NR	NR	NR	NR	NR	NR	20.2	20.2	NR	NR	0.060	1.0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Time: 12:05	Date: 16.10.19	
BH01	ND	ND	ND	ND	4.0	3.5	8.6	8.6	ND	ND	0.054	1.0	ND	ND			NR	0.004	3.20	3.20		991				
BH02	ND	ND	ND	ND	2.3	2.3	14.7	15.2	ND	ND	0.055	1.0	ND	ND			NR	0.0023	2.20	2.20		991		Cloudy, Breeze, Cold		
BH03	ND	ND	ND	ND	7.5	7.5	6.3	6.3	ND	ND	0.052	1.0	ND	ND			NR	0.0075	3.20	3.20		991				
BH12	0.4	0.4	9.2	9.2	1.4	1.4	0.2	2.1	ND	ND	0.074	1.1	ND	ND			0.0004	0.0014	3.20	3.20		991				
BH13	ND	ND	ND	ND	5.6	5.6	14.1	14.1	ND	25	0.053	1.0	47.2	91.7	742	30	NR	2.6432	0.20			994				
BH16	ND	ND	ND	ND	2.2	2.2	16.7	16.7	ND	ND	0.051	1.0	4.2	36.7	33	45	NR	0.0924	0.95			993				
BH19	ND	ND	ND	ND	0.9	0.9	18.9	18.9	ND	ND	0.053	1.0	ND	ND			NR	0.0009	3.20	3.20		991				
BH20	ND	ND	ND	ND	1.5	1.5	18.5	18.5	ND	ND	0.052	1.0	ND	ND			NR	0.0015	3.20	3.20		991				
Ambient Air	NR	NR	NR	NR	0.1	0.1	19.9	19.9	ND	ND	0.059	1.0	ND	ND	NR	NR	NR	0.0001	NR	NR		NR	NR	Time: 10:15	Date: 06.11.19	
BH01	ND	ND	ND	ND	6.9	6.9	0.0	0.0	ND	ND	0.051	1.0	ND	ND			NR	0.0069	3.20	3.20		996				
BH02	ND	ND	ND	ND	2.6	2.6	15.6	15.6	ND	ND	0.054	1.0	ND	ND			NR	0.0026	2.20	2.20		997		Damp, Cold, Crisp air		
BH03	ND	ND	ND	ND	7.5	7.5	2.6	2.6	ND	ND	0.050	1.0	ND	ND			NR	0.0075	3.20	3.20		995				
BH12	ND	ND	ND	ND	3.0	3.0	7.5	7.5	ND	ND	0.051	1.0	ND	ND			NR	0.003	3.20	3.20		995		Falling AP		
BH13	Destroyed (Flooded)																									
BH16	Destroyed (Flooded)																									
BH19	ND	ND	ND	ND	1.1	1.1	18.6	18.6	ND	ND	0.052	1.0	ND	ND			NR	0.0011	3.20	3.20		995				
BH20	ND	ND	ND	ND	1.6	1.6	18.3	18.3	ND	ND	0.052	1.0	ND	ND			NR	0.0016	3.20	3.20		995				
																	0	0								
Ambient Air	NR	NR	NR	NR	0.1	0.1	19.9	19.9	ND	ND	0.063	1.0	ND	ND	NR	NR	NR	0.0001	NR	NR		NR	NR	Time: 12:15	Date: 27.11.19	
BH01	ND	ND	ND	ND	1.5	1.5	0.7	0.9	ND	ND	0.058	1.0	ND	ND			NR	0.0015	3.20	3.20		976				
BH02	ND	ND	ND	ND	2.4	2.4	16.1	16.1	ND	ND	0.059	1.0	ND	ND			NR	0.0024	2.00	2.20		976		Cloudy, Raining, Cold		
BH03	ND	ND	ND	ND	7.0	7.0	0.8	0.8	ND	ND	0.056	1.0	ND	ND			NR	0.007	3.20	3.20		974				
BH12	ND	ND	ND	ND	2.5	2.5	5.1	9.8	ND	ND	0.057	1.0	ND	ND			NR	0.0025	2.90	3.20		974		Falling AP		
BH13	Destroyed (Flooded)																									
BH16	Destroyed (Flooded)																									
BH19	Destroyed (Flooded)																									
BH20	Destroyed (Flooded)																									

ND - Not detected

NR - Not recorded

NB: where no flow (ND) recorded Qhg values are calculated using equipment limit of detection (0.1 l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.



SITE:	Darfield	
CLIENT:	Saul Construction	
JOB NO:	7309	
SHEET NO:	2	

GAS MONITORING RESULTS

Monitoring Point	GAS CONCENTRATIONS												FLOW DATA			Qhg per borehole		WELL AND WATER DATA			A Pressure (mB)	Comments	
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Oxygen (%v/v)		H2S (ppm)	CO (ppm)	Hex (%)	PIDCF ()	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)			Response Zone
	Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady					Steady	Peak									
Ambient Air	NR	NR	NR	NR	0.1	0.1	19.7	19.7	ND	ND	0.061	1.0	NR	NR	NR	NR	NR	0.0001	NR	NR	NR	NR	Time: 10:45 Date: 11.12.19
BH01	ND	ND	ND	ND	2.4	2.4	16.9	16.9	ND	ND	0.052	1.0	NR	NR	NR	NR	NR	0.0024	3.20	3.20	NR	991	
BH02	ND	ND	ND	ND	6.5	6.5	8.5	9.0	ND	ND	0.052	1.0	NR	NR	NR	NR	NR	0.0065	2.30	2.20	NR	991	Cold, Clear, Sunny
BH03	ND	ND	ND	ND	7.0	7.0	4.6	4.6	ND	ND	0.052	1.0	NR	NR	NR	NR	NR	0.007	3.20	3.20	NR	991	
BH12	ND	ND	ND	ND	2.4	2.4	11.7	11.9	ND	ND	0.053	1.0	NR	NR	NR	NR	NR	0.0024	2.90	3.20	NR	991	Falling AP
BH13	Destroyed (Flooded)																						
BH16	Destroyed (Flooded)																						
BH19	Destroyed (Flooded)																						
BH20	ND	ND	ND	ND	1.0	1.0	18.9	18.9	ND	ND	0.054	1.0	NR	NR	NR	NR	NR	0.001	3.10	3.20	NR	990	
Ambient Air	NR	NR	NR	NR	0.2	0.2	20.3	20.3	ND	ND	0.057	1.0	NR	NR	NR	NR	NR	0.0002	NR	NR	NR	NR	Time: 9:00am Date: 27.03.20
BH01	ND	ND	ND	ND	2.5	2.5	14.5	14.7	ND	ND	0.052	1.0	ND	ND	ND	ND	NR	0.0025	3.10	3.20	ND	1020	
BH02	ND	ND	ND	ND	1.9	1.6	12.8	14.7	ND	ND	0.053	1.0	ND	ND	ND	ND	NR	0.0019	2.10	2.20	ND	1018	Foggy, Cold, Dry
BH03	ND	ND	ND	ND	5.9	5.8	7.1	7.1	ND	ND	0.050	1.0	ND	ND	ND	ND	NR	0.0059	3.10	3.20	ND	1018	
BH12	ND	ND	ND	ND	2.2	2.1	13.9	14.0	ND	ND	0.053	1.0	ND	ND	ND	ND	NR	0.0022	3.00	3.20	ND	1018	
BH13	Water Pumped from Borehole																						
BH16	Water Pumped from Borehole																						
BH19	ND	ND	ND	ND	0.9	0.9	19.4	19.4	ND	ND	0.054	1.0	ND	ND	ND	ND	NR	0.0009	3.10	3.20	ND	1018	
BH20	ND	ND	ND	ND	1.1	1.1	19.2	19.2	ND	ND	0.054	1.0	ND	ND	ND	ND	NR	0.0011	3.20	3.20	ND	1019	
																	0	0					
Ambient Air	NR	NR	0.3	0.0	0.1	0.1	20.3	20.3	ND	ND	0.060	1.0	NR	NR	NR	NR	NR	0.0001	NR	NR	NR	NR	Time: 12:40 Date: 14.04.20
BH01	ND	ND	0.7	0.3	4.5	4.5	11.2	11.2	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.0045	3.20	3.20	ND	1021	
BH02	ND	ND	0.3	0.3	2.0	2.0	19.0	19.0	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.002	2.20	2.20	ND	1021	Sunny, Dry, Warm
BH03	ND	ND	13.9	0.0	6.3	6.1	6.7	6.7	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.0063	3.20	3.20	ND	1022	
BH12	Bung Tampered With																						
BH13	Water sucking into the machine due to high water level (0.90)																						
BH16	ND	ND	0.7	0.0	1.8	1.8	17.7	17.7	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.0018	1.75	3.20	ND	1021	
BH19	ND	ND	0.9	0.0	0.9	0.9	19.8	19.8	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.0009	3.10	3.20	ND	1020	
BH20	ND	ND	0.7	0.3	1.0	1.0	19.7	19.7	ND	ND	0.060	1.0	ND	ND	ND	ND	NR	0.001	3.20	3.20	ND	1020	

ND - Not detected

NR - Not recorded

NB: where no flow (ND) recorded Qhg values are calculated using equipment limit of detection (0.1 l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.



Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Firth Buildings, 99 - 101 Leeds Road, Dewsbury, WF12 7BU

t 01924 464342 f 01924 450662 e trevor.haigh@haighhuddleston.co.uk

SITE:	Darfield	
CLIENT:	Saul Construction	
JOB NO:	7309	
SHEET NO:	3	

GAS MONITORING RESULTS

Monitoring Point	GAS CONCENTRATIONS												FLOW DATA				Qhg per borehole		WELL AND WATER DATA			A Pressure (mB)	Comments	
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Oxygen (%v/v)		H2S (ppm)	CO (ppm)	Hex (%)	PIDCf ()	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Methane (l/hr)	CO2 (l/hr)	Water level (mbgl)	Depth of well (m)	Response Zone			
	Peak	Steady	Peak	Steady	Peak	Steady	Min	Steady					Steady	Peak										
Ambient Air	ND	ND	ND	ND	0.0	0.0	20.5	20.5	ND	ND	0.061	1.0	NR	NR	NR	NR	NR	0	NR	NR	NR	NR	NR	Time: 14:15 Date: 05.05.20
BH01	Bung Tampered With																							
BH02	ND	ND	ND	ND	1.8	1.8	19.3	19.3	ND	ND	0.059	1.0	ND	ND	ND	ND	NR	0.0018	2.65	3.20	ND	1016	Sunny, Dry, Windy	
BH03	ND	ND	ND	ND	6.4	6.3	7.4	7.5	ND	ND	0.058	1.0	ND	ND	ND	ND	NR	0.0064	3.20	3.20	ND	1016		
BH12	Bung Tampered With																							
BH13	Water sucking into the machine due to high water level (0.90)																							
BH16	ND	ND	ND	ND	2.1	2.1	14.9	14.9	ND	ND	0.056	1.0	2.4	5.1	15.0	20.0	NR	0.0504	1.50	3.20	ND	1014		
BH19	ND	ND	ND	ND	0.9	0.9	19.8	20.0	ND	ND	0.058	1.0	ND	ND	ND	ND	NR	0.0009	3.20	3.20	ND	1014		
BH20	ND	ND	ND	ND	0.7	0.7	20.1	20.1	ND	ND	0.058	1.0	ND	ND	ND	ND	NR	0.0007	3.20	3.20	ND	1014		
Ambient Air																								
BH01																								
BH02																								
BH03																								
BH12																								
BH13																								
BH16																								
BH19																								
BH20																								
Ambient Air																		0	0					
BH01																								
BH02																								
BH03																								
BH12																								
BH13																								
BH16																								
BH19																								
BH20																								

ND - Not detected

NR - Not recorded

NB: where no flow (ND) recorded Qhg values are calculated using equipment limit of detection (0.1 l/hr). Where negative flows recorded, these are converted to positive values for calculation of Qhg.

APPENDIX D

Coal Authority Report

Geology Report



The Coal
Authority

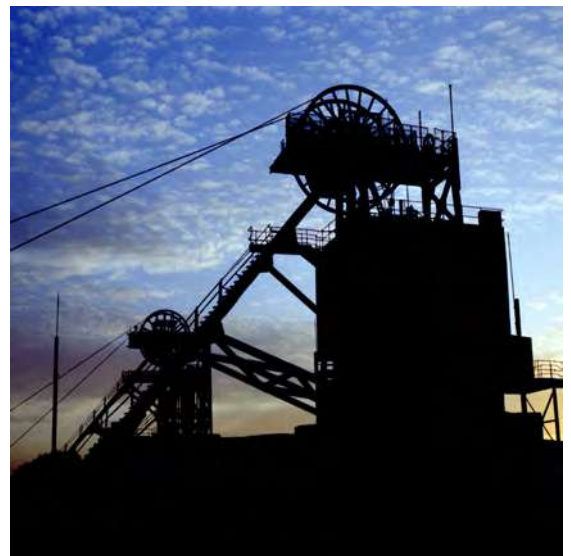
Resolving the **impacts** of mining

CON29M Non-Residential Mining Report

DONCASTER ROAD
DARFIELD
BARNESLEY
S71 5EZ

Date of enquiry: 25 July 2018
Date enquiry received: 25 July 2018
Issue date: 25 July 2018

Our reference: 51001903729001
Your reference: SAUL 7309



CON29M Non-Residential Mining Report

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

Client name

HAIGH HUDDLESTON & ASSOCIATES

Enquiry address

DONCASTER ROAD, DARFIELD, BARNSELY, S71 5EZ


How to contact us


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

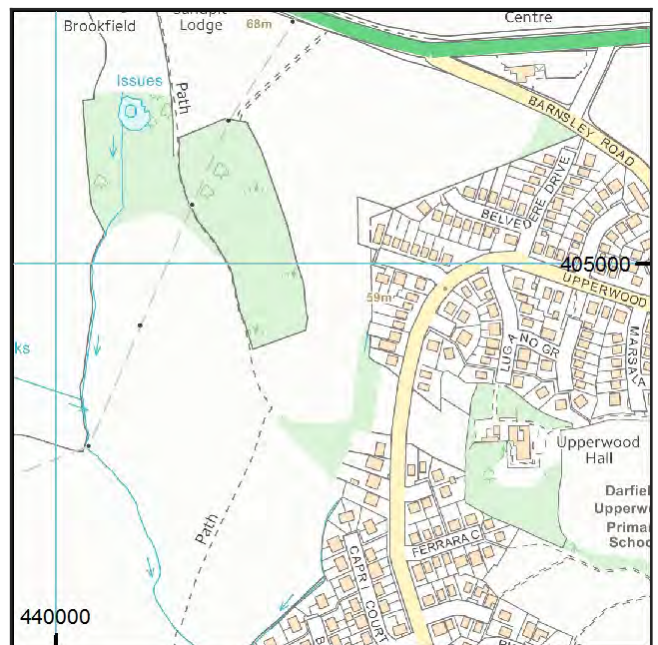
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

 /company/the-coal-authority

 /thecoalauthority

 /coalauthority



Approximate position of property



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Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
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	Yes
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	Yes
13	Working facilities order	No
14	Payments to owners of former copyhold land	No

Further recommended reports
Coal mining subsidence claims 50m buffer report
Coal mining subsidence claims history

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 14 seams of coal at 180m to 750m depth, and last worked in 1990.

Any movement in the ground due to coal mining activity should have stopped.

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

A damage notice or claim for alleged subsidence damage was made in October 1996 for LAND OS 0064 & OS 1753 LOW LAITHES FARM, ARDSLEY, BARNSELY, SOUTH YORKSHIRE, S71 5HB. However, the claim was rejected.

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

A damage notice or claim for alleged subsidence damage was made in February 1996 for 47 UPPERWOOD ROAD, DARFIELD, BARNSELY, SOUTH YORKSHIRE, S73 9QD. However, the claim was rejected.

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

There are a further 1 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot.

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.

If further subsidence damage claims information is required, please visit www.groundstability.com.

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 in an area where notices to withdraw support were given in 1979, 1982 and 1983.

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.

Additional remarks

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

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Alternative formats

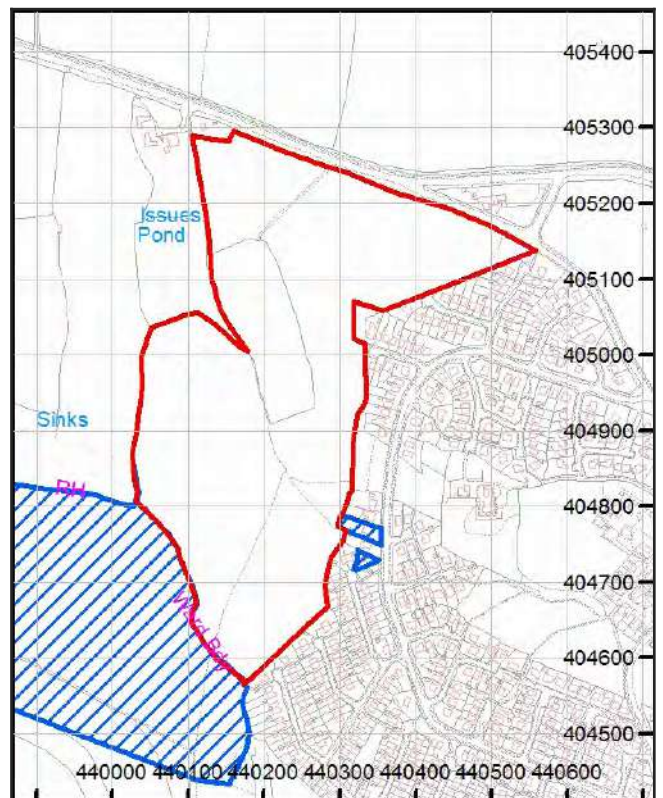
If you would like this report in an alternative format, please contact our communications team.

Enquiry boundary

Key

Approximate position of enquiry boundary shown 

Coal claims 




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



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Haigh Huddleston & Associates
99-101, LEEDS ROAD,
DEWSBURY, WF12 7BU

Groundsure Reference: GS-5269511

Your Reference: SAUL_7309

Report Date 25 Jul 2018

Report Delivery Method: Email - pdf

Geo Insight

Address: DONCASTER ROAD, DARFIELD, S71 5EZ

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 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geo Insight

Geo Insight

Address: DONCASTER ROAD, DARFIELD, S71 5EZ
Date: 25 Jul 2018
Reference: GS-5269511
Client: Haigh Huddleston & Associates



Aerial Photograph Capture date: 07-Jun-2013
Grid Reference: 440215,404985
Site Size: 17.55ha

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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?	Yes
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?*	Yes
	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 linear features	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 linear features 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?	Yes
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	Yes
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	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 linear features

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 linear features within 500m of the study site boundary?

Yes

Section 3: Radon

3. Radon

3.1 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 in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level.

3.2 Radon Protection

Basic 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	6	0	9	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	6	5
4.3 Current Ground Workings	0	0	0	0	8

Section 5: Mining, Extraction & Natural Cavities

	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	6	5
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*	4	2	1	0	4
5.5 Non-Coal Mining Cavities	0	0	0	1	1
5.5 Natural Cavities	0	0	0	0	0

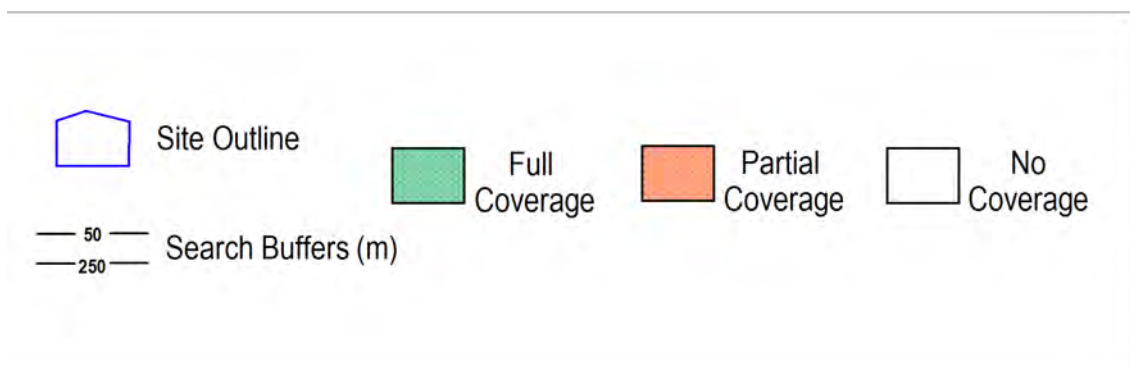
Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0
Section 6: Natural Ground Subsidence	On-site				
6.1 Shrink-Swell Clay	Very Low				
6.2 Landslides	Low				
6.3 Ground Dissolution of Soluble Rocks	Negligible				
6.4 Compressible Deposits	Very Low				
6.5 Collapsible Deposits	Very Low				
6.5 Running Sand	Very Low				
Section 7: Borehole Records	On-site	0-50m	51-250		
7 BGS Recorded Boreholes	0	0	8		
Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
8 Records of Background Soil Chemistry	16	11	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	0	5	Not Searched	
9.3 Historical Railways	0	0	0	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

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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	No coverage
2	0.0	Some deposits are mapped	Full	Full	No coverage
3	25.0	Some deposits are mapped	Full	Full	Some deposits are mapped
4	37.0	Some deposits are mapped	Full	Full	No coverage

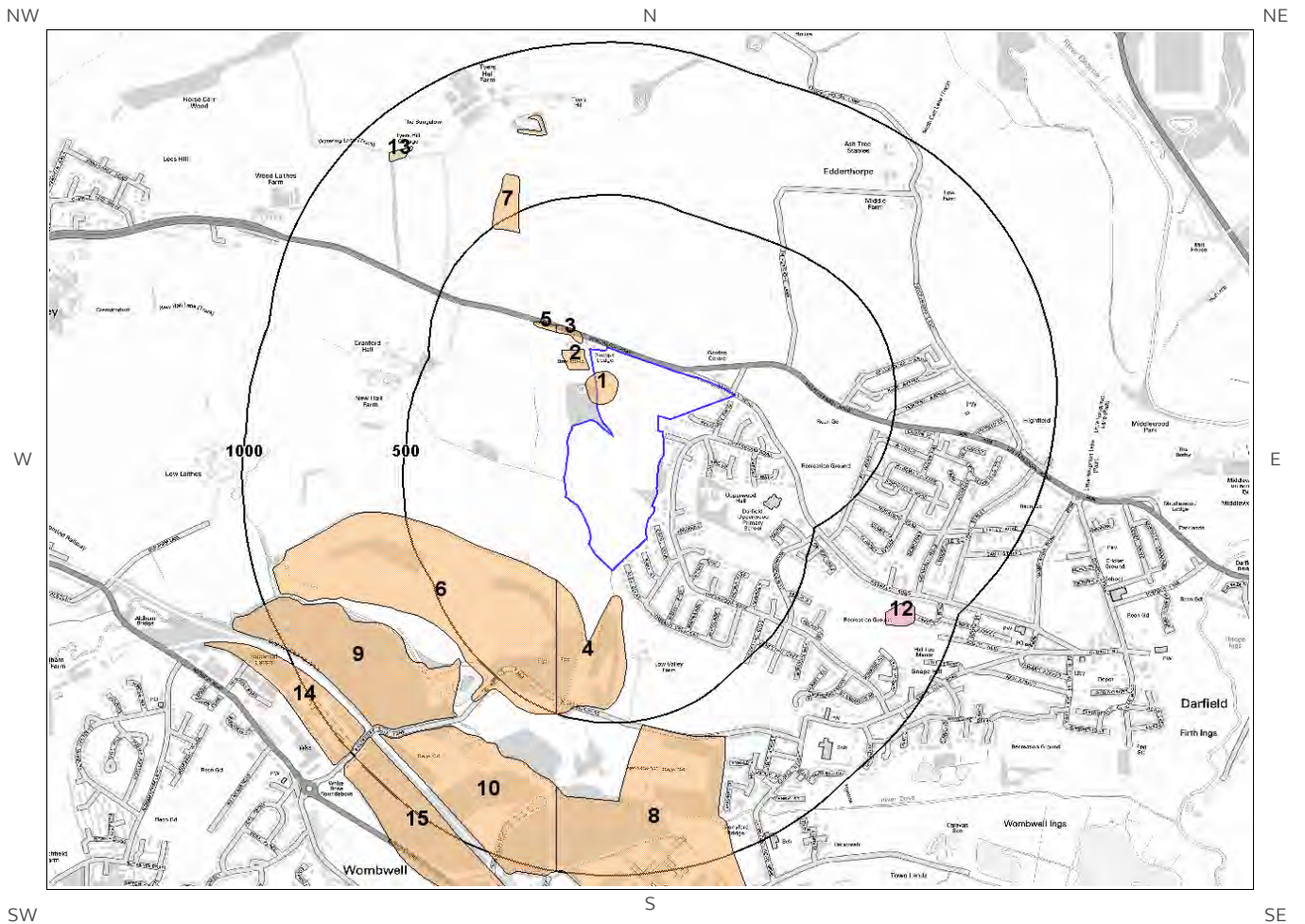
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not 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

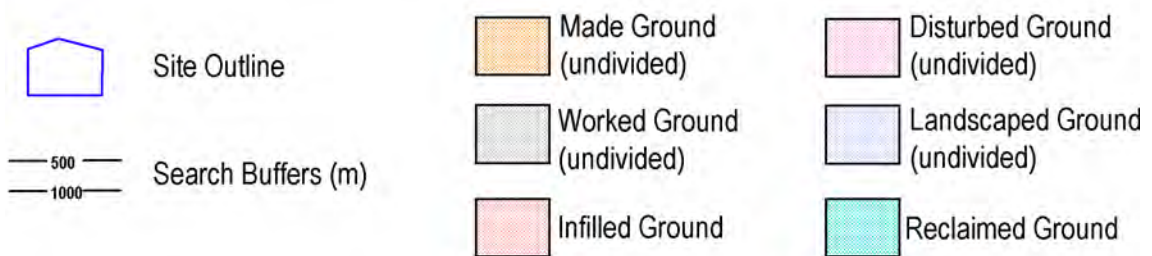
1 Geology (1:10,000 scale).

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



Artificial Ground Legend

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1. Geology 1:10,000 scale

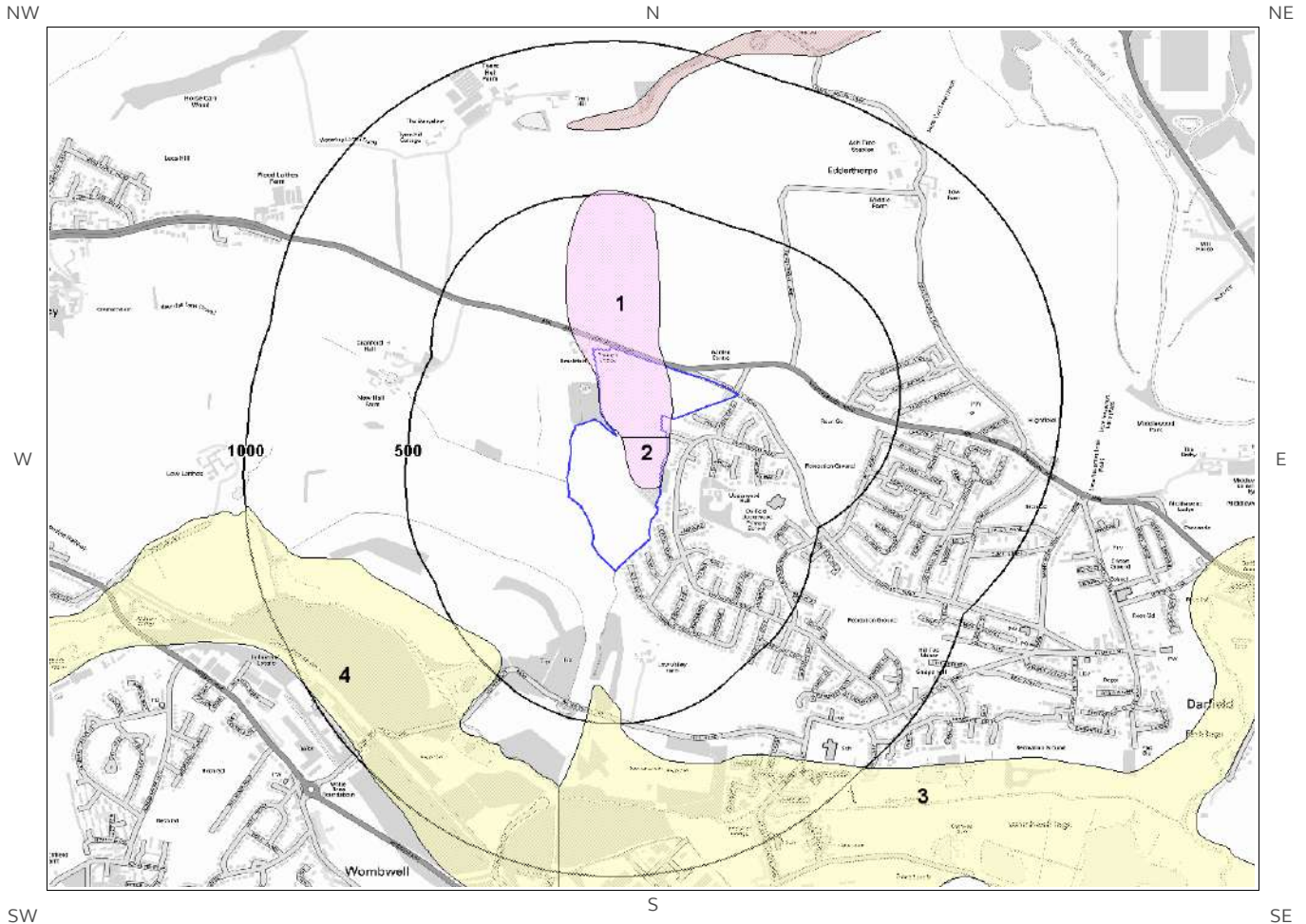
1.1 Artificial Ground

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	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	13.0	W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	32.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	83.0	S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
5	119.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
6	148.0	SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
7	441.0	NW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

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



Artificial Ground Legend

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-  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
1	0.0	On Site	GFDMP-XSV	Glaciofluvial Deposits, Mid Pleistocene - Sand And Gravel	Sand And Gravel
2	0.0	On Site	GFDMP-XSV	Glaciofluvial Deposits, Mid Pleistocene - Sand And Gravel	Sand And Gravel
3	376.0	S	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt
4	441.0	SW	ALV-XCZ	Alluvium - Clay And Silt	Clay And Silt

1.2.2 Landslip

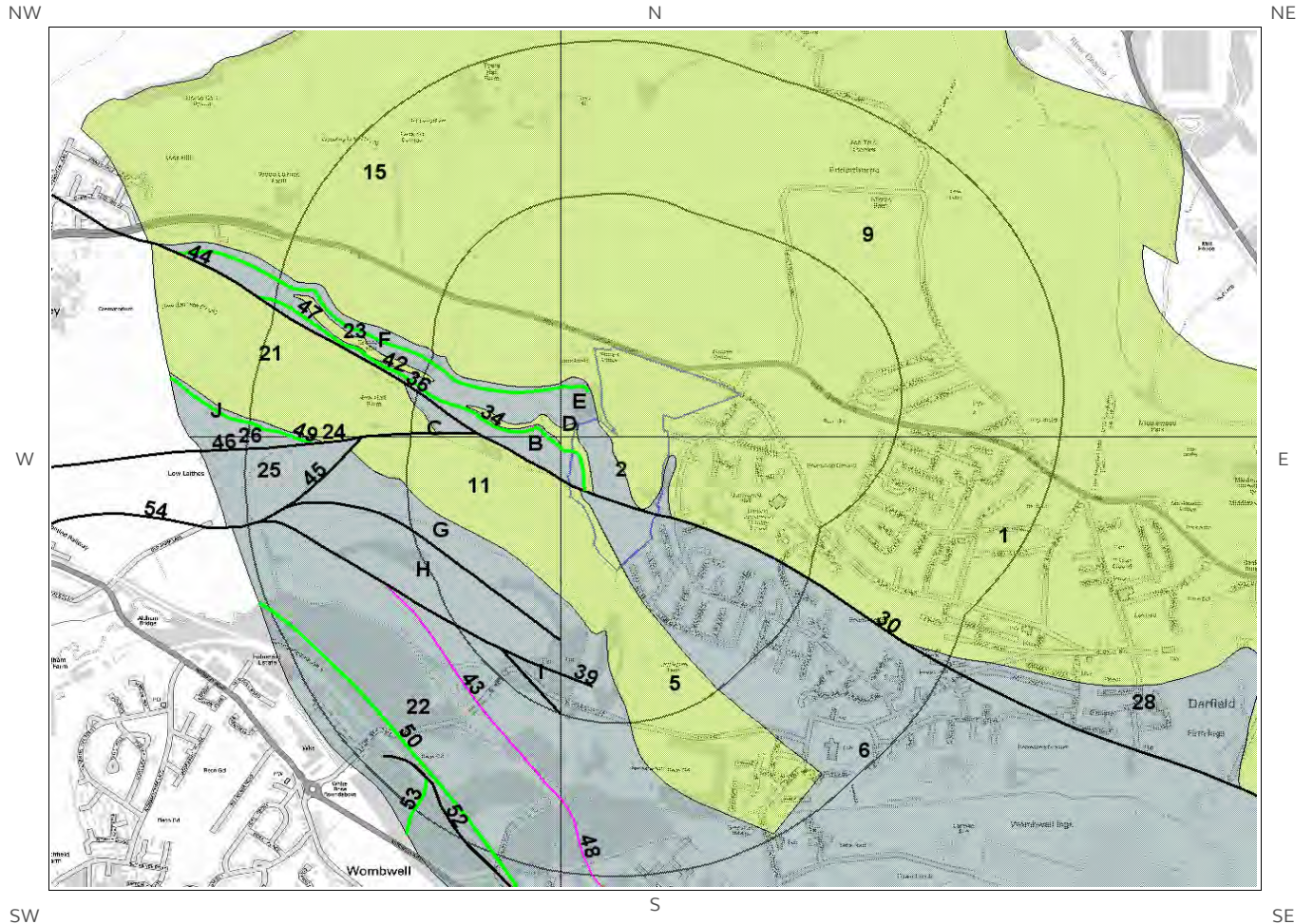
Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale? No

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

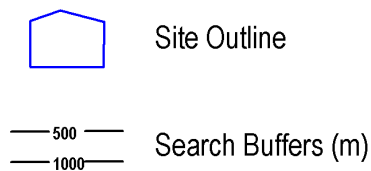
This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and linear features map (1:10,000 scale)



Bedrock and linear features Legend

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1.3 Bedrock and linear features

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	MXR-SDST	Mexborough Rock - Sandstone	Bolsovian Sub-age
2	0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
3A	0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
4A	0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
5	0.0	On Site	ACR-SDST	Ackton Rock - Sandstone	Bolsovian Sub-age
6	0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
7D	0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
8E	0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
9	0.0	On Site	MXR-SDST	Mexborough Rock - Sandstone	Bolsovian Sub-age
10B	25.0	W	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
11	26.0	W	ACR-SDST	Ackton Rock - Sandstone	Bolsovian Sub-age
12B	36.0	W	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
13	37.0	W	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
14F	45.0	W	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
15	105.0	W	MXR-SDST	Mexborough Rock - Sandstone	Bolsovian Sub-age
16G	183.0	SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
17C	275.0	W	ACR-SDST	Ackton Rock - Sandstone	Bolsovian Sub-age
18H	287.0	SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
19C	296.0	W	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
20I	379.0	SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
21	421.0	W	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
22	435.0	SW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
23	465.0	W	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian Sub-age - Duckmantian Sub-age

1.3.2 Linear features

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

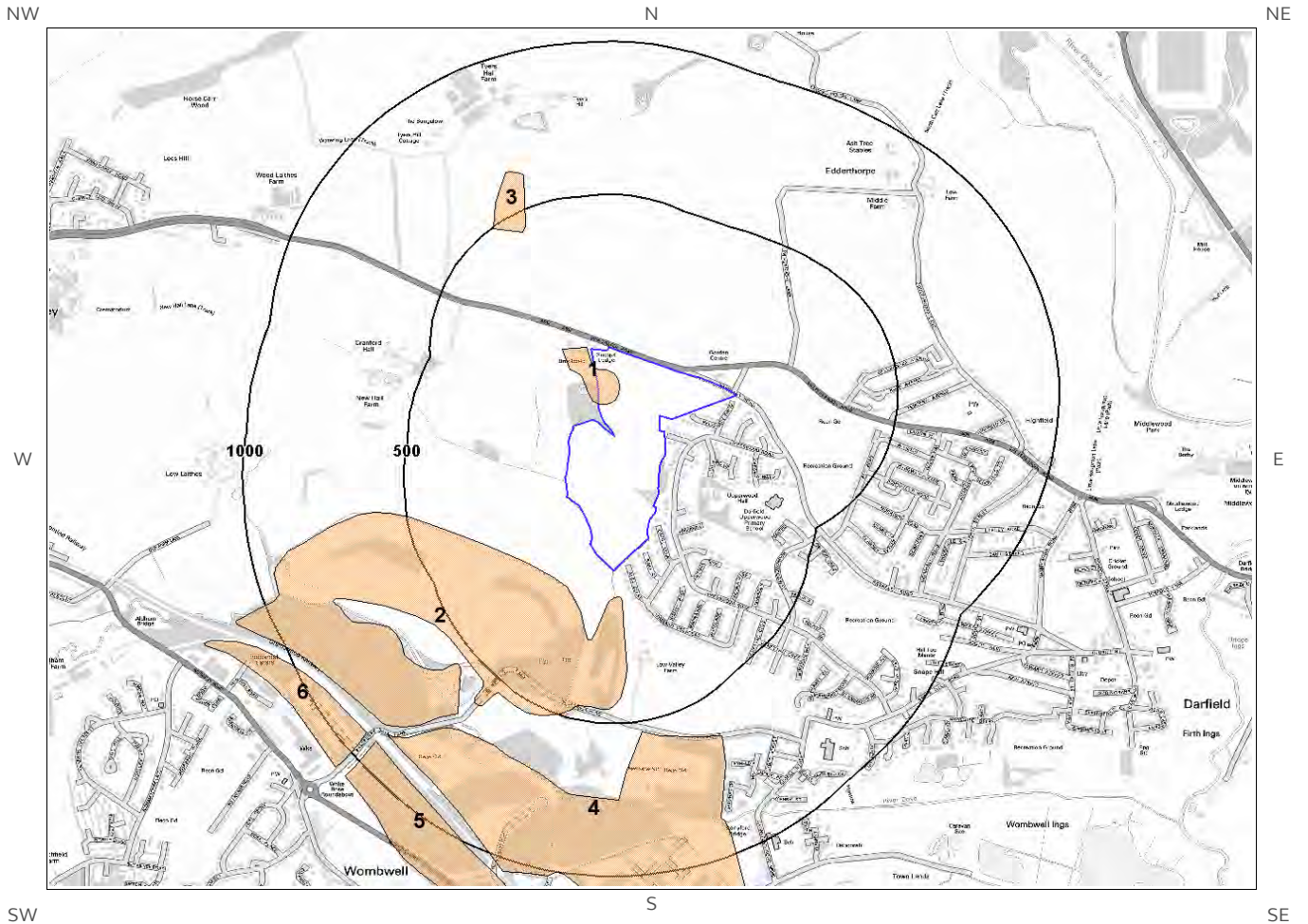
ID	Distance (m)	Direction	Category Description	Feature Description
29A	0.0	On Site	ROCK	Coal seam, inferred
30	0.0	On Site	FAULT	Normal fault, inferred
31B	26.0	W	FAULT	Normal fault, inferred
32D	37.0	W	ROCK	Coal seam, inferred
33E	42.0	W	ROCK	Coal seam, inferred
34	79.0	W	ROCK	Coal seam, inferred
35F	126.0	W	ROCK	Coal seam, inferred
36	275.0	W	FAULT	Normal fault, inferred
37G	287.0	SW	FAULT	Normal fault, inferred
38C	296.0	W	FAULT	Normal fault, inferred
39	378.0	SW	FAULT	Normal fault, inferred
40H	379.0	SW	FAULT	Normal fault, inferred
41I	435.0	SW	FAULT	Normal fault, 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.

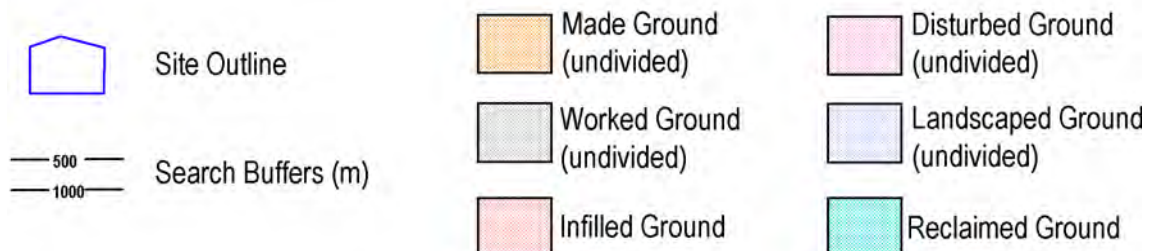
This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground map



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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

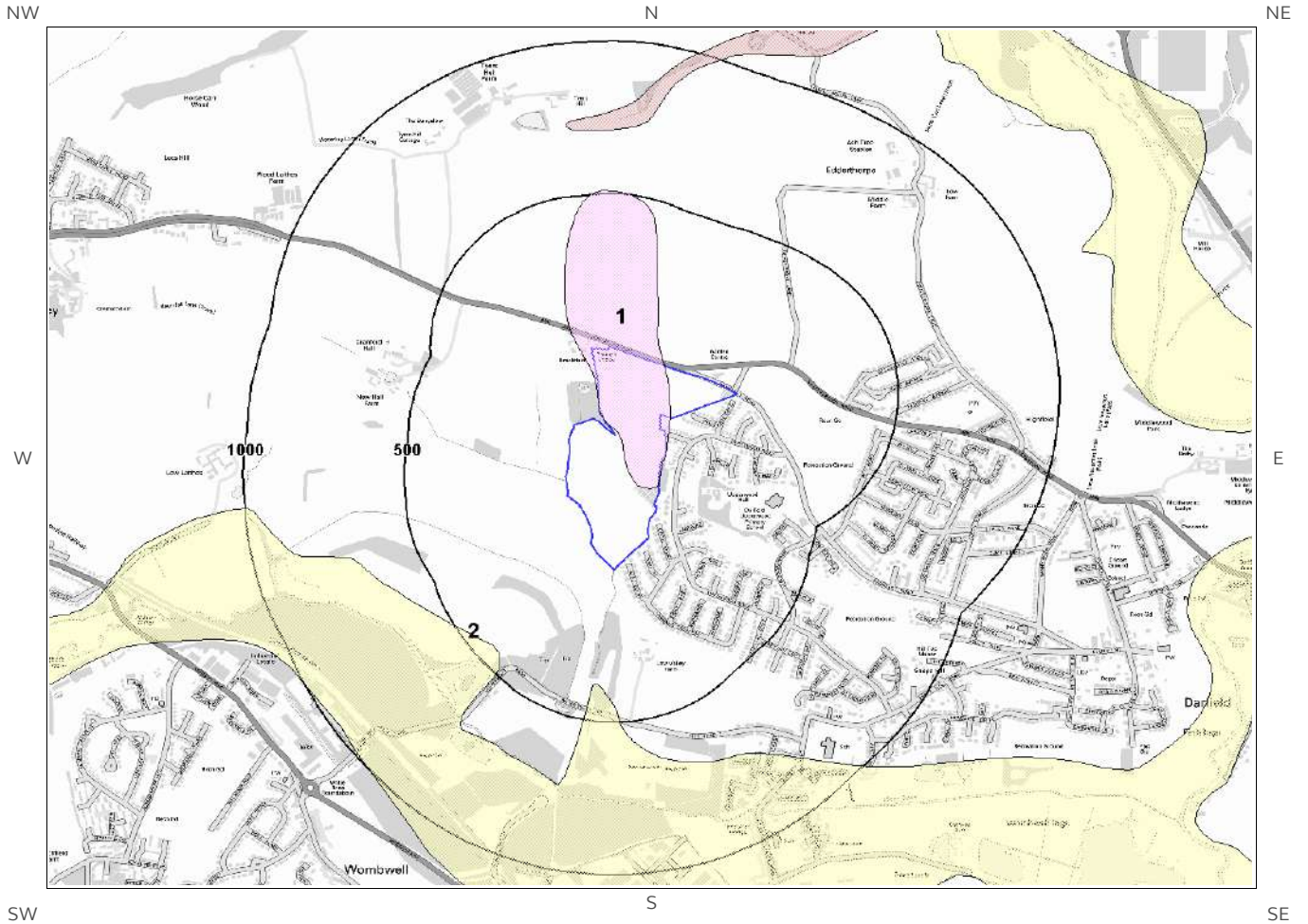
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	86.0	S	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	437.0	NW	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

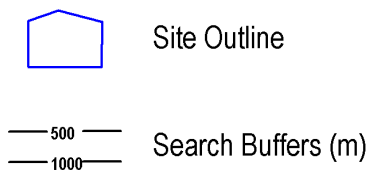
Are there any records relating to permeability of artificial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Very High	Low

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



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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
1	0.0	On Site	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL
2	378.0	S	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

2.2.2 Permeability of Superficial Ground

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

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	High
0.0	On Site	Intergranular	Very High	High

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.

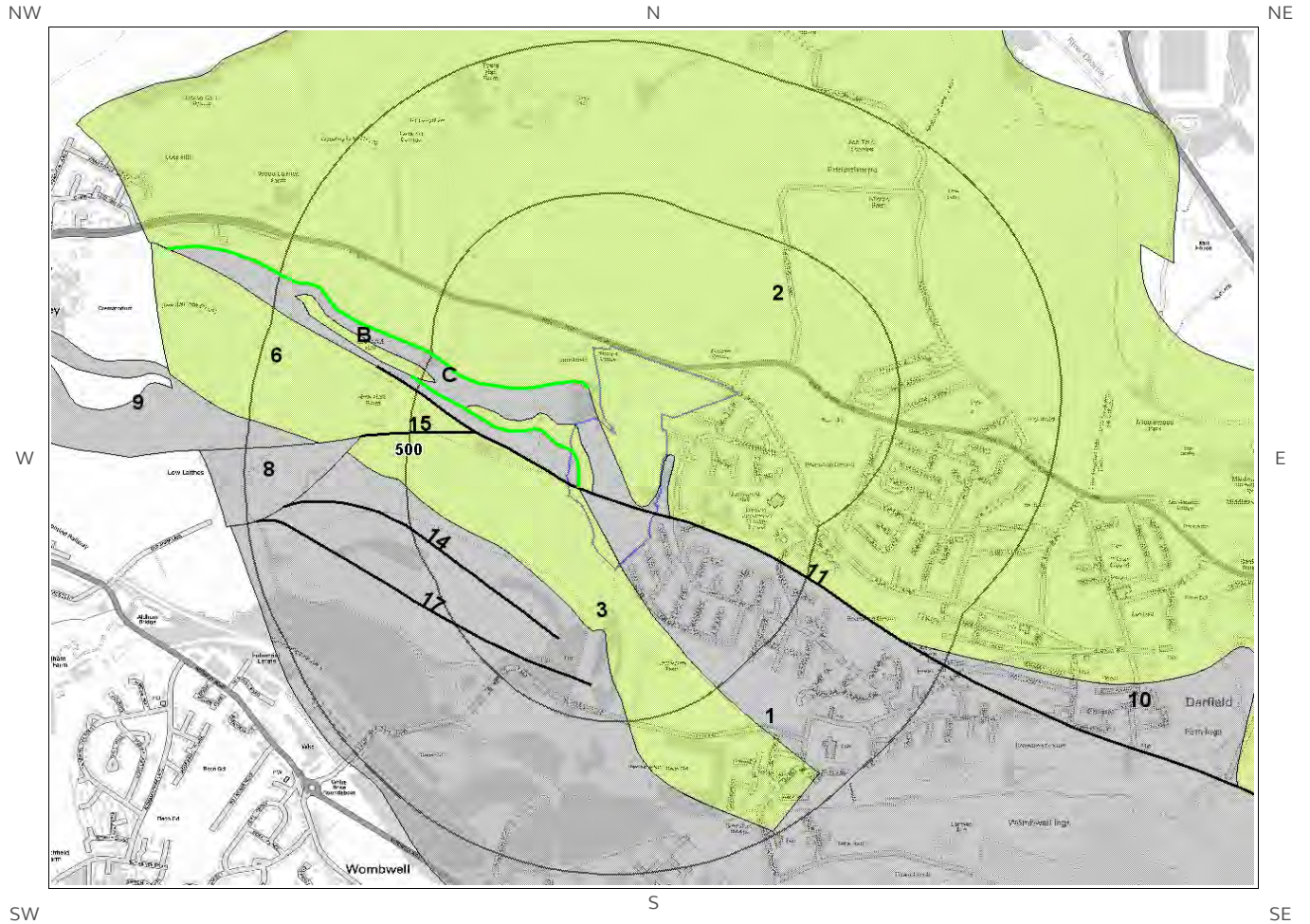
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

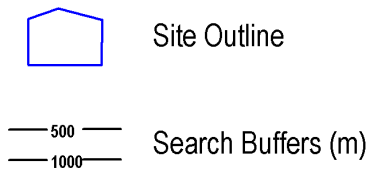
Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and linear features map (1:50,000 scale)



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2.3 Bedrock, Solid Geology & linear features

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
1	0.0	On Site	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
2	0.0	On Site	MXR-SDST	MEXBOROUGH ROCK - SANDSTONE	WESTPHALIAN
3	0.0	On Site	ACR-SDST	ACKTON ROCK - SANDSTONE	WESTPHALIAN
4C	0.0	On Site	PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
5A	0.0	On Site	PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
6	296.0	W	PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE	WESTPHALIAN
7B	456.0	W	PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION - 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	Moderate
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	Moderate	Low
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	Moderate	Low
0.0	On Site	Fracture	High	Moderate
0.0	On Site	Fracture	Moderate	Low
25.0	W	Fracture	Moderate	Low
26.0	W	Fracture	High	Moderate
36.0	W	Fracture	High	Moderate
37.0	W	Fracture	High	Moderate
49.0	NW	Fracture	Moderate	Low

2.3.3 Linear features

Are there any records of linear features within 500m of the study site boundary?

Yes

ID	Distance	Direction	Category Description	Feature Description
11	0.0	On Site	FAULT	Fault, inferred
12A	0.0	On Site	ROCK	Coal seam, inferred
13B	35.0	W	ROCK	Coal seam, inferred
14	287.0	SW	FAULT	Fault, inferred
15	296.0	W	FAULT	Fault, inferred
16C	343.0	W	ROCK	Coal seam, inferred
17	378.0	S	FAULT	Fault, 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 in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

3.2 Radon Protection



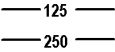


Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? Basic radon protective measures are necessary.

4 Ground Workings map



Ground Workings Legend

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-  Site Outline
-  Historic Surface Ground Workings
-  Search Buffers (m)
-  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	0.0	On Site	440222 404959	Unspecified Pit	1977
2A	0.0	On Site	440223 404977	Refuse Heap	1967
3B	0.0	On Site	440171 405080	Unspecified Quarry	1948
4	0.0	On Site	440197 404989	Refuse Heap	1951
5	0.0	On Site	440214 405066	Unspecified Ground Workings	1967
6B	0.0	On Site	440176 405076	Unspecified Quarry	1951
7C	184.0	E	440543 404638	Pond	1904
8C	184.0	E	440543 404638	Pond	1948
9C	184.0	E	440543 404636	Pond	1951
10C	185.0	E	440546 404635	Pond	1890
11	187.0	SW	439658 404463	Refuse Heap	1977
12	193.0	SW	440097 404290	Unspecified Disused Tip	1977
13	208.0	SW	439555 404458	Unspecified Disused Tip	1987
14	214.0	W	439664 404634	Disused Workings	1987
15	233.0	SW	440033 404272	Refuse Heap	1988

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
16	264.0	S	440276 404048	Colliery	1951
Not shown	292.0	S	440144 404173	Colliery	1904
Not shown	296.0	S	440313 404008	Colliery	1948
Not shown	461.0	S	440293 403957	Unspecified Mine	1967
Not shown	461.0	S	440313 403939	Colliery	1977
Not shown	465.0	S	440140 403972	Colliery	1988
Not shown	628.0	W	439257 404629	Unspecified Workings	1977
23	677.0	SW	439328 404262	Colliery	1951
Not shown	919.0	SW	439328 404032	Colliery	1948
Not shown	924.0	SW	439244 404135	Colliery	1890
Not shown	925.0	SW	439244 404132	Colliery	1904

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.

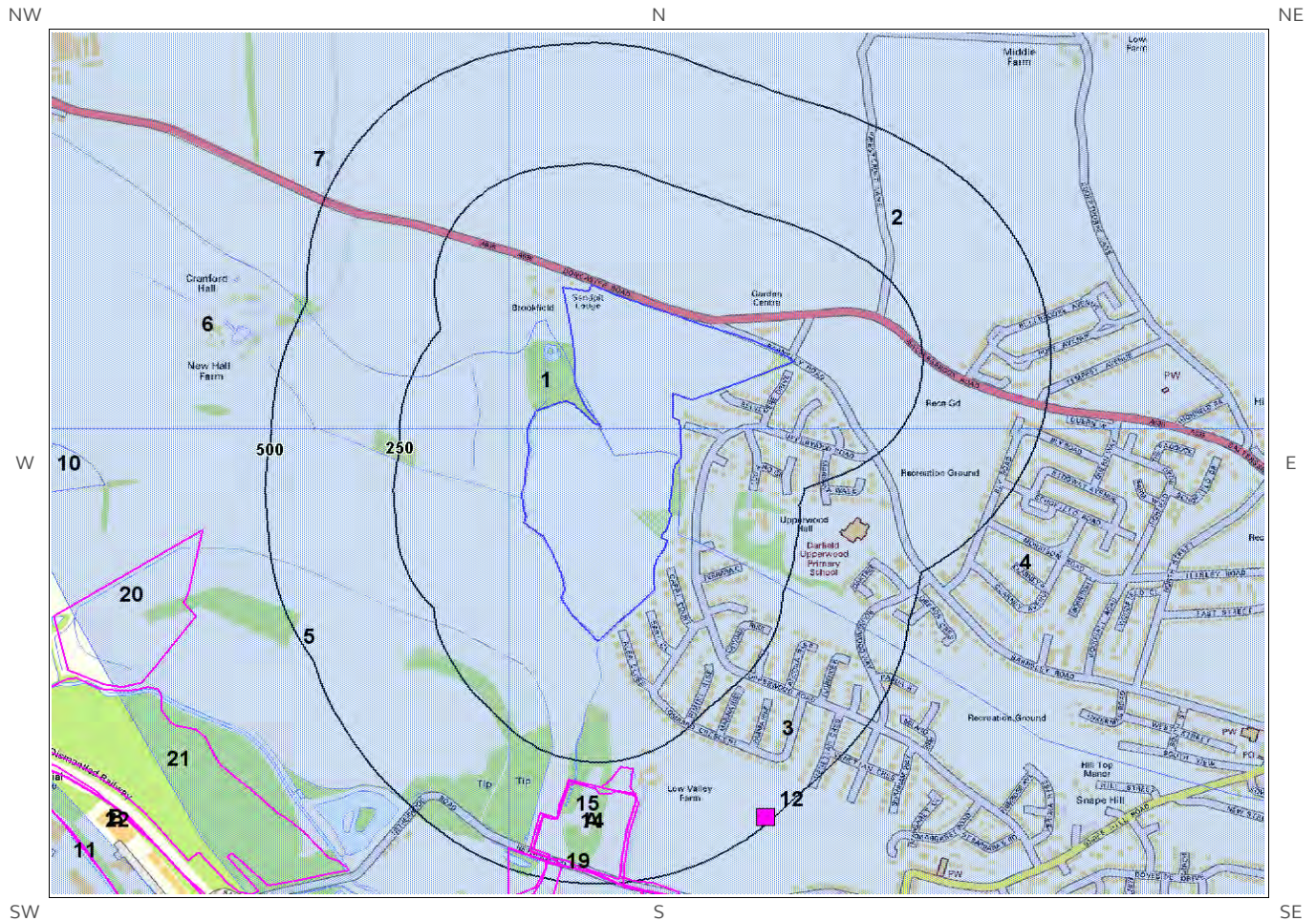
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

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	540.0	S	440115 404025	Coal, Deep	Darfield Main Colliery, No 1 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased

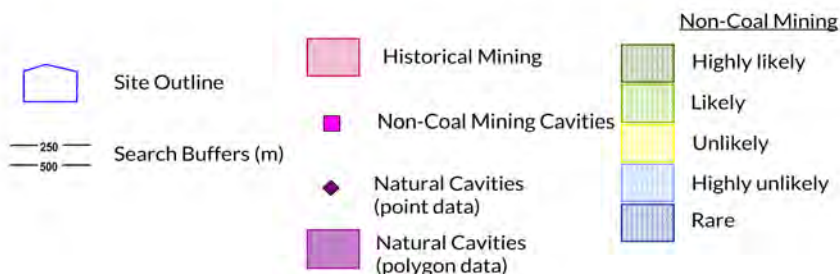
ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	568.0	S	440154 403994	Coal, Deep	Darfield Main Colliery, No 2 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	647.0	W	439390 405027	Sandstone	New Hall	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	649.0	S	440198 403913	Coal, Deep	Darfield Main Colliery, No 4 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	654.0	S	440238 403911	Clay & Shale	Nether Woodhall Mill Brickkiln	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	670.0	S	440141 403893	Coal, Deep	Darfield Main Colliery, No 3 Shaft	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	751.0	S	440283 403819	Fireclay	South Yorkshire Sanitary Tube Works Mine	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
34	834.0	E	441078 404410	Sandstone	Woodhall	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

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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
14	264.0	S	440276 404048	Colliery	1951
15	292.0	S	440144 404173	Colliery	1904
16A	296.0	S	440313 404008	Colliery	1948
17A	461.0	S	440293 403957	Unspecified Mine	1967
18A	461.0	S	440313 403939	Colliery	1977
19	465.0	S	440140 403972	Colliery	1988
20	628.0	W	439257 404629	Unspecified Workings	1977
21	677.0	SW	439328 404262	Colliery	1951
22	919.0	SW	439328 404032	Colliery	1948
23B	924.0	SW	439244 404135	Colliery	1890
24B	925.0	SW	439244 404132	Colliery	1904

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	Not available	Iron Ore (Bedded)	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
2	0.0	On Site	Sheffield Area	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
3	0.0	On Site	Not available	Iron Ore (Bedded)	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
4	0.0	On Site	Sheffield Area	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	25.0	W	Not available	Iron Ore (Bedded)	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
6	37.0	W	Not available	Iron Ore (Bedded)	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
7	105.0	W	Sheffield Area	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	700.0	N	Not available	Iron Ore (Bedded)	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	701.0	N	Not available	Iron Ore (Bedded)	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
10	813.0	W	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
11	990.0	SW	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? Yes

The following Non-Coal Mining Cavities information provided by Peter Brett Associates:

ID	Distance (m)	Direction	NGR	Address	Superficial Deposits	Bedrock Deposits	Extracted Mineral
12	487.0	SE	440500 404200	DARFIELD, South Yorkshire	-	-	Fireclay
Not shown	871.0	S	440300 403700	DARFIELD, South Yorkshire	-	-	Fireclay

5.6 Natural Cavities

This dataset provides information based on the Peter Brett Associates natural cavities database. The dataset is made up of points and polygons. Where polygons are used these represent an area in which it is expected the cavities could be found. It does not indicate that cavities are present everywhere within the polygon, and caution should be used in the interpretation of this data.

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

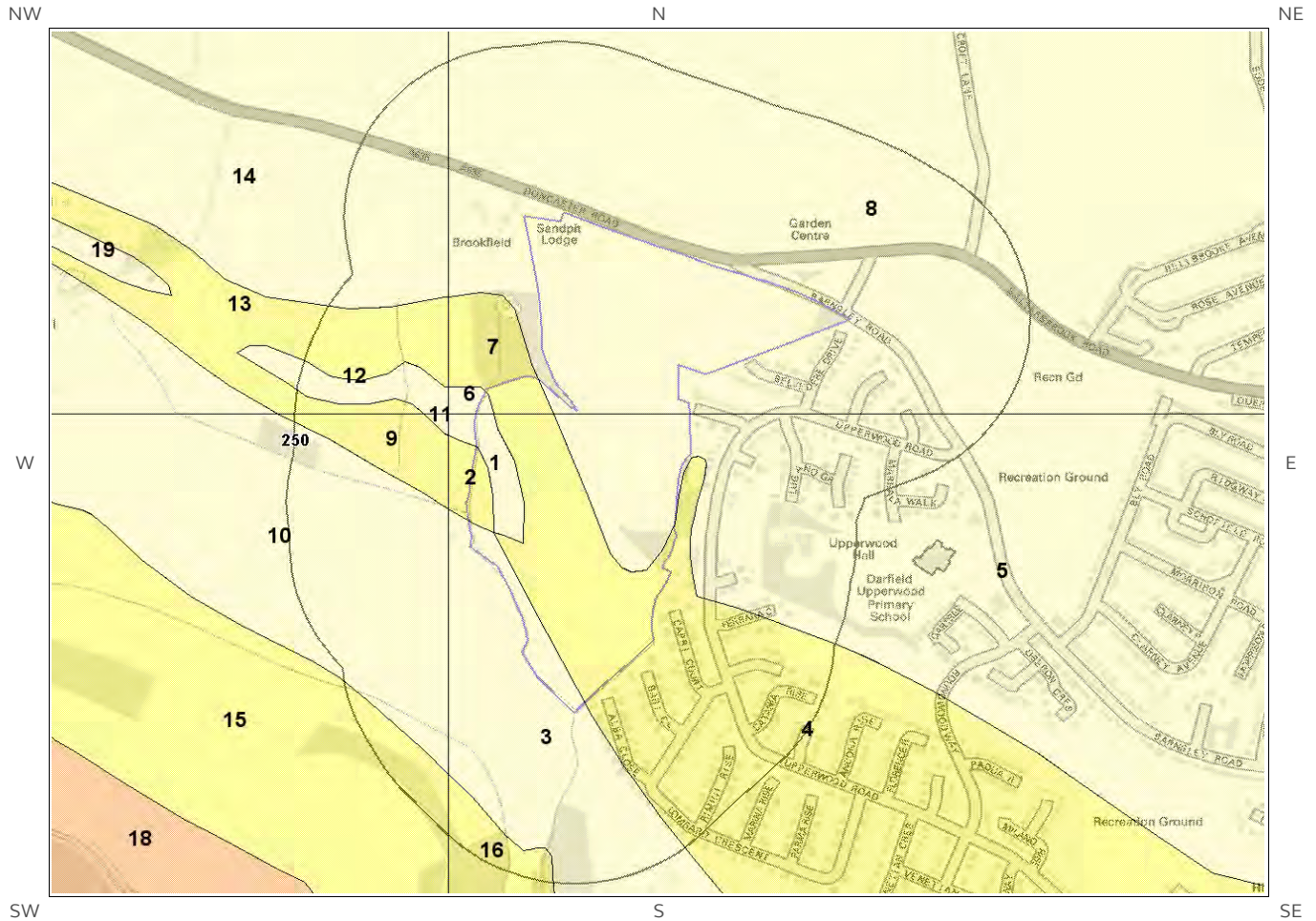
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

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

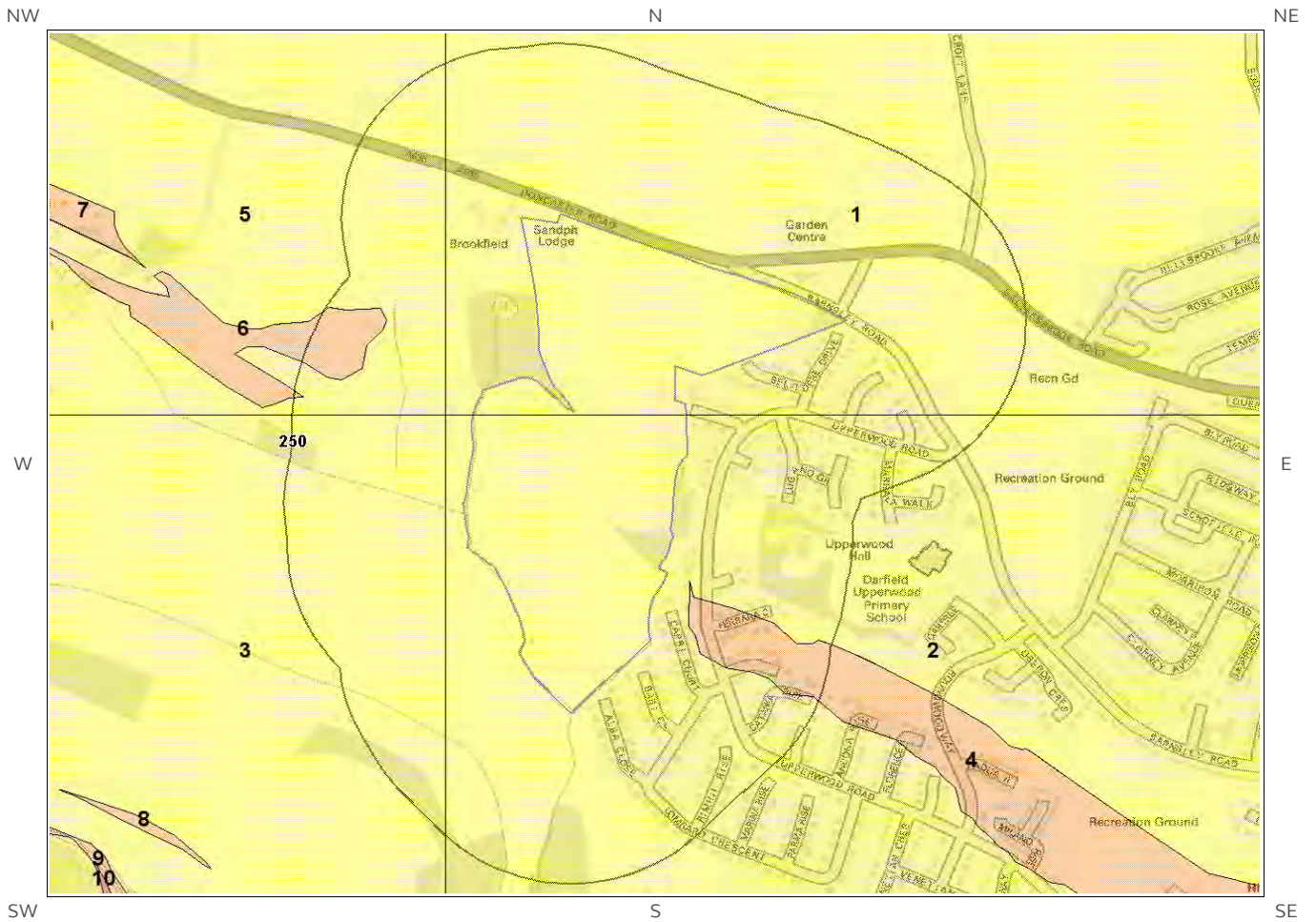


Shrink Swell Clay Legend

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6.2 Landslides map

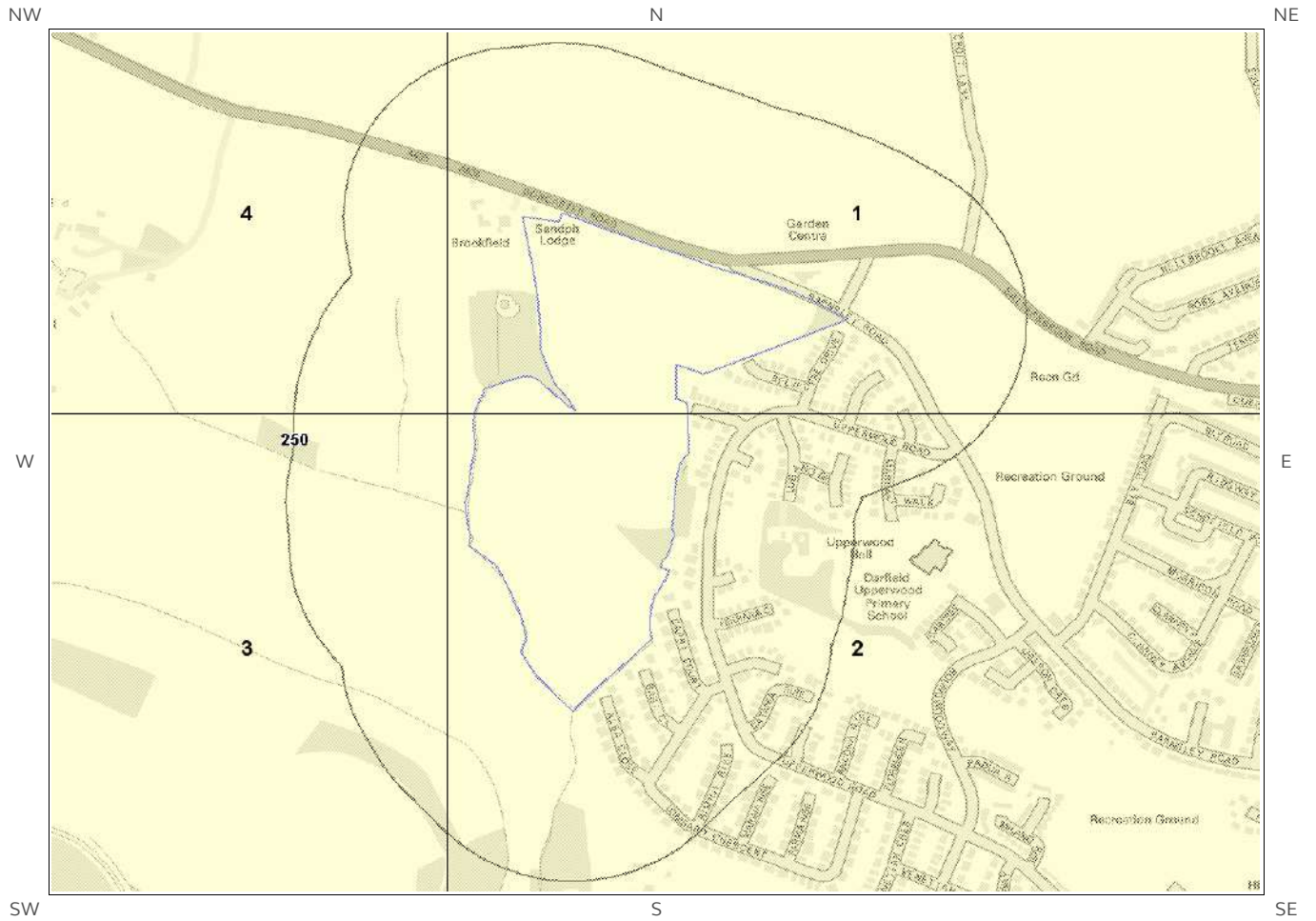


Landslides Legend

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6.3 Ground Dissolution of Soluble Rocks map

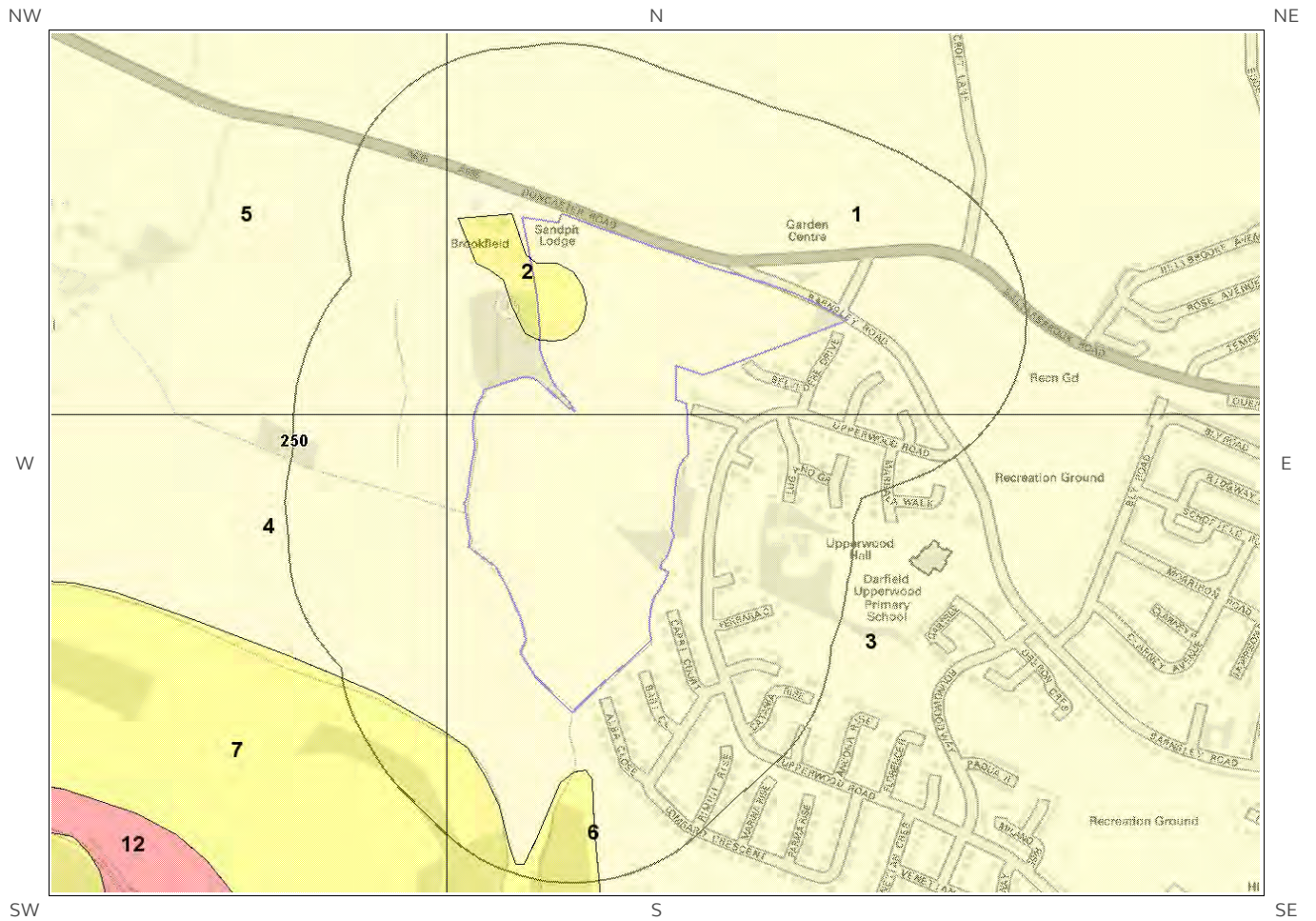


Ground Dissolution
Soluble Rocks Legend

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6.4 Compressible Deposits map

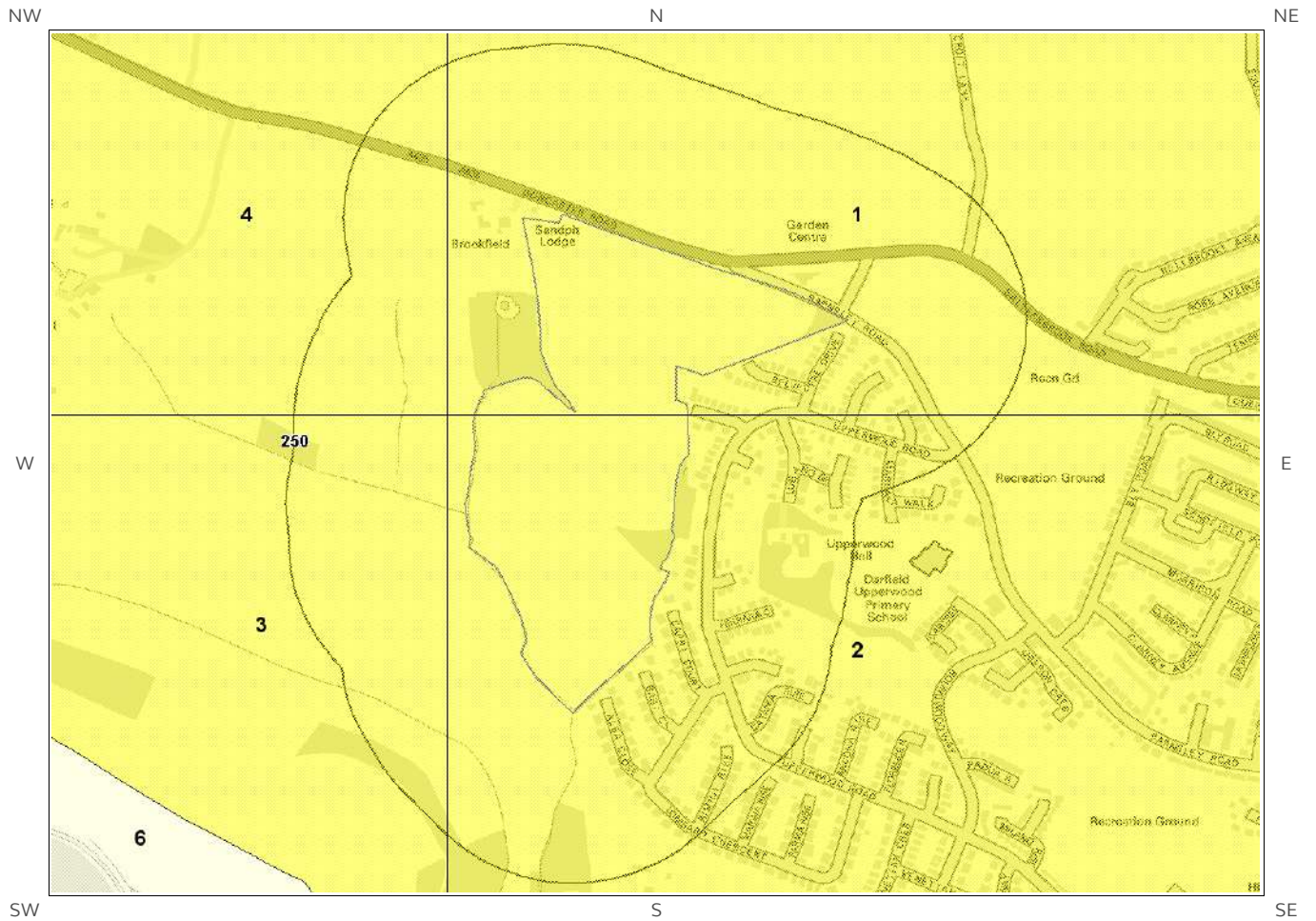


Compressible Deposits Legend

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6.5 Collapsible Deposits map

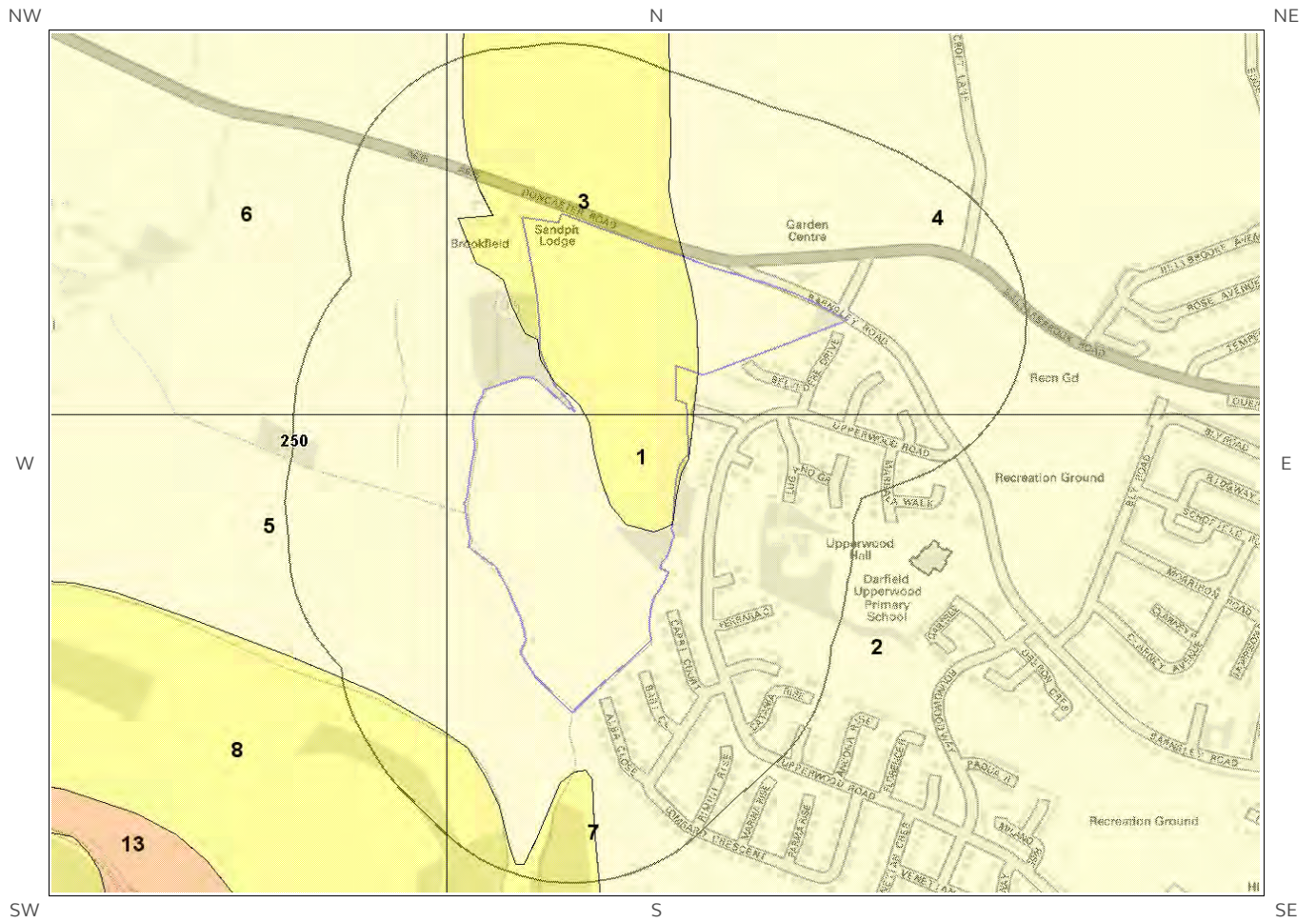


Collapsible Deposits Legend

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6.6 Running Sand map



Running Sand Legend

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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	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.
2	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.
3	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.
4	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.
5	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.

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

ID	Distance (m)	Direction	Hazard Rating	Details
6	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.
7	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.
8	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.
9	25.0	W	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.
10	26.0	W	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.
11	36.0	W	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.
12	37.0	W	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.
13	49.0	NW	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.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	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.
2	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.
3	25.0	W	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.
4	34.0	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.
5	37.0	W	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.

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.
2	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.

ID	Distance (m)	Direction	Hazard Rating	Details
3	25.0	W	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.
4	37.0	W	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.
2	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. 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.
3	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.
4	25.0	W	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.
5	37.0	W	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.
2	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.
3	25.0	W	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.

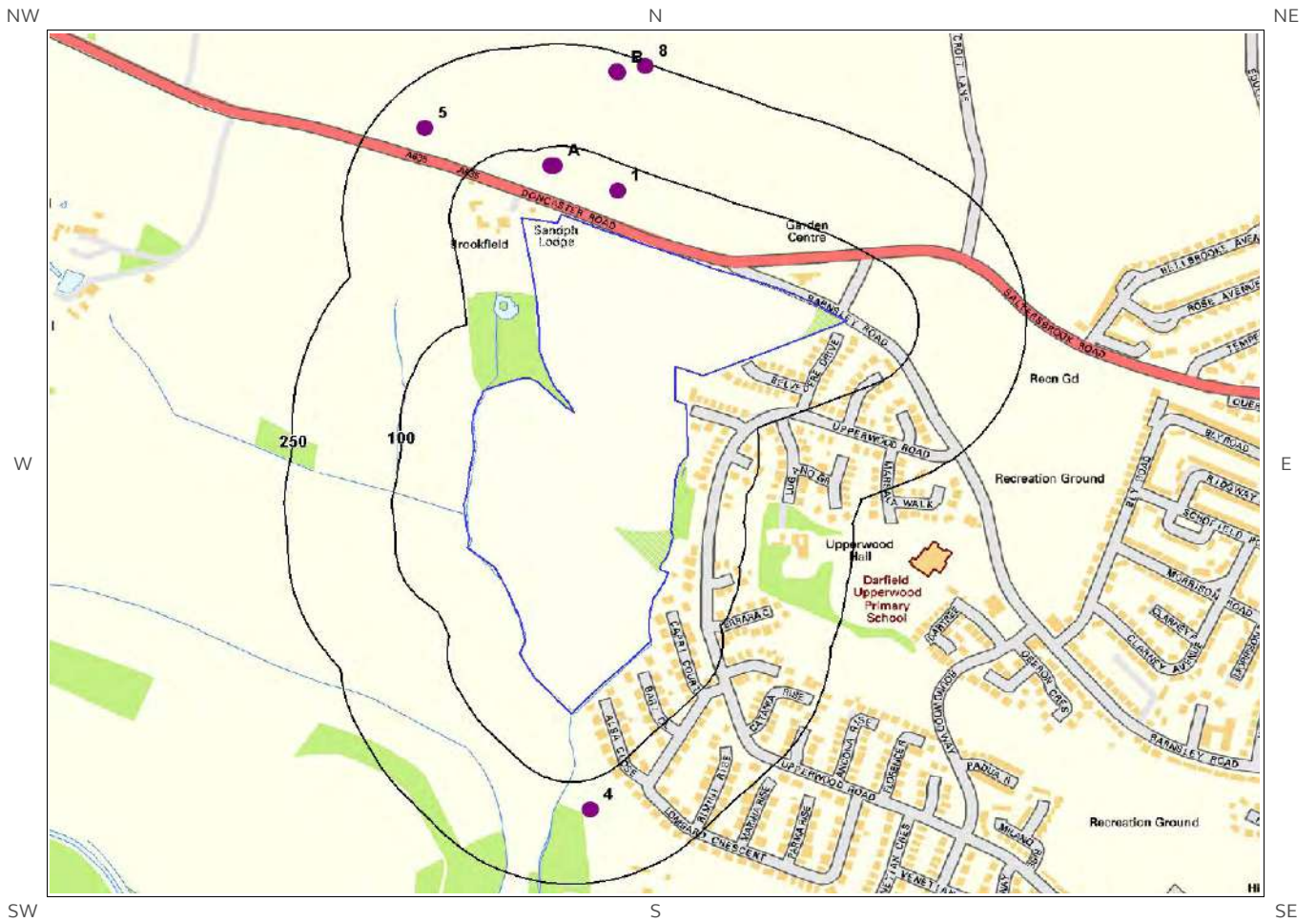
ID	Distance (m)	Direction	Hazard Rating	Details
4	37.0	W	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

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

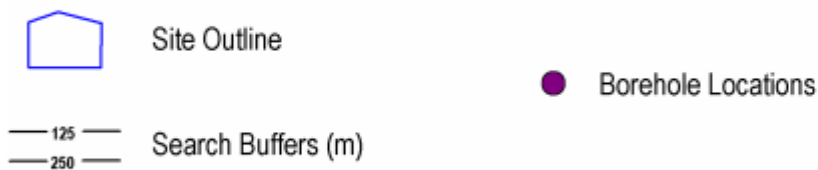
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	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.
3	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. 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.
4	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.
5	25.0	W	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.
6	37.0	W	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

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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:

8

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	60.0	N	440238 405329	SE40NW93	45.0	DARFIELD MAIN COLLIERY NO.12 UGBH UP
2A	71.0	N	440150 405365	SE40NW65	48.0	DARFIELD MAIN COLLIERY NO.1 UG
3A	73.0	N	440145 405366	SE40NW66	34.0	DARFIELD MAIN COLLIERY NO.3 UGBH
4	144.0	S	440200 404420	SE40SW220	2.0	BARNSELEY-DONCASTER RD BH2
5	189.0	NW	439970 405421	SE30NE17	34.0	DARFIELD MAIN COLLIERY NO.6 UGBH
6B	221.0	N	440239 405502	SE40NW99	84.0	HOUGHTON MAIN COLLIERY 45 & 45UGBH
7B	222.0	N	440237 405504	SE40NW100	26.0	HOUGHTON MAIN COLLIERY 44 UGBH
8	244.0	N	440277 405512	SE40NW173	-1.0	HOUGHTON MAIN COLLIERY

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.

- #1: scans.bgs.ac.uk/sobi_scans/boreholes/105565
- #2A: scans.bgs.ac.uk/sobi_scans/boreholes/105526
- #3A: scans.bgs.ac.uk/sobi_scans/boreholes/105527
- #4: scans.bgs.ac.uk/sobi_scans/boreholes/106383
- #5: scans.bgs.ac.uk/sobi_scans/boreholes/83510
- #6B: scans.bgs.ac.uk/sobi_scans/boreholes/105581
- #7B: scans.bgs.ac.uk/sobi_scans/boreholes/105582
- #8: scans.bgs.ac.uk/sobi_scans/boreholes/105656

8 Estimated Background Soil Chemistry

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

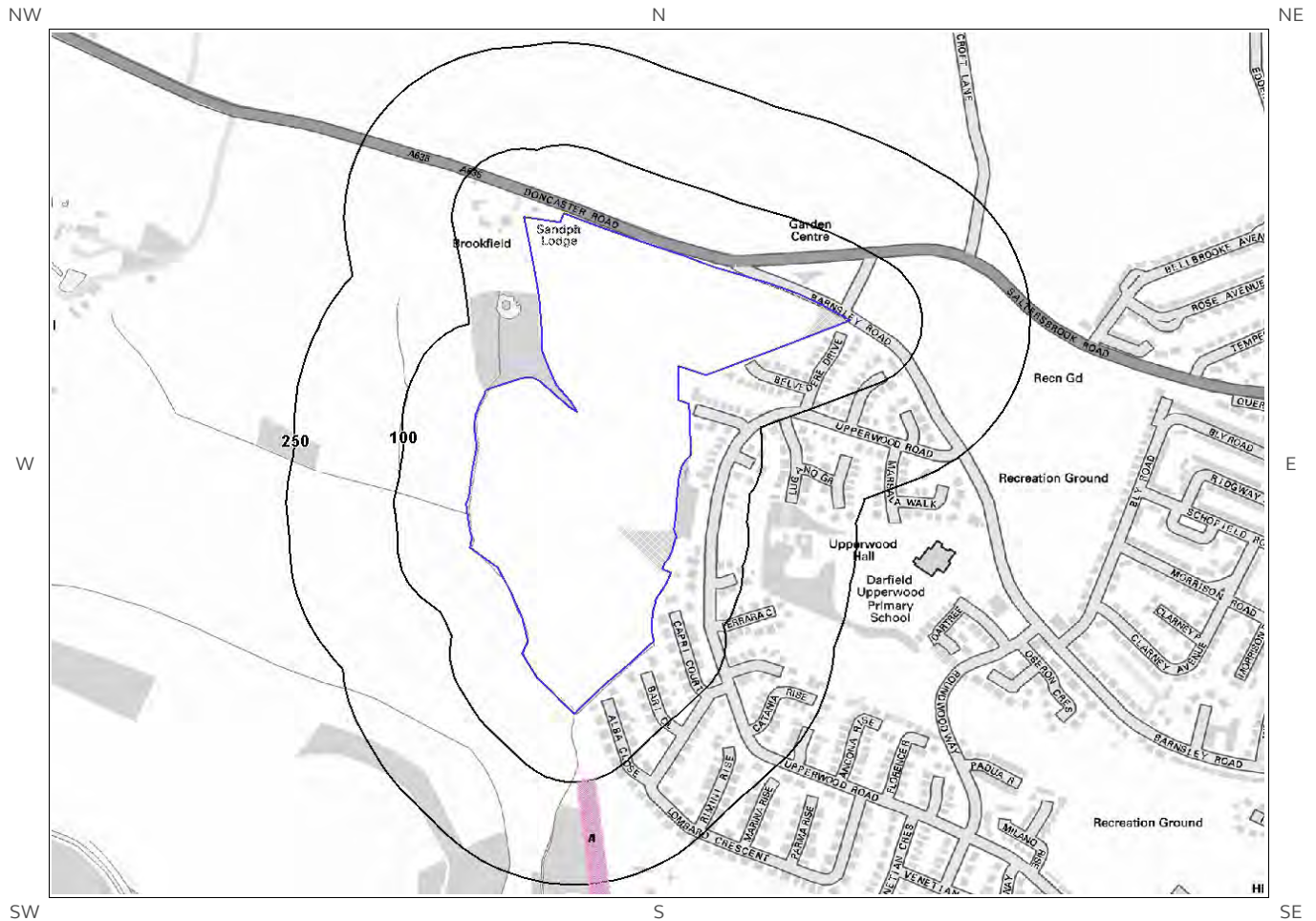
27

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 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 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	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 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	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
25.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
25.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
25.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
25.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg	<100 mg/kg
35.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
35.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
37.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
37.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
37.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
37.0	W	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	30 - 45 mg/kg	<100 mg/kg
39.0	W	RuralSoil	<15 mg/kg	<1.8 mg/kg	40 - 60 mg/kg	<15 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

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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
2A	96	S	440208 404234	Railway Sidings	1970
3A	96	S	440208 404234	Railway Sidings	1961
4A	96	S	440208 404234	Railway Sidings	1976
5A	97	S	440216 404233	Railway Sidings	1982
1	101	S	440177 404126	Railway Sidings	1977

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? 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.

9.4 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? Yes

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

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com



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://www.1.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>



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Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-may25-2018>

APPENDIX E

Groundsure Report

Historical Plans



Haigh Huddleston & Associates
99-101, LEEDS ROAD,
DEWSBURY, WF12 7BU

Groundsure Reference: GS-5269510

Your Reference: SAUL_7309

Report Date 25 Jul 2018

Report Delivery Method: Email - pdf

Enviro Insight

Address: DONCASTER ROAD, DARFIELD, S71 5EZ

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 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Address: DONCASTER ROAD, DARFIELD, S71 5EZ
Date: 25 Jul 2018
Reference: GS-5269510
Client: Haigh Huddleston & Associates



Aerial Photograph Capture date: 07-Jun-2013
Grid Reference: 440215,404985
Site Size: 17.55ha

Report Reference: GS-5269510
Client Reference: SAUL_7309

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8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:	50
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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	7	0	6	41
1.2 Additional Information – Historical Tank Database	0	0	0	3
1.3 Additional Information – Historical Energy Features Database	0	0	5	11
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	0	0
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	7	0	10	30
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	1	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	1	0	0
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	0
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	0
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	2	0	0	0	2	5
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	1	4

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	1	0	5	Not searched
4.2 Records of Petrol and Fuel Sites	0	1	0	0
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 Records of Artificial Ground and Made Ground present beneath the study site	Identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
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 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified					
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified					
	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	2	4
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
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)	2	1	#250GWV #	#500GWV #	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 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	Yes
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	16	0	12	16	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Environment Agency Zone 2 floodplains within 250m of the study site	Identified					
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified					
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low					
7.4 Flood Defences within 250m of the study site	None identified					
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified					
7.6 Areas used for Flood Storage within 250m of the study site	None identified					
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Potential below Surface					
7.8 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	1
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	0	5
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	1	1	0	0	0	0
8.14 Records of Green Belt land	1	1	0	0	0	0

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence

Very Low

9.1.1 Maximum Shrink-Swell hazard rating identified on the study site

Very Low

9.1.2 Maximum Landslides hazard rating identified on the study site

Low

9.1.3 Maximum Soluble Rocks hazard rating identified on the study site

Negligible

9.1.4 Maximum Compressible Ground hazard rating identified on the study site

Very Low

9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site

Very Low

9.1.6 Maximum Running Sand hazard rating identified on the study site

Very Low

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 site is in a Radon Affected Area, as between 3 and 5% 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?

Basic radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site

Identified

10.2 Non-Coal Mining areas within 50m of the study site boundary

Identified

10.3 Brine affected areas within 75m of the study site

None identified

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 licences, 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.

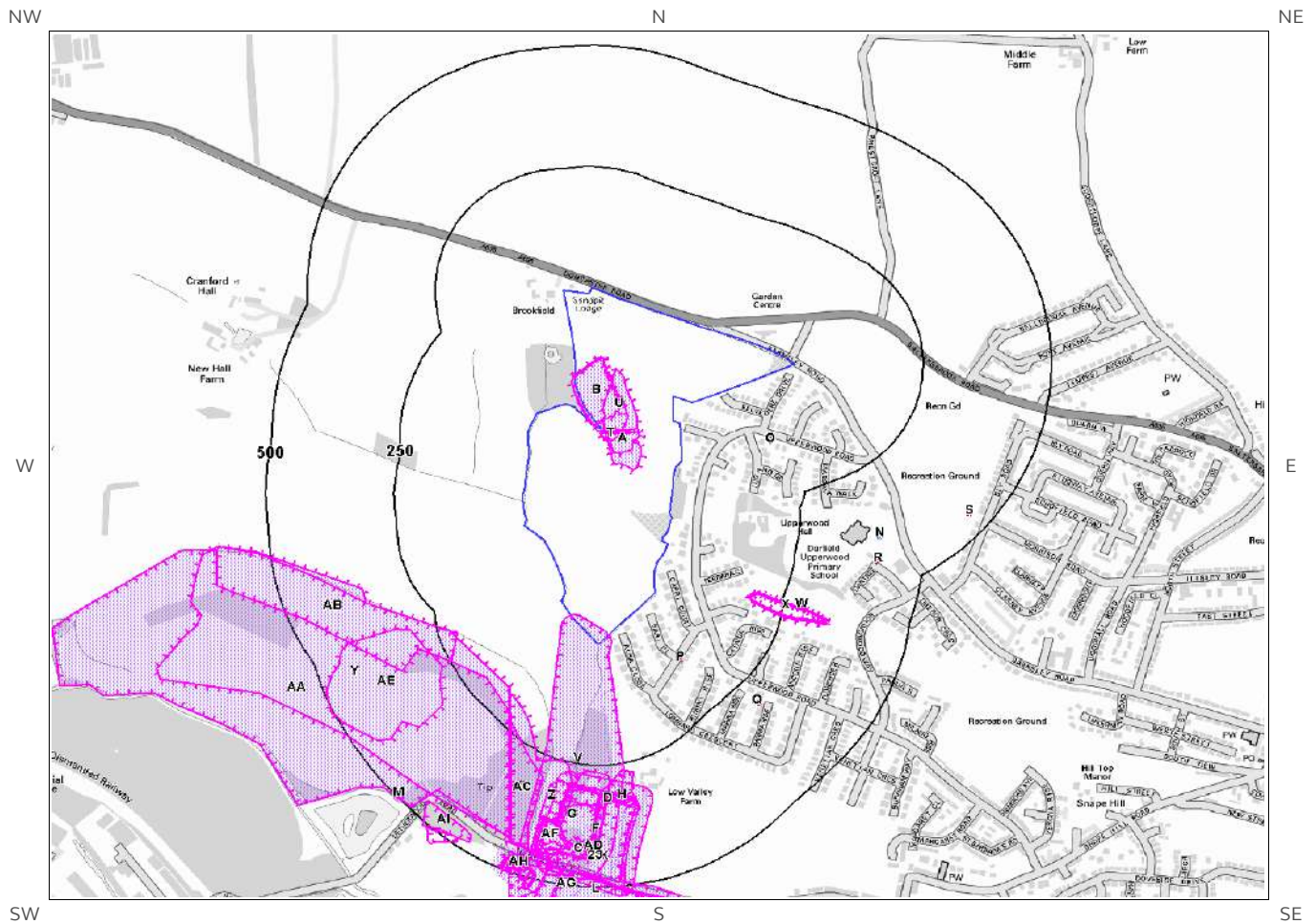
Note: Maps

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



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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: 54

ID	Distance [m]	Direction	Use	Date
1B	0	On Site	Unspecified Quarry	1948
2T	0	On Site	Refuse Heap	1951
3A	0	On Site	Refuse Heap	1967
4V	0	On Site	Unspecified Disused Workings	1988
5A	0	On Site	Unspecified Pit	1977
6U	0	On Site	Unspecified Ground Workings	1967
7B	0	On Site	Unspecified Quarry	1955
8D	101	S	Railway Sidings	1977
9Y	187	SW	Refuse Heap	1977
10Z	193	SW	Unspecified Disused Tip	1977
11AA	208	SW	Unspecified Disused Tip	1987
12AB	214	W	Disused Workings	1987
13AC	233	SW	Refuse Heap	1988
14AD	264	S	Colliery	1951
15AE	268	SW	Refuse Heap	1966
16F	268	S	Colliery	1890
17C	272	S	Colliery	1931
18C	272	S	Colliery	1938
19J	277	S	Railway Sidings	1904
20E	282	S	Railway Sidings	1890
21W	285	E	Boat House	1904
22D	288	S	Tramway Sidings	1951
23	289	S	Railway Sidings	1938
24E	291	S	Railway Sidings	1938
25E	291	S	Railway Sidings	1931
26G	291	S	Unspecified Ground Workings	1967
27F	292	S	Colliery	1904
28G	293	S	Refuse Heap	1951
29C	296	S	Colliery	1948
30G	296	S	Refuse Heap	1948
31G	298	S	Refuse Heap	1931
32G	298	S	Refuse Heap	1938

33G	299	S	Refuse Heap	1938
34G	299	S	Refuse Heap	1938
35H	309	S	Unspecified Heap	1951
36H	310	S	Unspecified Heap	1938
37H	310	S	Unspecified Heap	1938
38I	312	S	Unspecified Ground Workings	1931
39I	312	S	Unspecified Ground Workings	1938
40K	312	S	Railway Sidings	1948
41H	312	S	Unspecified Heap	1948
42G	328	S	Refuse Heap	1904
43G	333	S	Refuse Heap	1890
44AF	373	S	Unspecified Pit	1904
45C	461	S	Unspecified Mine	1967
46AG	461	S	Colliery	1977
47J	465	S	Sanitary Tube Works	1904
48K	465	S	Colliery	1988
49J	466	S	Sanitary Tube Works	1890
50L	468	S	Colliery	1938
51L	468	S	Colliery	1938
52M	488	SW	Unspecified Tank	1948
53M	488	SW	Unspecified Tank	1931
54M	488	SW	Unspecified Tank	1938

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
55N	386	SE	Unspecified Tank	1996
56N	387	SE	Unspecified Tank	1982
57N	388	SE	Unspecified Tank	1976

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:

16

ID	Distance (m)	Direction	Use	Date
58O	129	S	Electricity Substation	1996
59O	129	S	Electricity Substation	1982
60P	130	SE	Electricity Substation	1982
61P	135	SE	Electricity Substation	1976
62P	135	SE	Electricity Substation	1970
63Q	292	SE	Electricity Substation	1982
64Q	293	SE	Electricity Substation	1994
65Q	300	SE	Electricity Substation	1970
66Q	300	SE	Electricity Substation	1976
67R	405	E	Electricity Substation	1976
68R	406	E	Electricity Substation	1982
69R	406	E	Electricity Substation	1996
70S	453	SE	Electricity Substation	1976
71S	453	SE	Electricity Substation	1970
72S	456	SE	Electricity Substation	1982
73S	456	SE	Electricity Substation	1996

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: 0

Database searched and no data found.

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary:

0

Database searched and no data found.

1.7 Potentially Infilled Land

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

47

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













ID	Distance(m)	Direction	Use	Date
74T	0	On Site	Refuse Heap	1951
75T	0	On Site	Refuse Heap	1967
76B	0	On Site	Unspecified Quarry	1948
77B	0	On Site	Unspecified Quarry	1955
78T	0	On Site	Unspecified Pit	1977
79U	0	On Site	Unspecified Ground Workings	1967
80V	0	On Site	Unspecified Disused Workings	1988
81W	184	E	Pond	1904
82X	184	E	Pond	1948
83X	184	E	Pond	1951
84X	184	E	Pond	1938
85W	185	E	Pond	1890
86Y	187	SW	Refuse Heap	1977
87Z	193	SW	Unspecified Disused Tip	1977
88AA	208	SW	Unspecified Disused Tip	1987
89AB	214	W	Disused Workings	1987
90AC	233	SW	Refuse Heap	1988
91AD	264	S	Colliery	1951
92AE	268	SW	Refuse Heap	1966
93F	268	S	Colliery	1890
94G	291	S	Unspecified Ground Workings	1967
95G	292	S	Colliery	1904
96G	293	S	Refuse Heap	1951
97C	296	S	Colliery	1948
98G	296	S	Refuse Heap	1948
99G	299	S	Refuse Heap	1938
100G	299	S	Refuse Heap	1938
101H	309	S	Unspecified Heap	1951
102H	310	S	Unspecified Heap	1938
103H	310	S	Unspecified Heap	1938
104H	312	S	Unspecified Heap	1948
105G	328	S	Refuse Heap	1904
106G	333	S	Refuse Heap	1890

107AF	373	S	Unspecified Pit	1904
108C	461	S	Unspecified Mine	1967
109AG	461	S	Colliery	1977
110AI	461	SW	Water Body	1890
111K	465	S	Colliery	1988
112AG	468	S	Colliery	1938
113AG	468	S	Colliery	1938
114AH	475	S	Pond	1988
115AH	475	S	Ponds	1890
116AH	476	S	Ponds	1904
117AH	478	S	Pond	1938
118AH	478	S	Pond	1948
119AI	485	SW	Pond	1966
120AI	485	SW	Pond	1977

2. Environmental Permits, Incidents and Registers Map



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

1

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
3A	210	SW	440000 404440	Operator: Ellison Metal Finishing Ltd Installation Name: Hayfield Mill Process: SURFACE TREATING METALS AND PLASTICS; ELECTROLYTIC/CHEMICAL >30 CU M Permit Number: BN7923IV Original Permit Number: BN7923IV EPR Reference: - Issue Date: - Effective Date: - Last date noted as effective: 2005-04-01 Status: Determination

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
2	45	NW	440069 405317	<p>Address: Brookfield Fill Station, Doncaster Rd, Ardsley, Barnsley, S71 5EZ</p> <p>Process: Petrol Vapour Recovery Process</p> <p>Status: Historical Permit Permit Type: Part B</p> <p>Enforcement: No Enforcements Notified Date of Enforcement: No Enforcements Notified Comment: No Enforcements Notified</p>

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:

0

Database searched and no data found.

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:

0

Database searched and no data found.

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

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



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- | | | | | | |
|---|------------------------|---|---------------------------|---|---|
|  | Site Outline |  | EA/NRW Active Landfill |  | Historic and Planned Waste Sites |
|  | 250 Search Buffers (m) |  | EA/NRW Historic Landfill |  | EA/NRW Licensed Waste Site |
|  | 500 Search Buffers (m) |  | BGS / DoE Survey Landfill |  | 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:

9

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	0	On Site		<p>Site Address: Land to the rear of Brookfield, Doncaster Road, Ardsley, Barnsley</p> <p>Waste Licence: Yes</p> <p>Site Reference: 4400/B568, 20B568(105), WD20 B568</p> <p>Waste Type: Inert, Commercial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 11-Apr-1988</p> <p>Licence Surrendered: 07-Apr-1991</p> <p>Licence Holder Address: Brookfield, Doncaster Road, Ardsley, Barnsley</p> <p>Operator: S T Horrobin</p> <p>Licence Holder: S T Horrobin</p> <p>First Recorded: 11-Apr-1988</p> <p>Last Recorded: 07-Aug-1989</p>
2	0	On Site		<p>Site Address: Upperwood Hall, Doncaster Road, Darfield, Barnsley</p> <p>Waste Licence: Yes</p> <p>Site Reference: 4400/2B11, WD2 B11, 2B11(55)</p> <p>Waste Type: Inert</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 04-Oct-1974</p> <p>Licence Surrendered: 31-Dec-1990</p> <p>Licence Holder Address: -</p> <p>Operator: -</p> <p>Licence Holder: South Yorkshire County Council</p> <p>First Recorded: 04-Oct-1974</p> <p>Last Recorded: 31-Dec-1990</p>
Not shown	882	S		<p>Site Address: Land North of Valley Road, Station Road, Industrial Estate, Wombwell, Barnsley</p> <p>Waste Licence: Yes</p> <p>Site Reference: 20B803(110), WD20 B803, 4400/B803</p> <p>Waste Type: Inert, Commercial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 19-Dec-1990</p> <p>Licence Surrendered: 28-Sep-1993</p> <p>Licence Holder Address: Hangmanstone Depot, Birdwell, Barnsley</p> <p>Operator: Rafahart Limited</p> <p>Licence Holder: Rafahart Project and Mangement Limited</p> <p>First Recorded: 01-Jan-1991</p> <p>Last Recorded: 31-Dec-1992</p>
Not shown	977	S		<p>Site Address: Station Road Industrial Estate, Valley Road, Wombwell, Barnsley</p> <p>Waste Licence: Yes</p> <p>Site Reference: 4400/(125), WD20/B803</p> <p>Waste Type: Inert</p> <p>Licence Issue: 19-Dec-1990</p> <p>Licence Surrendered: 31-Dec-1993</p> <p>Licence Holder Address: -</p> <p>Operator: -</p> <p>Licence Holder: Rafahart Limited</p>

ID	Distance (m)	Direction	NGR	Details
				Environmental Permitting Regulations (Waste) Reference: - First Recorded: 31-Jan-1991 Last Recorded: 31-Dec-1993
Not shown	1213	S		Site Address: Disused canal between Station Road and Littlefield Road, Wombell, Barnsley Waste Licence: Yes Site Reference: WD2 B19, WD20 B609, 4400/B609, 20B609(56) Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 26-Sep-1988 Licence Surrendered: 22-Apr-1993 Licence Holder Address: Stanney Mill Road, Little Stanney, Chester Operator: Barnsley Metropolitan Borough Council Licence Holder: J L F Civil Engineering Limited First Recorded: 26-Sep-1988 Last Recorded: 22-Apr-1993
Not shown	1258	S		Site Address: North Ferriby Tip, Church Road, North Ferriby Waste Licence: Yes Site Reference: 55/30/10, 4400/41B61 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 13-Jul-1995 Licence Surrendered: Licence Holder Address: - Operator: Humberside County Council Licence Holder: Mr C Bell First Recorded: - Last Recorded: -
Not shown	1303	S		Site Address: Disused Canal between Littlefield Lane and Station Road, Wombwell, Barnsley Waste Licence: Yes Site Reference: WD2 B17, 4400/B17 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 02-Mar-1988 Licence Surrendered: Licence Holder Address: Public Services Department, Central Offices, Kendray Street, Barnsley Operator: - Licence Holder: Barnsley Metropolitan Borough Council First Recorded: 31-Dec-1988 Last Recorded: 30-Nov-1990
Not shown	1444	SE		Site Address: End Of Ings Road, Wombwell, Barnsley Waste Licence: - Site Reference: (123)B, 4400/(123) Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1487	SE		Site Address: Parkhill Quarry, Everill Gate Lane, Wombwell, Barnsley Waste Licence: Yes Site Reference: 4400/B8, WD2 B8, WD2 B16, WD2 B24, 4400/B24, 4400/0410, 4400/0563 Waste Type: Inert, Industrial, Commercial, Household, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 17-Nov-1976 Licence Surrendered: 31-Dec-1990 Licence Holder Address: Central Offices, Barnsley Operator: Barnsley Metropolitan Borough Council Licence Holder: Barnsley Metropolitan Borough Council First Recorded: 31-Dec-1948 Last Recorded: 31-Dec-1995

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:

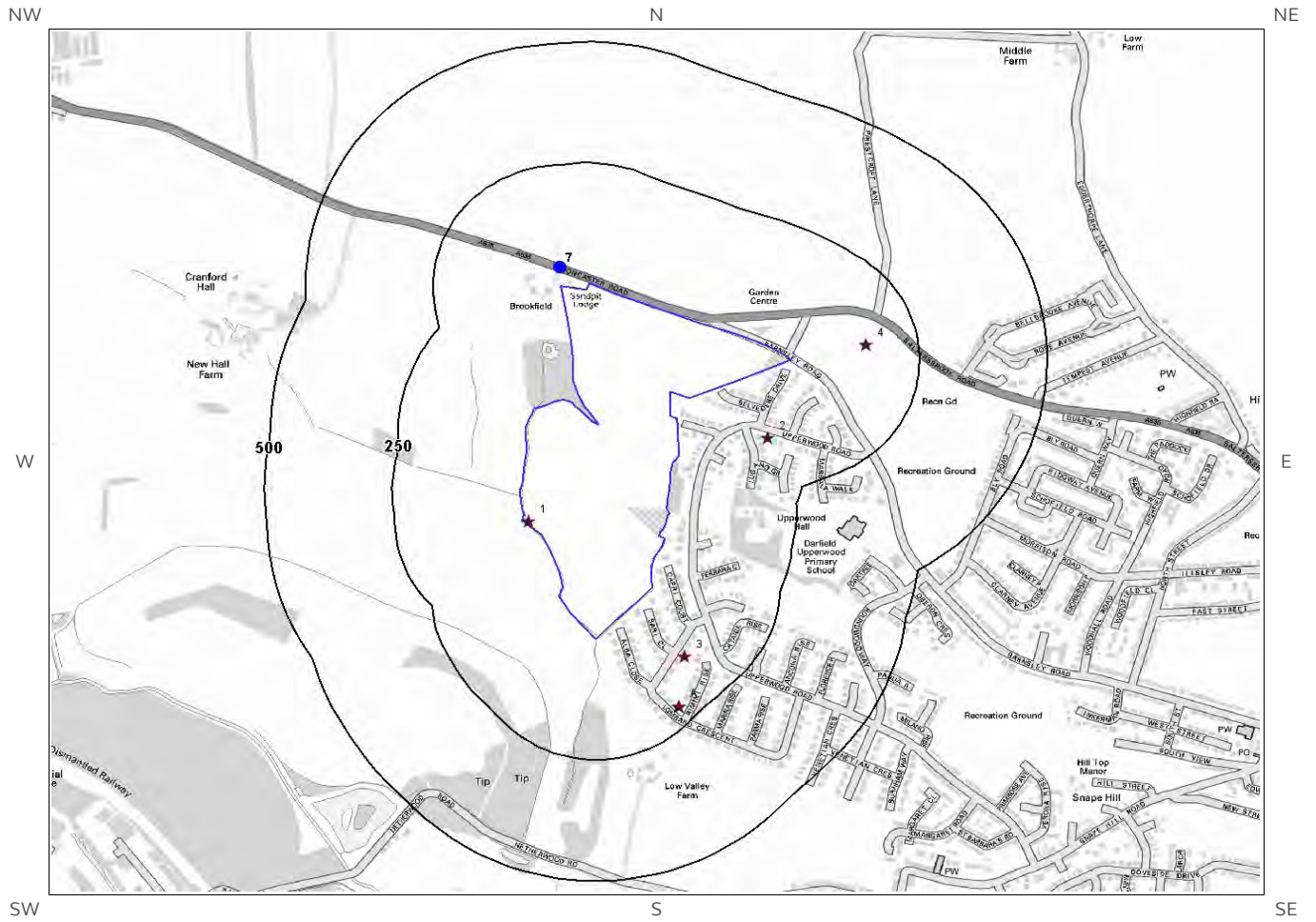
5

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	994	S	440386 403591	<p>Site Address: Station Road Industrial Estate, Valley Road, Wombwell, Barnsley, South Yorkshire, S73 0BS</p> <p>Type: 75kte Metal Recycling Site</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: GIL048</p> <p>EPR reference: EA/EPR/CB3032RL/A001</p> <p>Operator: Gillott Alloys Limited</p> <p>Waste Management licence No: 103352</p> <p>Annual Tonnage: 74999.0</p> <p>Issue Date: 09/01/2012</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Expired</p> <p>Site Name: Gillott Alloys Ltd</p> <p>Correspondence Address: -</p>
11A	1031	SW	439200 404150	<p>Site Address: Mitchell's Enterprise Park, Off Bradbury Balk Lane, Wombwell, Barnsley, South Yorkshire, S73 8HR</p> <p>Type: Physical Treatment Facility</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CUL008</p> <p>EPR reference: EA/EPR/CB3635RY/V002</p> <p>Operator: G B Cullet Limited</p> <p>Waste Management licence No: 103467</p> <p>Annual Tonnage: 60000.0</p> <p>Issue Date: 28/02/2013</p> <p>Effective Date: -</p> <p>Modified: 11/12/2015</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: The Cullet Yard</p> <p>Correspondence Address: -</p>
12A	1031	SW	439200 404150	<p>Site Address: Mitchell's Enterprise Park, Bradbury Balk Lane, Wombwell, Barnsley, South Yorks, S73 8HR</p> <p>Type: Physical Treatment Facility</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CUL008</p> <p>EPR reference: EA/EPR/CB3635RY/A001</p> <p>Operator: G B Cullet Ltd</p> <p>Waste Management licence No: 103467</p> <p>Annual Tonnage: 60000.0</p> <p>Issue Date: 28/02/2013</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: The Cullet Yard</p> <p>Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details
13A	1031	SW	439200 404150	<p>Site Address: Mitchell's Enterprise Park, Off Bradbury Balk Lane, Wombwell, Barnsley, South Yorkshire, S73 8HR Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CUL008 EPR reference: EA/EPR/CB3635RY/V002 Operator: G. B. Cullet Limited Waste Management licence No: 103467 Annual Tonnage: 60000.0</p> <p>Issue Date: 28/02/2013 Effective Date: - Modified: 11/12/2015 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: The Cullet Yard Correspondence Address: -</p>
Not shown	1425	SE	441000 403400	<p>Site Address: Wombwell Wwtw, Ings Lane, Wombwell, Barnsley, South Yorkshire, S73 OBP Type: Biological Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: YOR035 EPR reference: EA/EPR/DP3292ZS/A001 Operator: Yorkshire Water Services Ltd Waste Management licence No: 65470 Annual Tonnage: 4999.0</p> <p>Issue Date: 17/05/2006 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Wombwell Wwtw Correspondence Address: -</p>

4. Current Land Use Map



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-  Site Outline
-  Current Industrial Sites
-  Electricity Transmission Cables
-  Search Buffers (m)
-  Petrol & Fuel Sites
-  Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

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

6

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Electricity Poles	440042 404805	S71	Electrical Features	Infrastructure and Facilities
2	132	S	Electricity Sub Station	440510 404977	S73	Electrical Features	Infrastructure and Facilities
3	146	SE	Electricity Sub Station	440347 404526	S73	Electrical Features	Infrastructure and Facilities
4	147	E	Pylon	440701 405169	S73	Electrical Features	Infrastructure and Facilities
5A	212	SE	A1 Mobile Crypton Tuning	440335 404422	28, Lombard Crescent, Darfield, Barnsley, S73 9PX	Vehicle Repair, Testing and Servicing	Repair and Servicing
6A	212	SE	A1 Tuning	440335 404422	28, Lombard Crescent, Darfield, Barnsley, S73 9PX	Vehicle Repair, Testing and Servicing	Repair and Servicing

4.2 Petrol and Fuel Sites

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

1

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
7	40	N	440102 405329	Unbranded	Brookfield Filling Station, Doncaster Road, Doncaster Road, Ardsley, Barnsley, South Yorkshire, S71 5EZ	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

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

Lex Code	Description	Rock Type
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

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

Lex Code	Description	Rock Type
GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL

5.3 Bedrock and Solid Geology

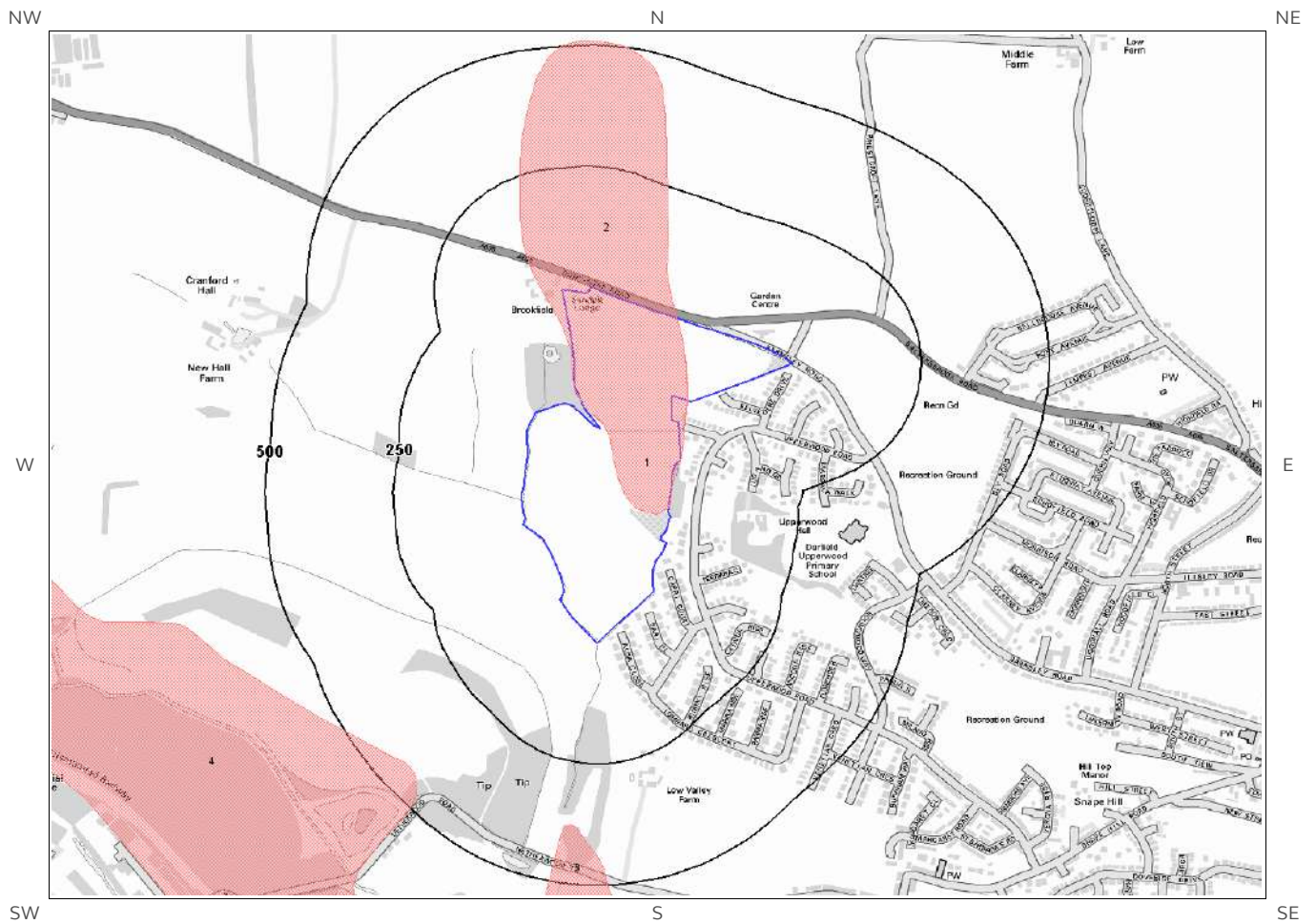
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION	SANDSTONE
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
ACR-SDST	ACKTON ROCK	SANDSTONE
MXR-SDST	MEXBOROUGH ROCK	SANDSTONE

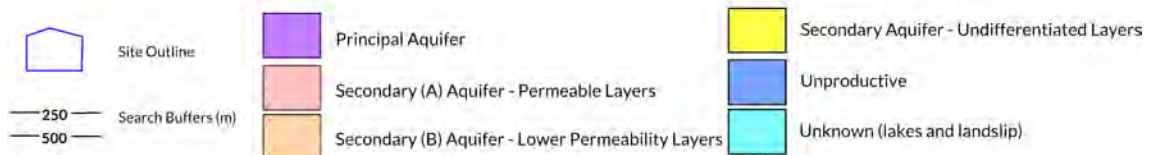
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

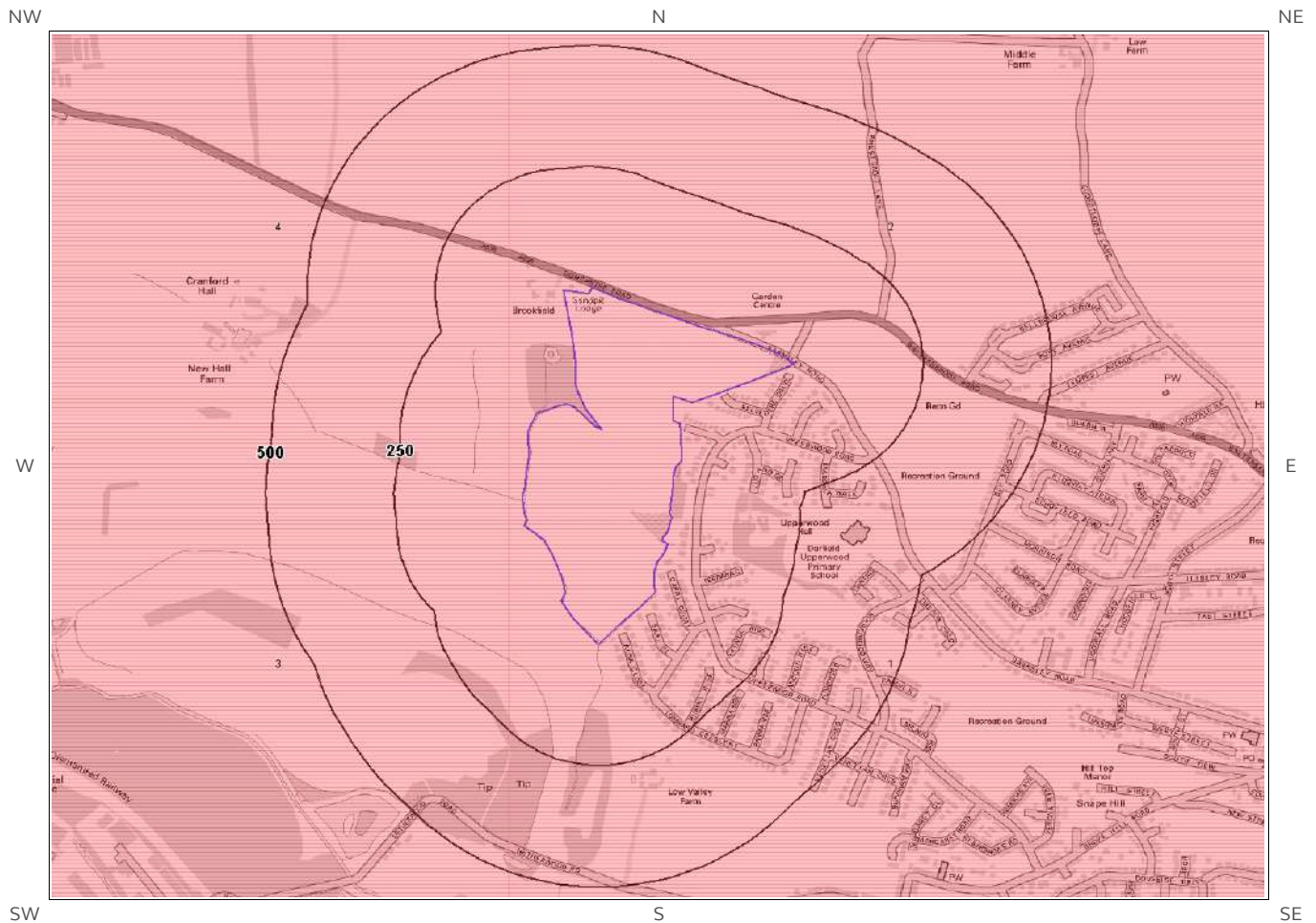
6a. Aquifer Within Superficial Geology



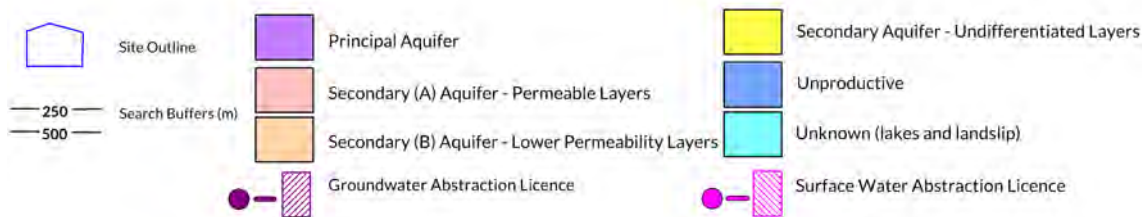
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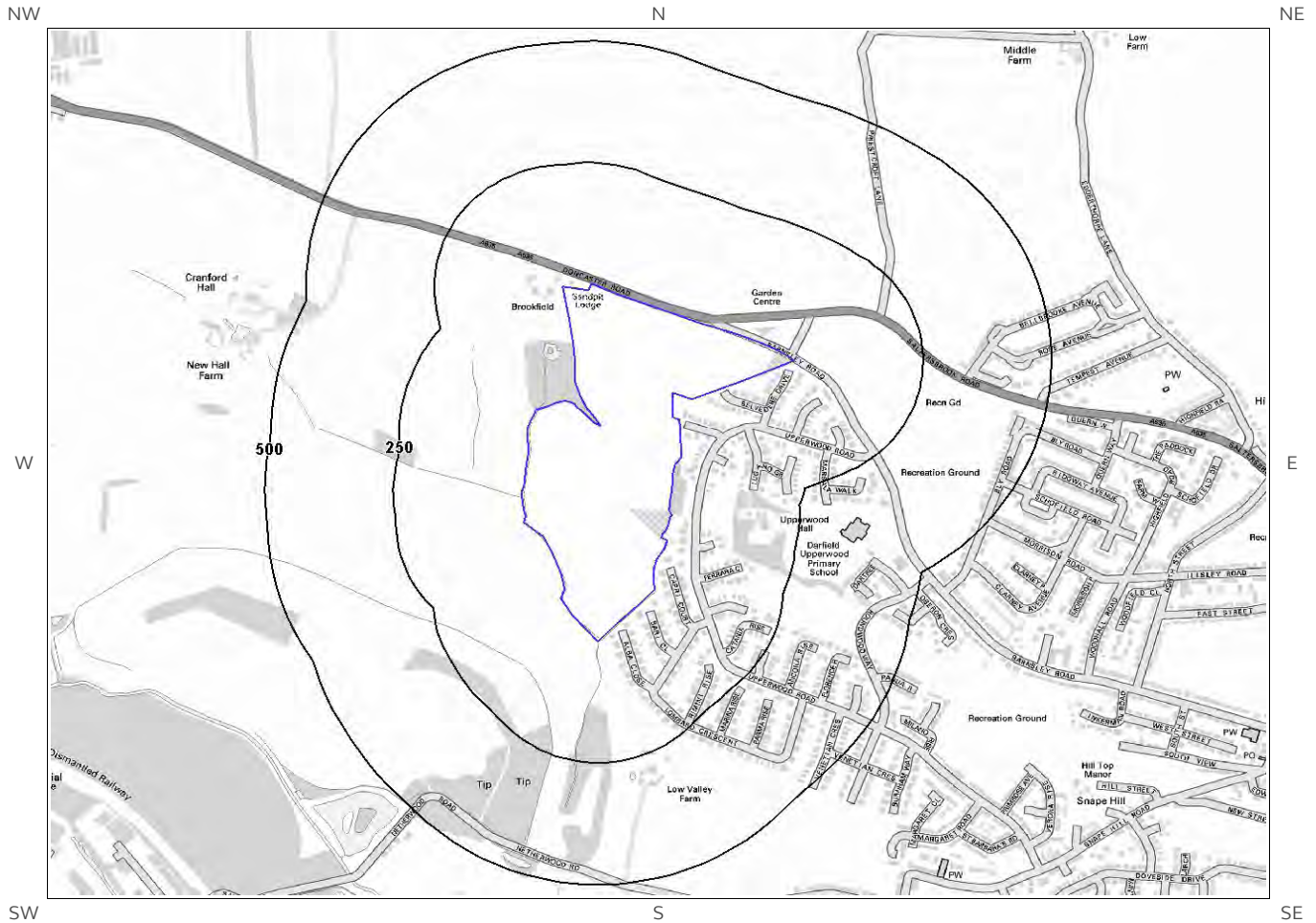
6b. Aquifer Within Bedrock Geology and Abstraction Licences



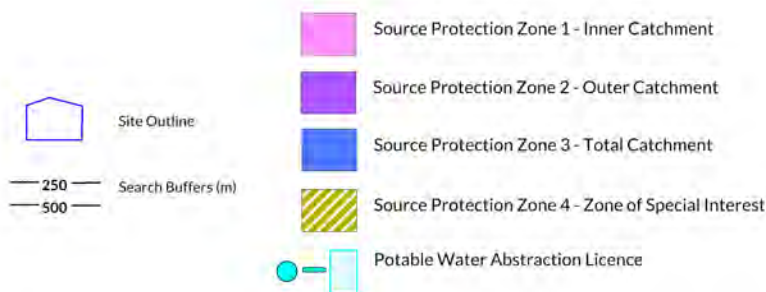
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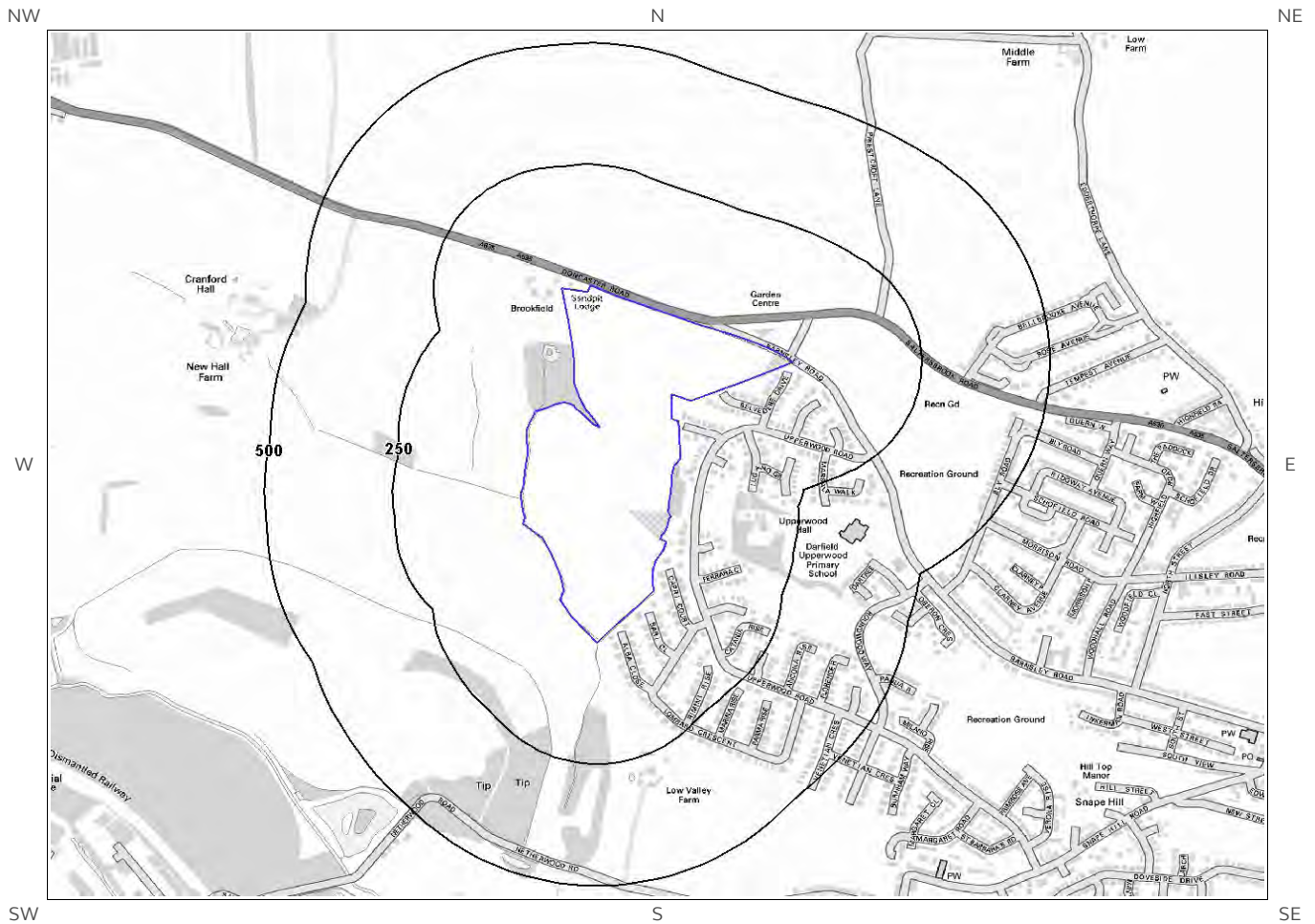
6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



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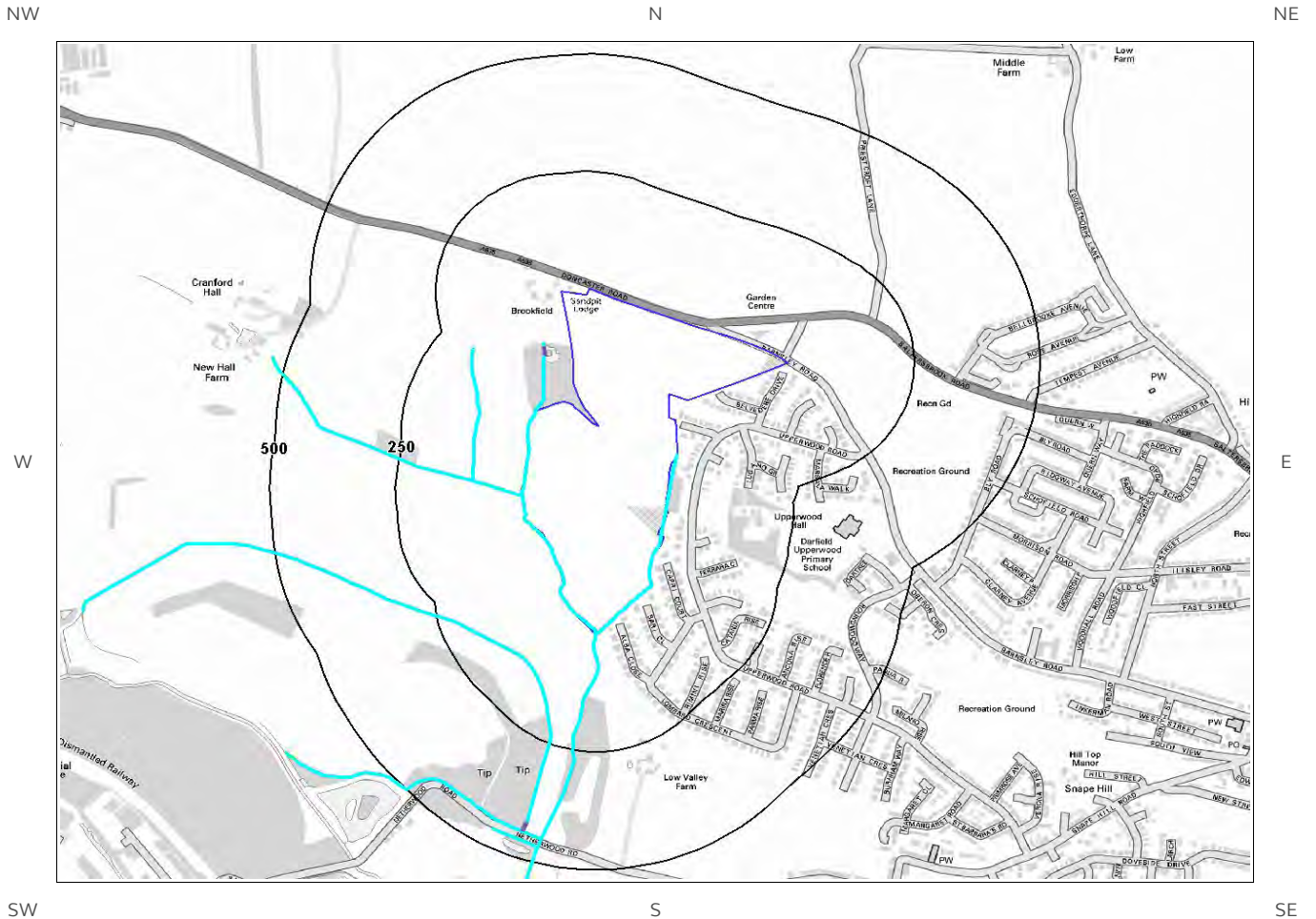
6d. Hydrogeology – Source Protection Zones within confined aquifer



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6e. Hydrology – Watercourse Network and River Quality



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- | | | | | | |
|---|------------------------|---|---------------------------------------|--|-------------------------------------|
|  | Site Outline |  | Tidal River |  | Canal |
|  | 250 Search Buffers (m) |  | Inland River |  | Underground or Elevated Canal |
|  | 500 Search Buffers (m) |  | Underground or Elevated Tidal River |  | Lock or Flight of Locks |
| | |  | Underground or Elevated Inland River |  | Lake, Reservoir, or Marsh |
| | |  | Foreshore |  | Drain or Transfer |
| | |  | General Quality Assessment: Chemistry |  | General Quality Assessment: Biology |

6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

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
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
2	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
3	378	S	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
4	441	SW	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

6.2 Aquifer within Bedrock Deposits

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
2	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
3	25	W	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
4	37	W	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

Groundwater Abstraction Licences within 2000m of the study site

Identified

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	943	W	439100 405100	Status: Historical Licence No: 2/27/08/029 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring No2 - Low Laithes Data Type: Point Name: LOW LAITHES DAIRY FARM LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 01449 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/1/1990 Version End Date:
Not shown	943	W	439100 405100	Status: Historical Licence No: 2/27/08/029 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring No2 Data Type: Point Name: LOW LAITHES DAIRY FARM LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 01449 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/1/1990 Version End Date:
Not shown	1244	W	438900 405600	Status: Historical Licence No: 2/27/08/029 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring No1 Data Type: Point Name: LOW LAITHES DAIRY FARM LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 01449 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/1/1990 Version End Date:
Not shown	1244	W	438900 405600	Status: Historical Licence No: 2/27/08/029 Details: General Farming & Domestic Direct Source: Groundwaters Point: Spring No1 - Low Laithes Data Type: Point Name: LOW LAITHES DAIRY FARM LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 01449 Original Start Date: 20/1/1966 Expiry Date: - Issue No: 100 Version Start Date: 9/1/1990 Version End Date:
Not shown	1317	NW	439584 406499	Status: Active Licence No: NE/027/0008/011 Details: General Farming & Domestic Direct Source: Groundwaters Point: Borehole - Coal Measures - Tyers Hall - Barnsley Data Type: Point Name: J & E Dickinson	Annual Volume (m ³): 30000 Max Daily Volume (m ³): 100 Original Application No: NPS/WR/010886 Original Start Date: 19/12/2012 Expiry Date: 31/3/2029 Issue No: 1 Version Start Date: 19/12/2012 Version End Date:
Not shown	1317	NW	439584 406499	Status: Active Licence No: NE/027/0008/011 Details: Heat Pump Direct Source: Groundwaters Point: Borehole - Coal Measures - Tyers Hall - Barnsley Data Type: Point Name: J & E Dickinson	Annual Volume (m ³): 30000 Max Daily Volume (m ³): 100 Original Application No: NPS/WR/010886 Original Start Date: 19/12/2012 Expiry Date: 31/3/2029 Issue No: 1 Version Start Date: 19/12/2012 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site

Identified

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	1792	N	439770 407050	Status: Active Licence No: 2/27/08/090 Details: Spray Irrigation - Storage Direct Source: Surface Water Point: River Dearne Data Type: Point Name: J & E DICKINSON Annual Volume (m ³): 180000 Max Daily Volume (m ³): 5278 Application No: 5519 Original Start Date: 25/7/1977 Expiry Date: - Issue No: 101 Version Start Date: 19/7/2004 Version End Date:
Not shown	1792	N	439770 407050	Status: Active Licence No: 2/27/08/090 Details: Spray Irrigation - Direct Direct Source: Surface Water Point: River Dearne Data Type: Point Name: J & E DICKINSON Annual Volume (m ³): 180000 Max Daily Volume (m ³): 5278 Application No: 5519 Original Start Date: 25/7/1977 Expiry Date: - Issue No: 101 Version Start Date: 19/7/2004 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site

None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site

None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site None identified

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

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	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.
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
25	W	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.
246	W	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site Identified

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

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

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
Not shown	1101	SE	440950 403780	River Name: Dove Reach: Blacker Dyke Wombwell Stw End/Start of Stretch: End of Stretch NGR	D	D	D	C	C

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

This watercourse information is provided by Ordnance Survey MasterMap Water Network. The data provides a detailed centre line following the curve of the waterway precisely, so all distances provided in the report should be understood as measurements to the centreline rather than a measurement to the nearest point of the watercourse. Underground watercourses are inferred from entry and exit points so caution is advised in using these to indicate precise locations of underground watercourses when planning site investigation and development.

The following Ordnance Survey MasterMap Water Network records are represented on the Hydrology Map (6e):

ID	Distance/Direction	Name	Type of Watercourse	Additional Details
1	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
2	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
3	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
4	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
5	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
6	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
7	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
8	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
5	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
6	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
7	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
8	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
9	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
10	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
11	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
12	0 On Site	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
9	53 W	- Alternative Name: -	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 2.6
13	53 W	- Alternative Name: -	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 2.6
10	54 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
14	54 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
11	97 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
12	97 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
15	97 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
16	97 W	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
13	139 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
17	139 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
14	162 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 2.3
18	162 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 2.3
15	298 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
Not shown	298 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
16	345 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
Not shown	345 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
17	421 S	- Alternative Name: -	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 3.3
Not shown	421 S	- Alternative Name: -	Lake, loch or reservoir.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 3.3
18	433 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided

ID	Distance/ Direction	Name	Type of Watercourse	Additional Details
22	433 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
19	443 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
Not shown	443 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
20	449 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
Not shown	449 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
21	461 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 3.2
Not shown	461 SW	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: On ground surface Permanence: Unclassified. Average Width in Watercourse Section (m): 3.2
22	468 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided
Not shown	468 S	- Alternative Name: -	Inland river not influenced by normal tidal action.	Catchment Area: Don and Rother Relationship to Ground Level: Not provided Permanence: Unclassified. Average Width in Watercourse Section (m): Not Provided

6.11 Surface Water Features

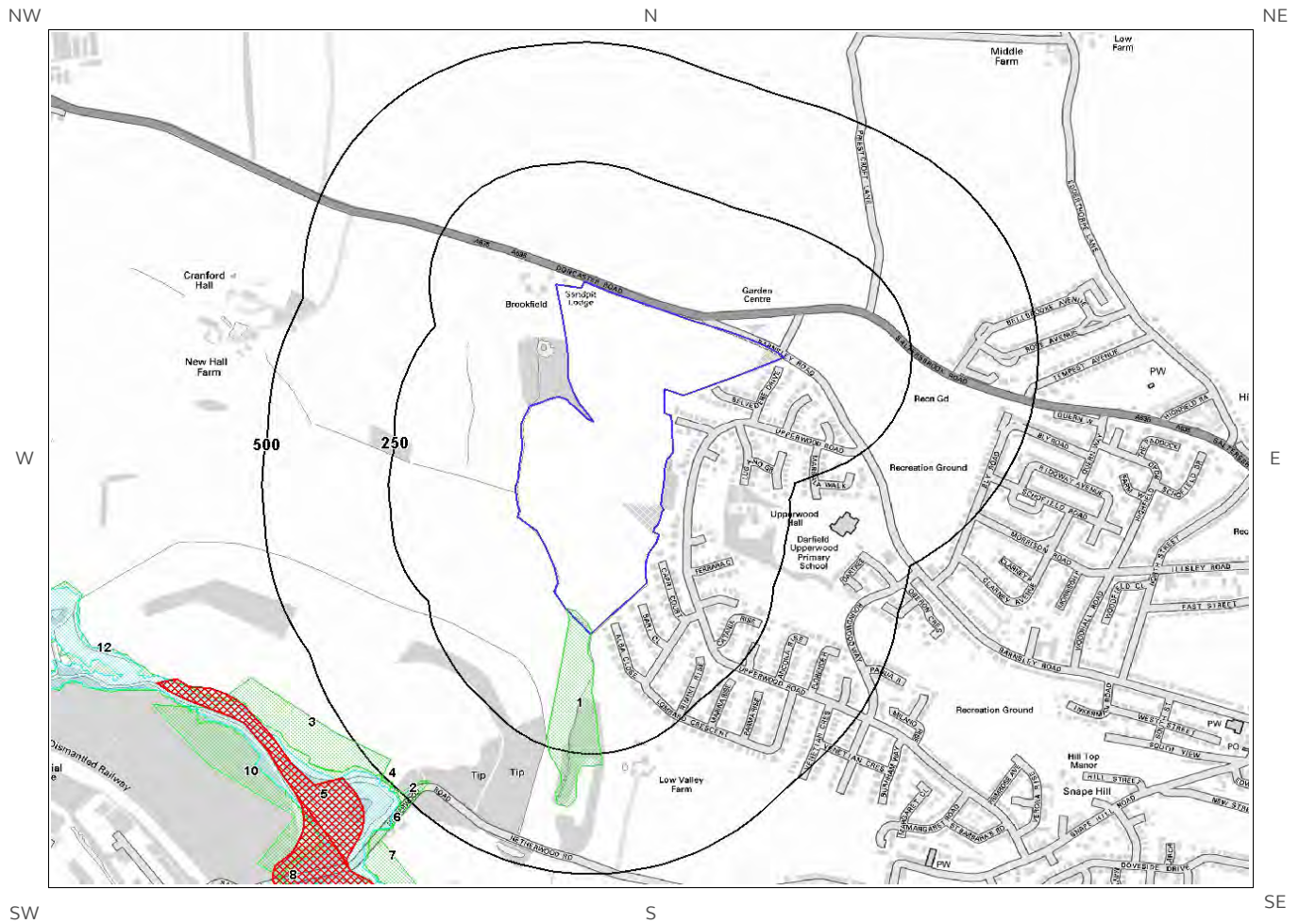
Surface water features within 250m of the study site

Identified

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
0	On Site
6	SE
25	W
27	W
80	S
100	W
139	SW
150	SW
213	W

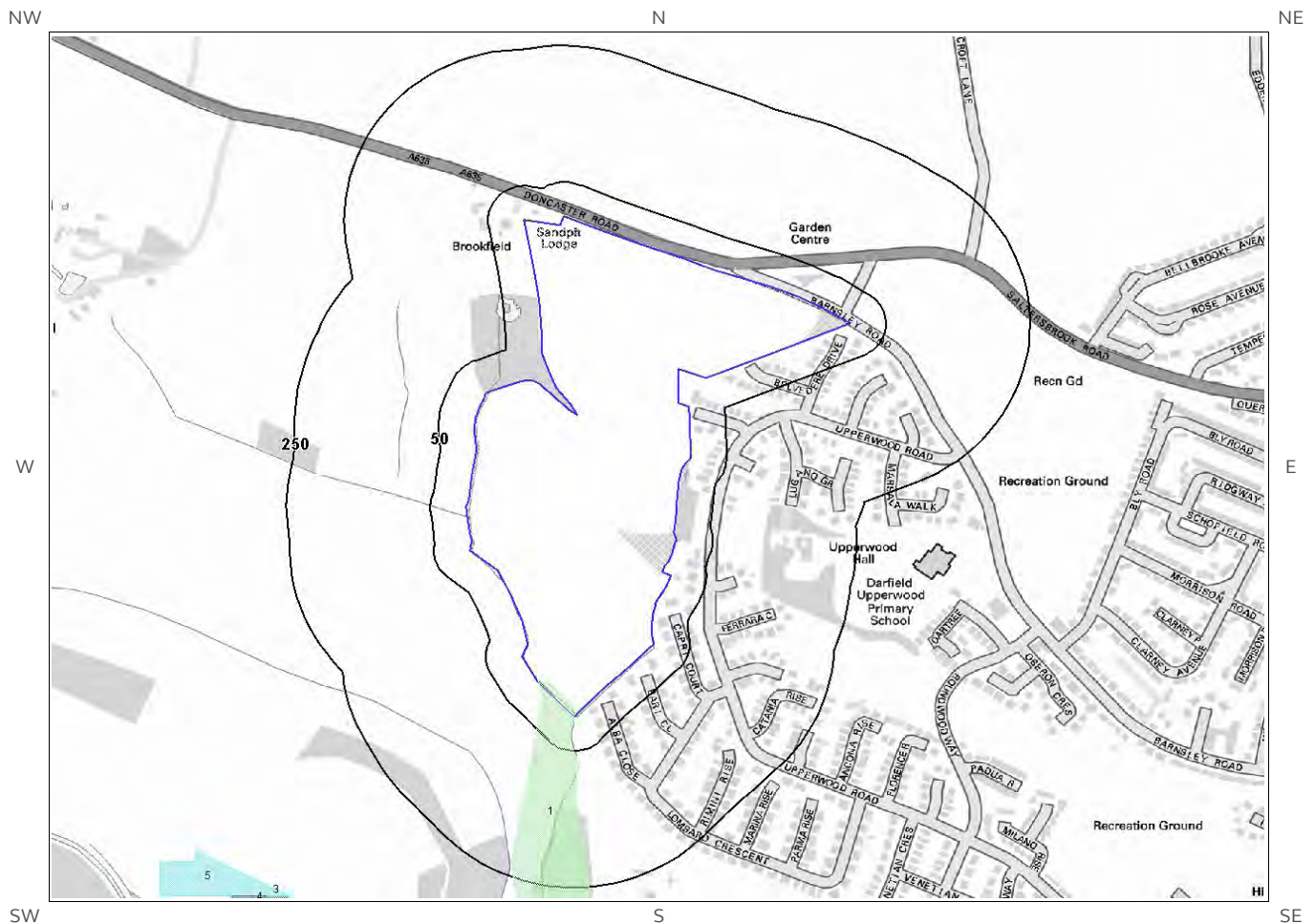
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



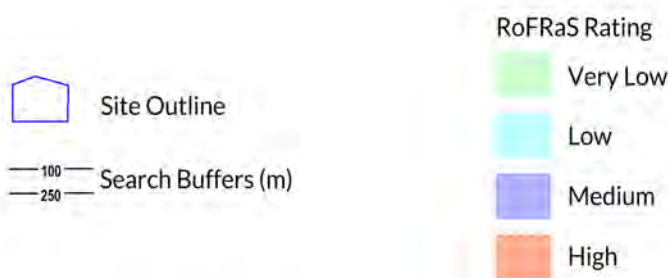
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m Identified

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:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	29-May-2018	Zone 2 - (Fluvial /Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m None identified

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.

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

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.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
1	0.0	On Site	Very Low

7.4 Flood Defences

Flood Defences within 250m of the study site None identified
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site Identified

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 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Potential below Surface

Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard. If there are records of previous incidences of groundwater flooding, then is recommended that other information e.g. rainfall history, property type, and land drainage information in addition to previous records of flooding be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

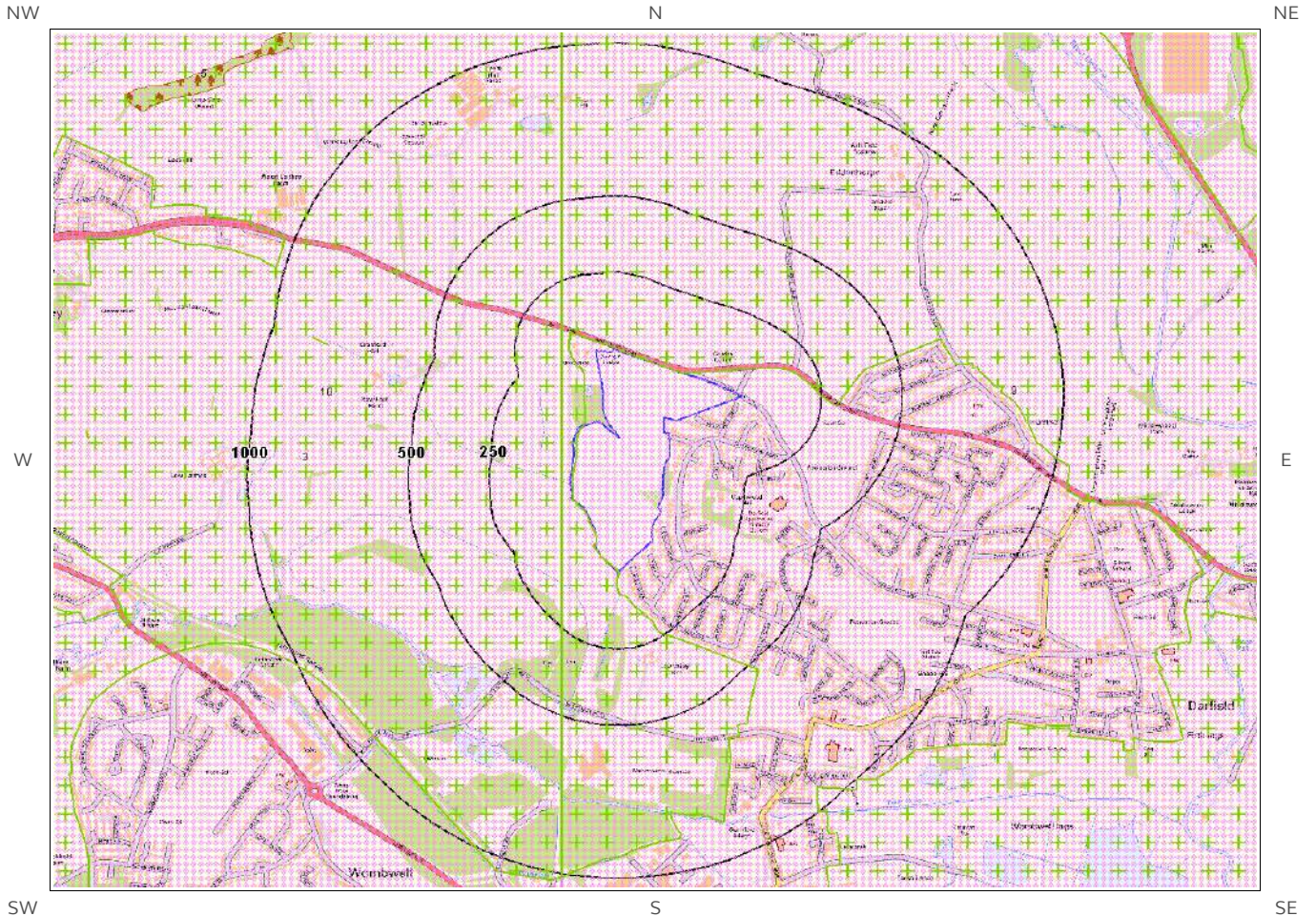
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result Low

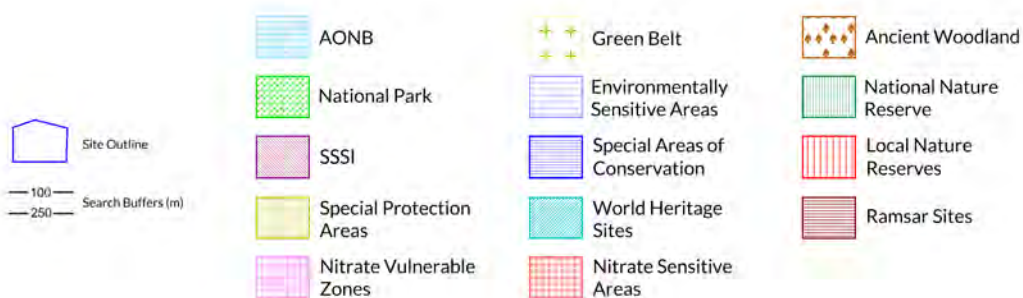
Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

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



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8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site

Identified

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

1

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
Not shown	1838	W	Stairfoot Brickworks	Natural England

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:

5

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
Not shown	1363	NW	UNKNOWN	Ancient and Semi-Natural Woodland
5	1365	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1395	N	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1624	NW	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1792	NW	UNKNOWN	Ancient and Semi-Natural 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:

2

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
2	0	On Site	Existing	DEFRA
3	25	W	Existing	DEFRA

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

2

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ID	Distance	Direction	Green Belt Name	Local Authority Name
9	0	On Site	Liverpool, Manchester and West Yorks Greenbelt	Barnsley District (B)
10	25	W	Liverpool, Manchester and West Yorks Greenbelt	Barnsley 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

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

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

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

Maximum Compressible Ground* 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

Very low potential for compressible deposits to be present. 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

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

Maximum Running Sand** 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

Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. 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.

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

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 site is in a Radon Affected Area, as between 3 and 5% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

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? Basic radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site

Identified

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

Non-Coal Mining areas within 50m of the study site boundary

Identified

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	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
0.0	On Site	Not available	Iron Ore (Bedded)	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
0.0	On Site	Not available	Iron Ore (Bedded)	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
0.0	On Site	Sheffield Area	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
25.0	W	Not available	Iron Ore (Bedded)	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
37.0	W	Not available	Iron Ore (Bedded)	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

Brine affected areas within 75m of the study site
Guidance: No Guidance Required.

None identified

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

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



Public Health England



The Coal Authority



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/Natural Resources Wales who retain the Copyright and Intellectual Property Rights for the data.

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Report Ref: GS-5269512
Grid Ref: 440291, 404928

Map Name: County Series

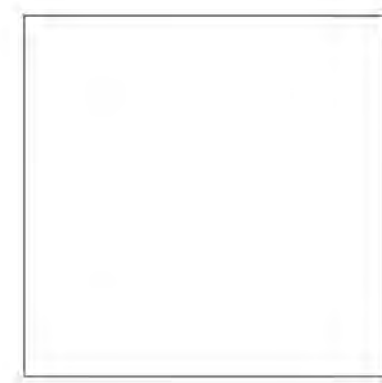
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Surveyed 1850
Revised N/A
Edition 1854
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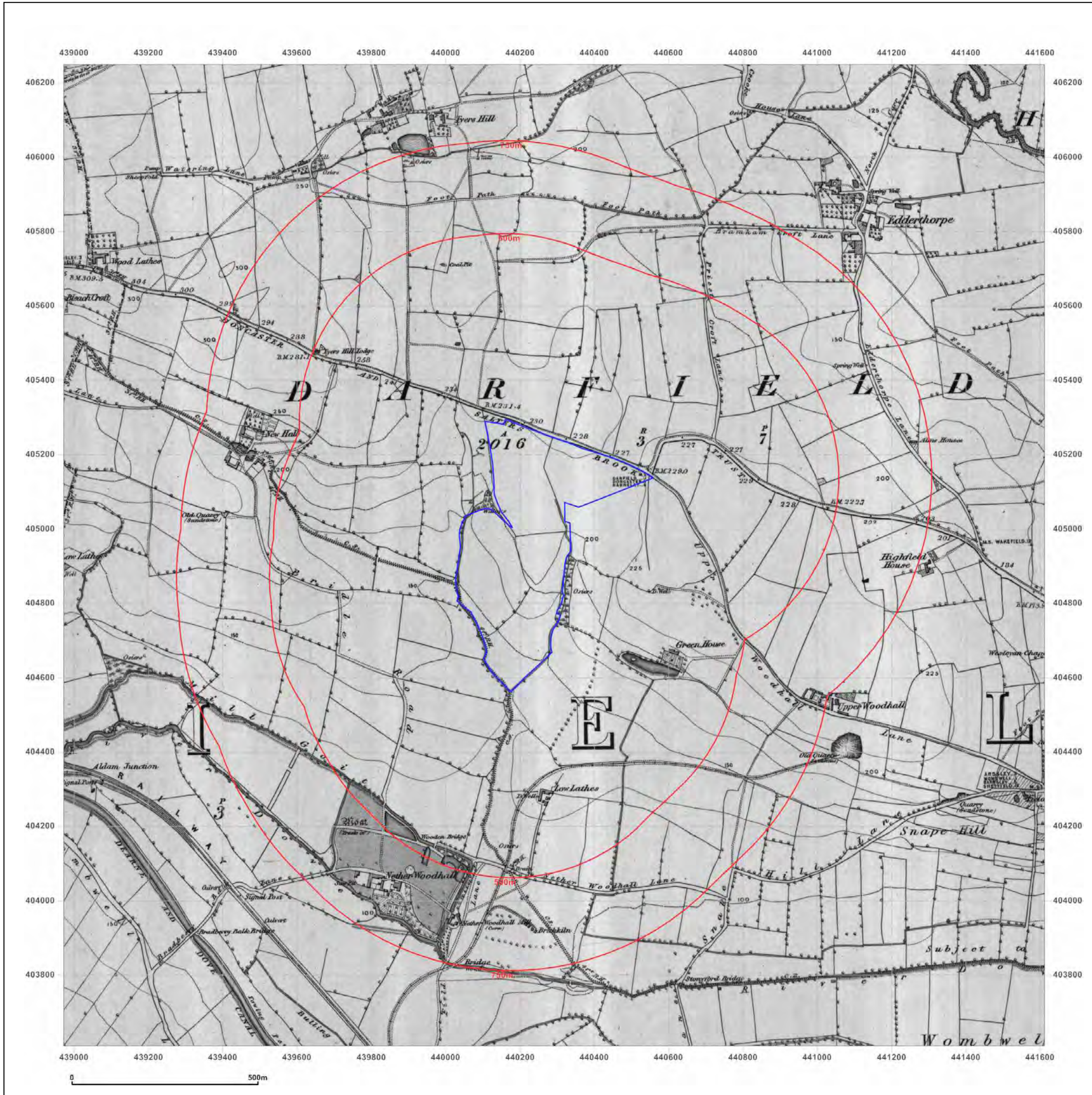


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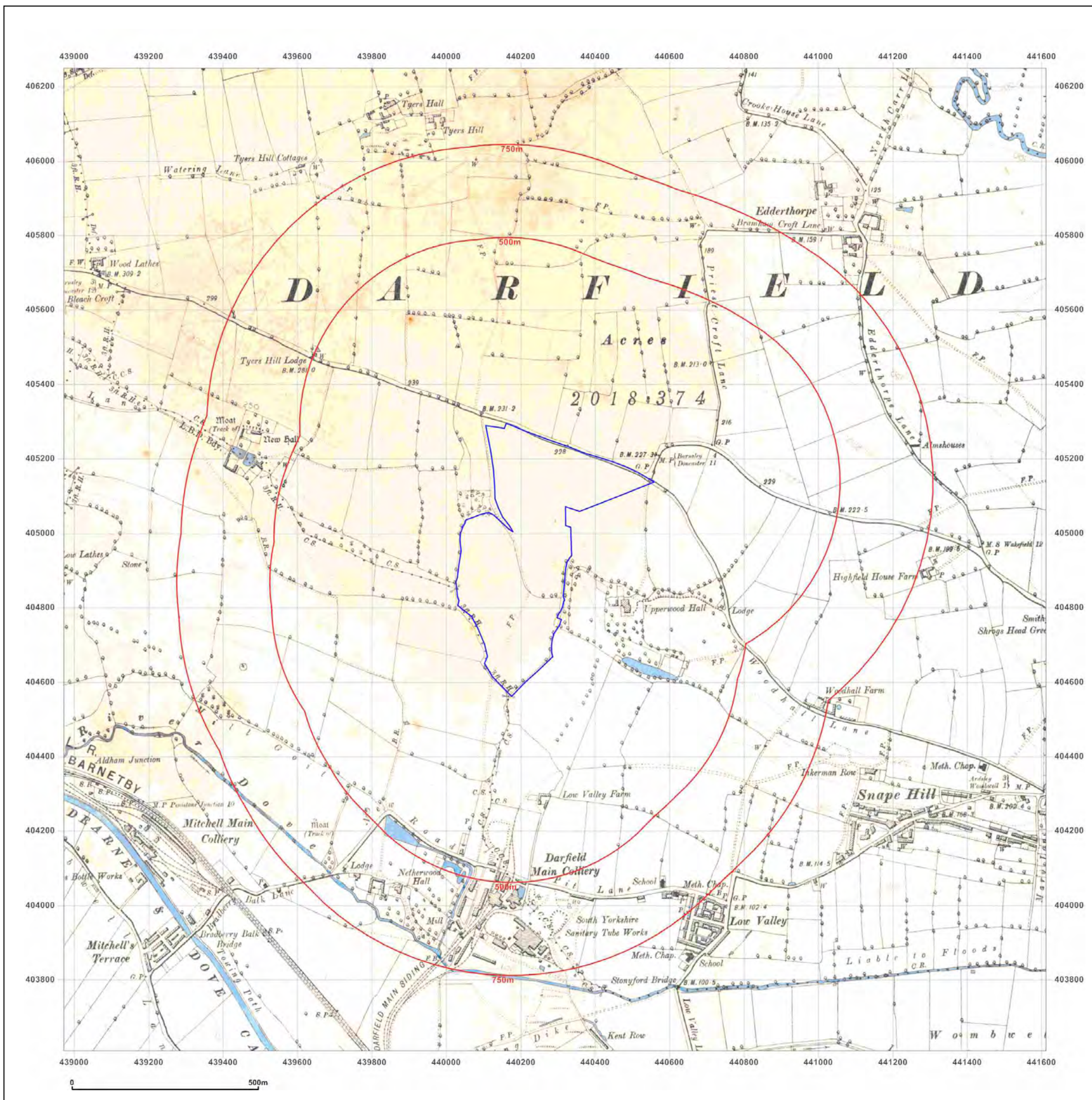


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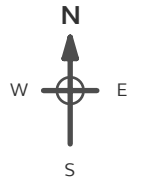
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Client Ref: SAUL_7309
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Grid Ref: 440291, 404928

Map Name: County Series
Map date: 1904
Scale: 1:10,560
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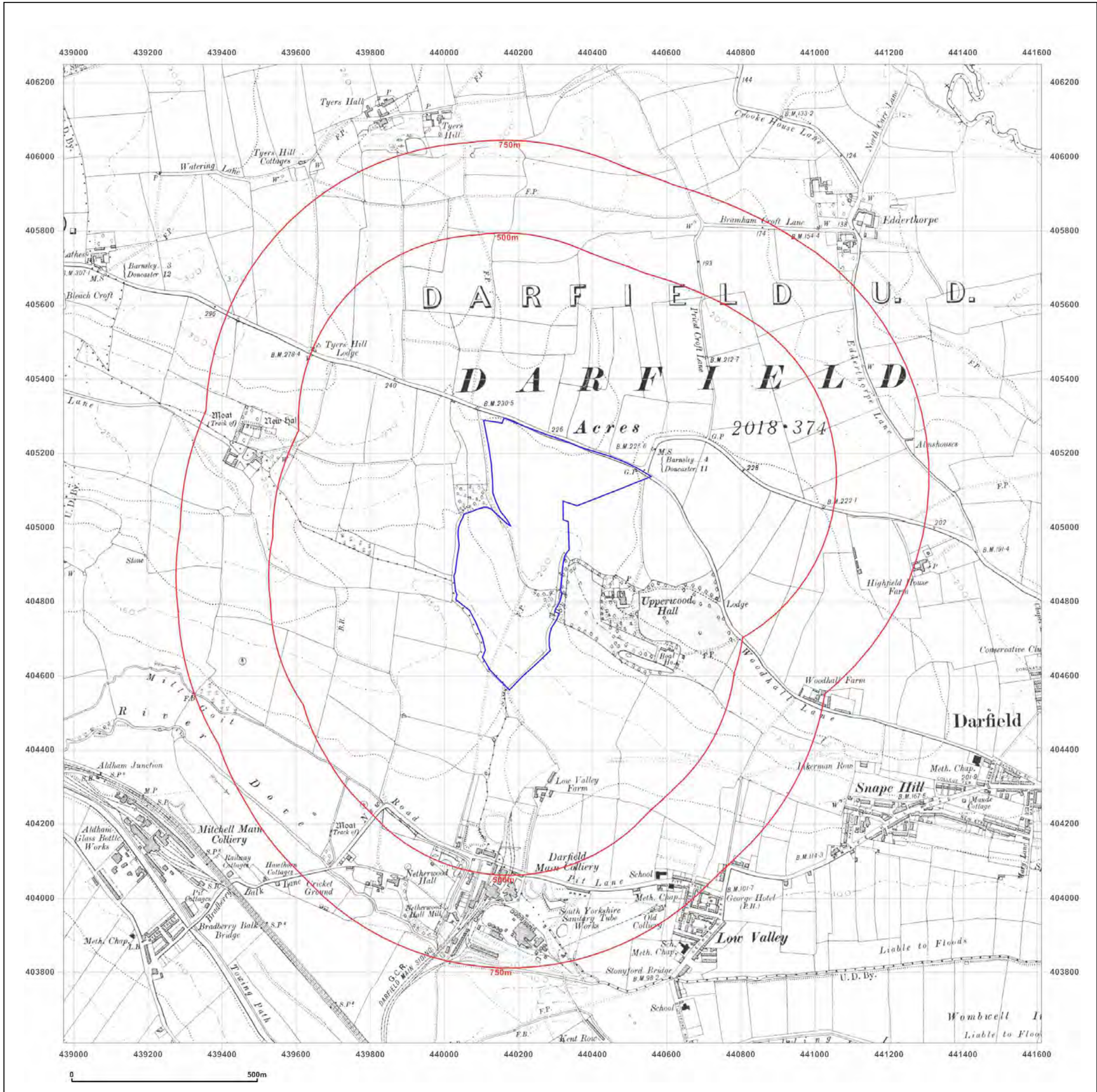


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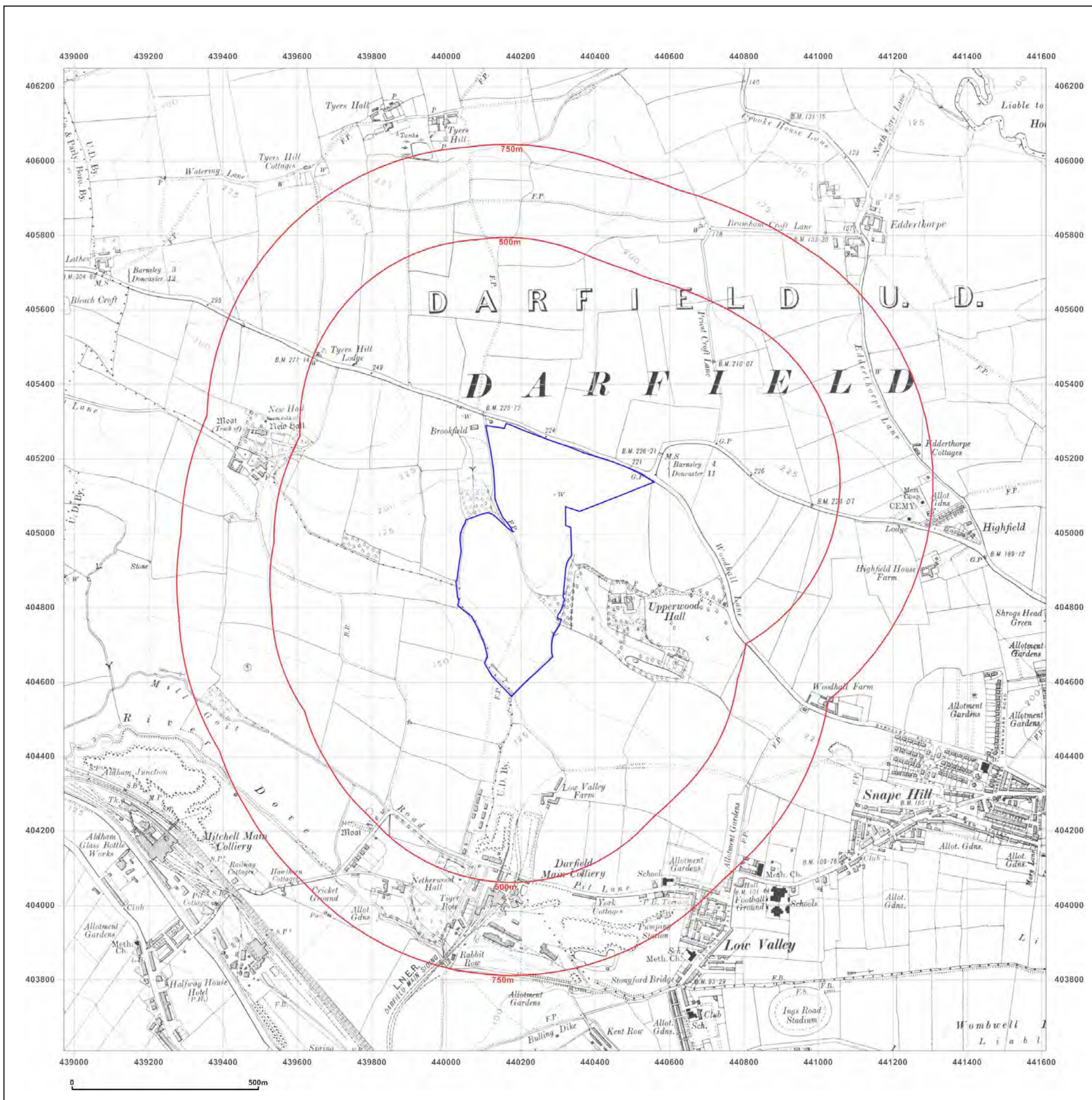


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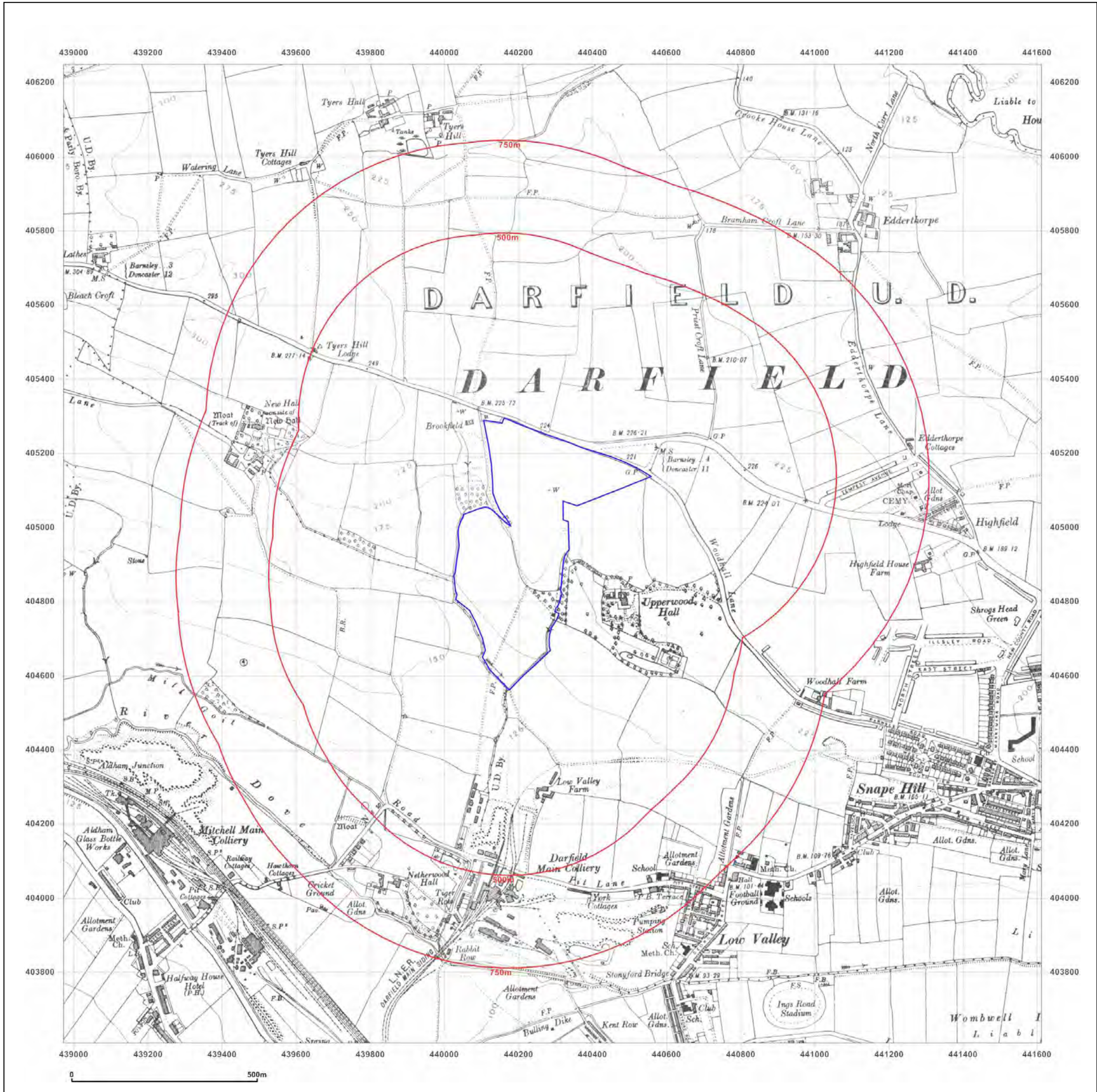


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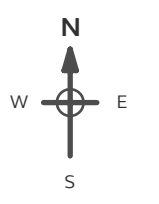
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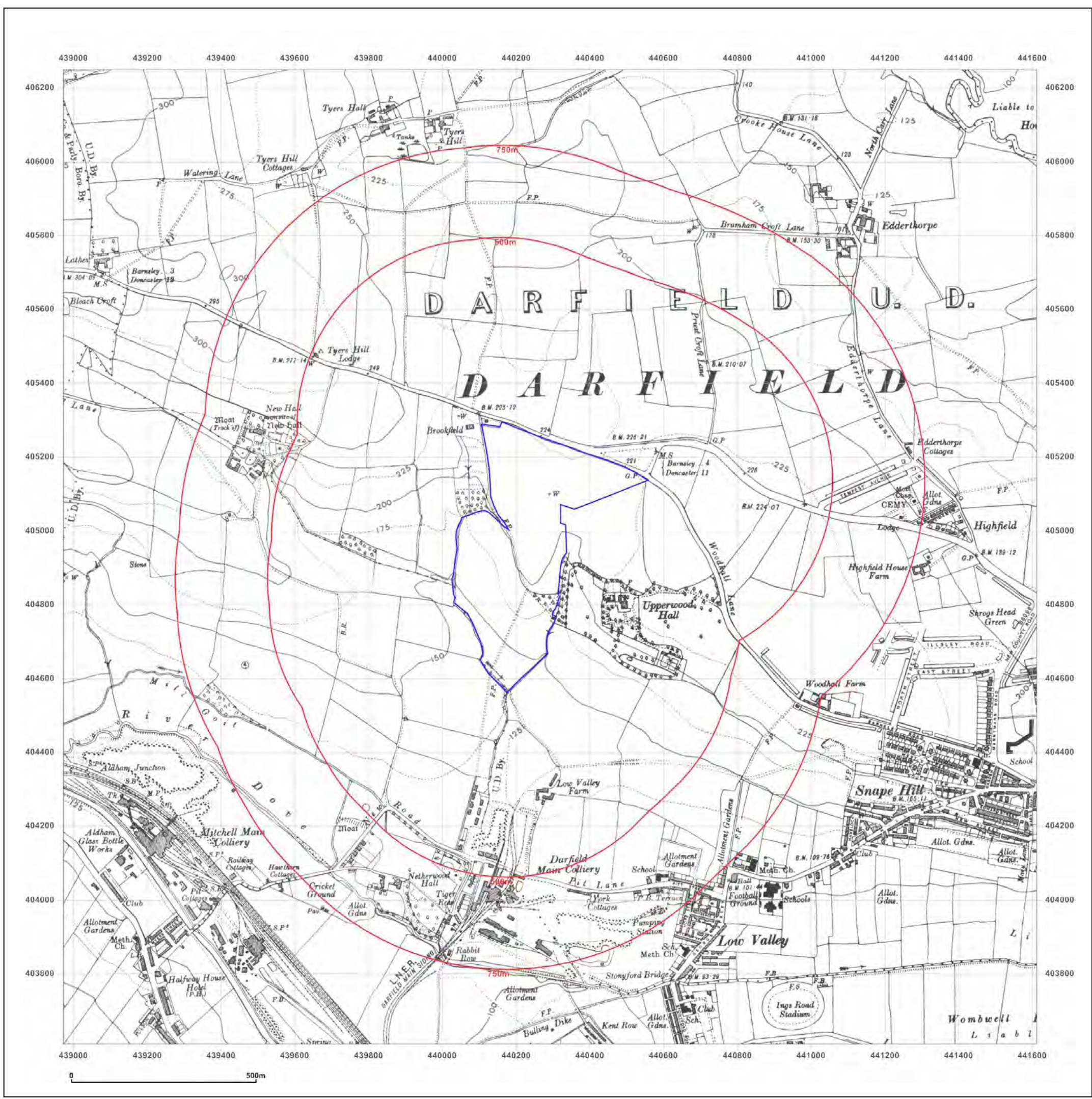


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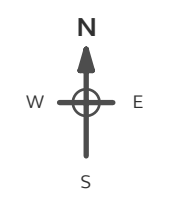
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Grid Ref: 440291, 404928

Map Name: County Series

Map date: 1948

Scale: 1:10,560

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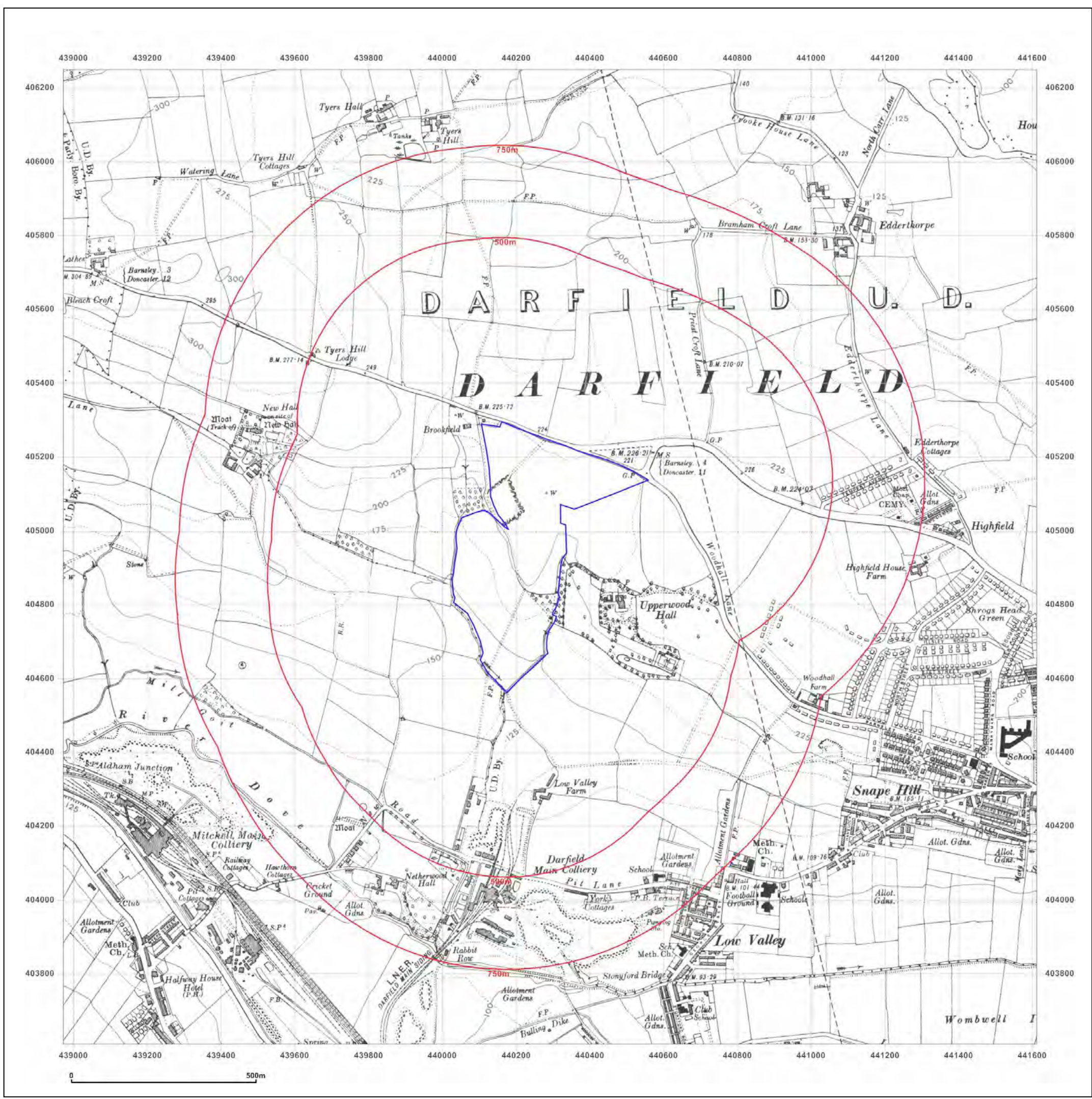


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Grid Ref: 440291, 404928

Map Name: Provisional

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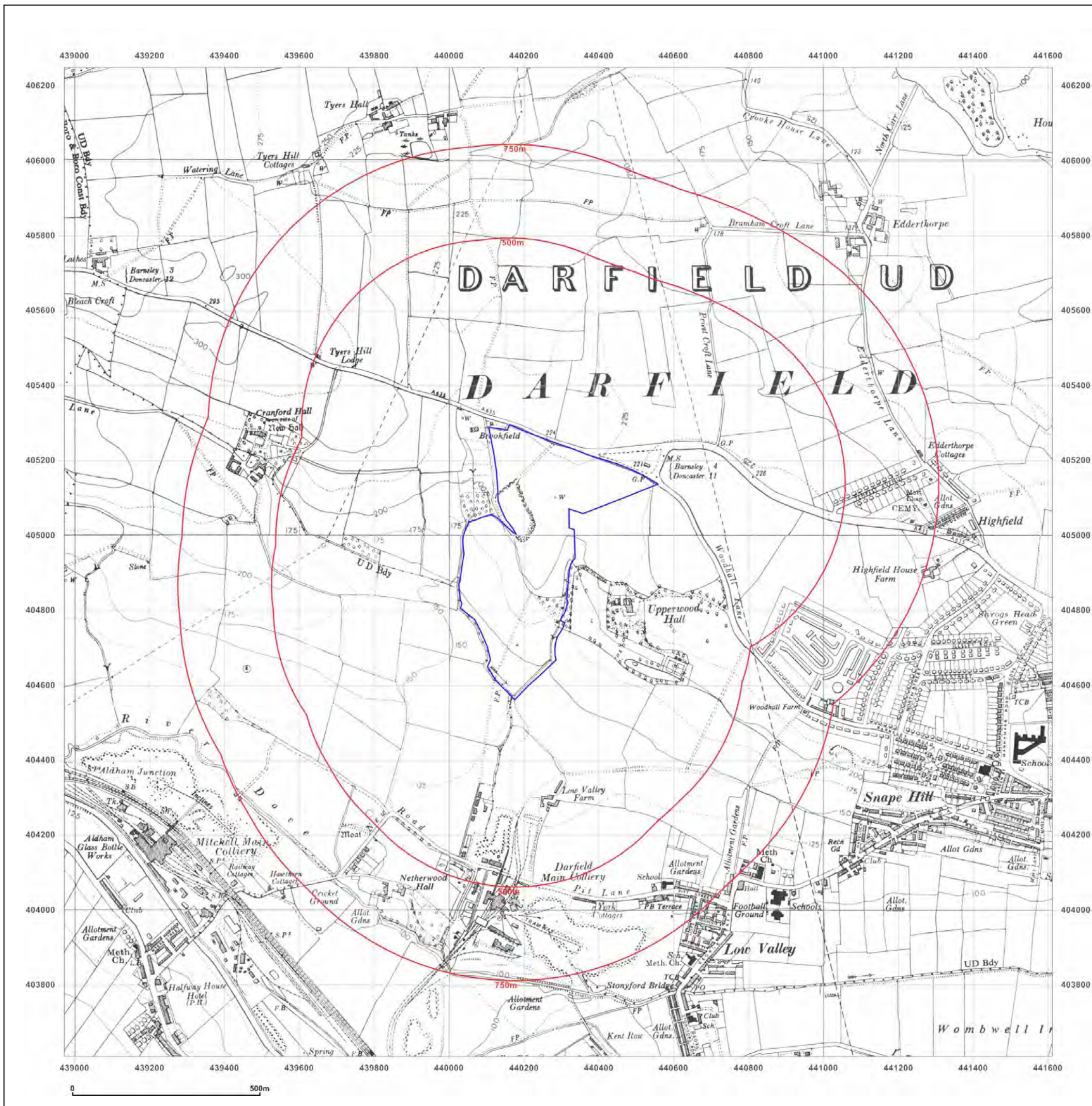


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Map Name: Provisional

Map date: 1966-1967

Scale: 1:10,560

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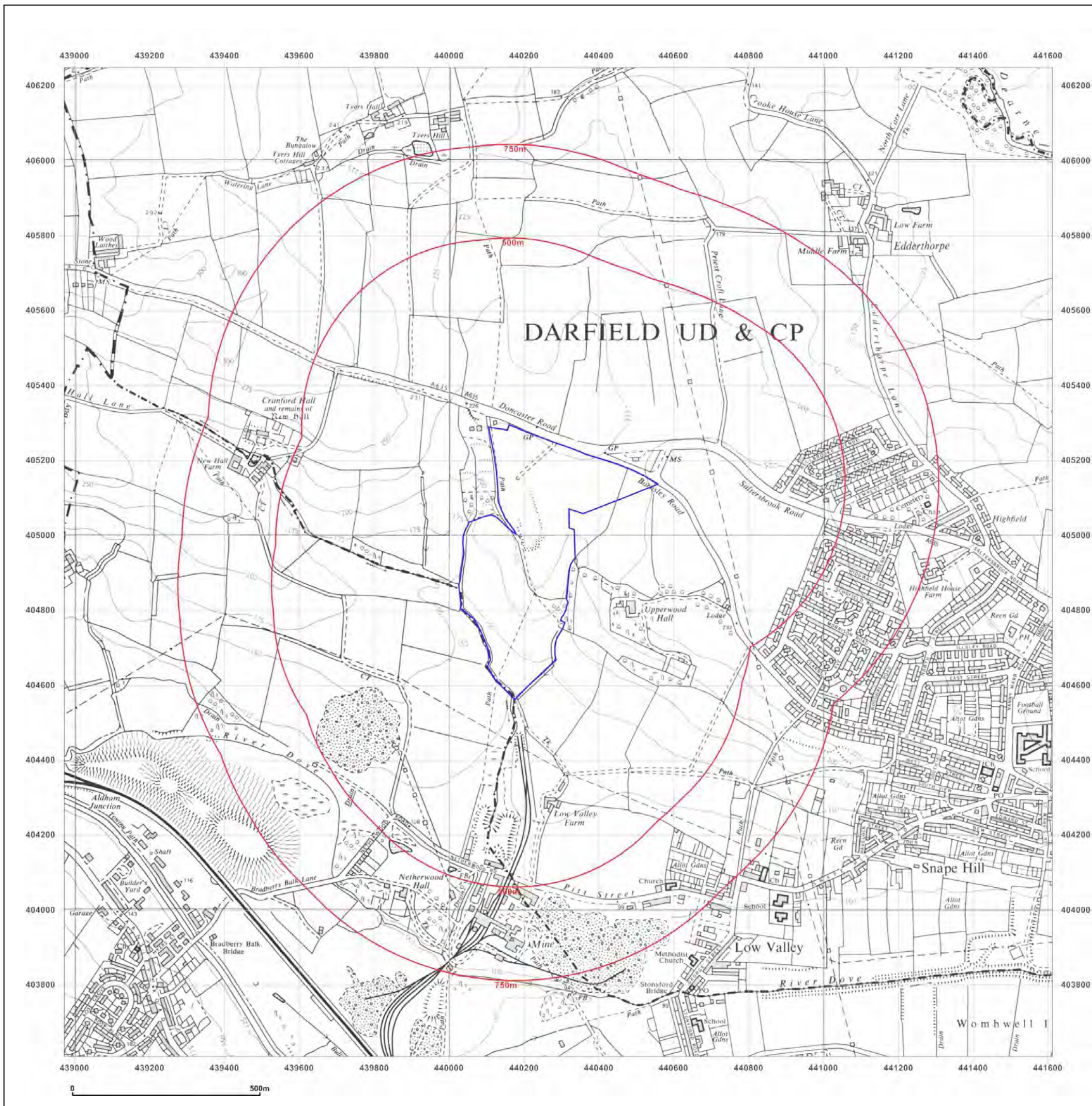


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Site Details:

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S71 5EZ

Client Ref: SAUL_7309
Report Ref: GS-5269512
Grid Ref: 440291, 404928

Map Name: National Grid

Map date: 1987-1992

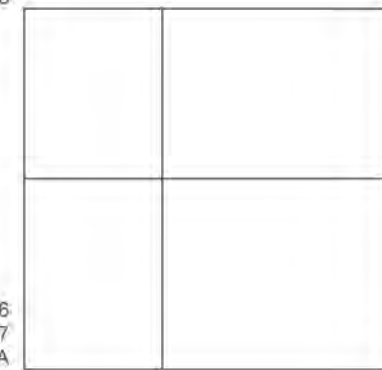
Scale: 1:10,000

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Surveyed 1981
Revised 1992
Edition N/A
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Revised 1988
Edition N/A
Copyright 1989
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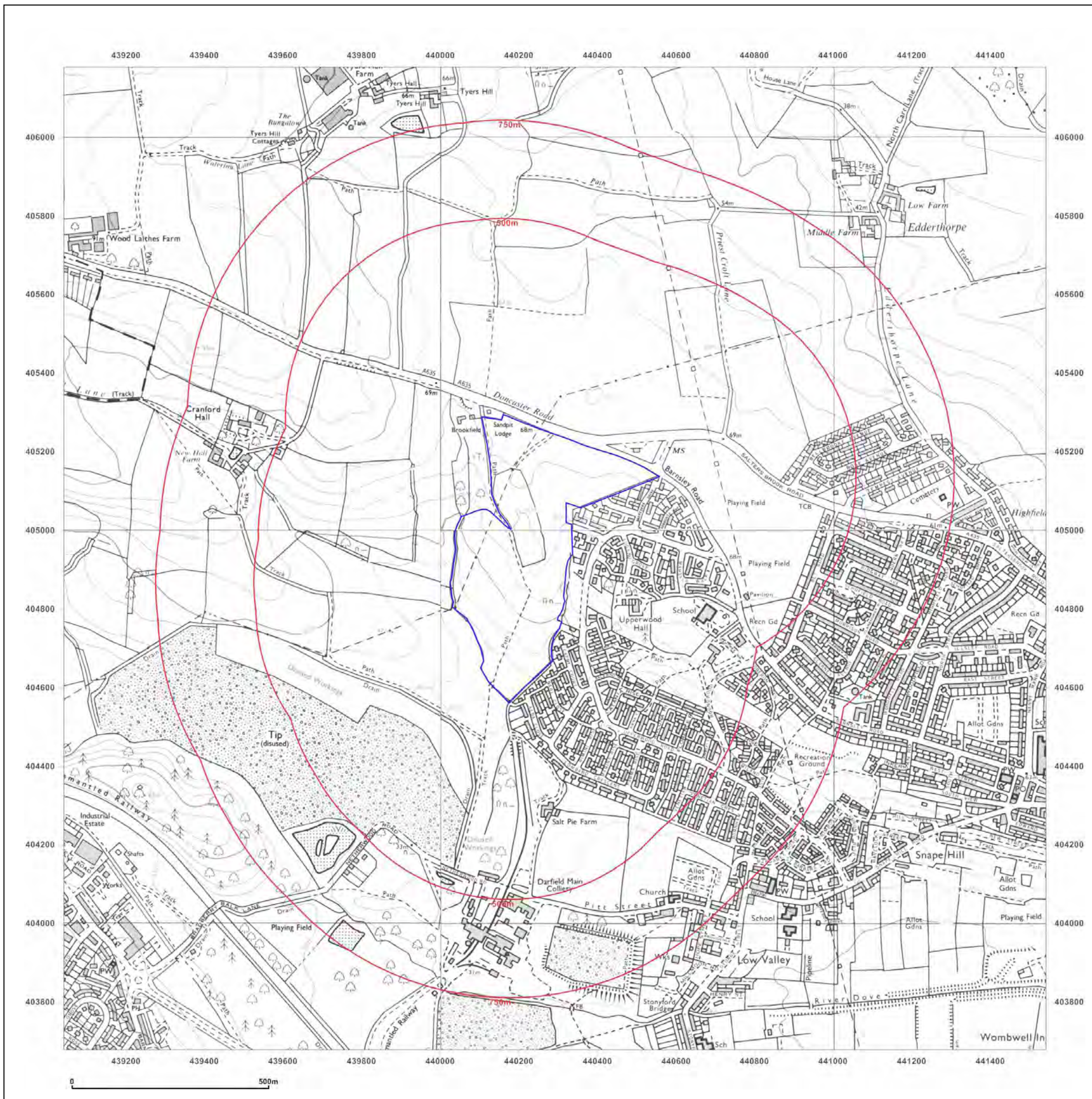


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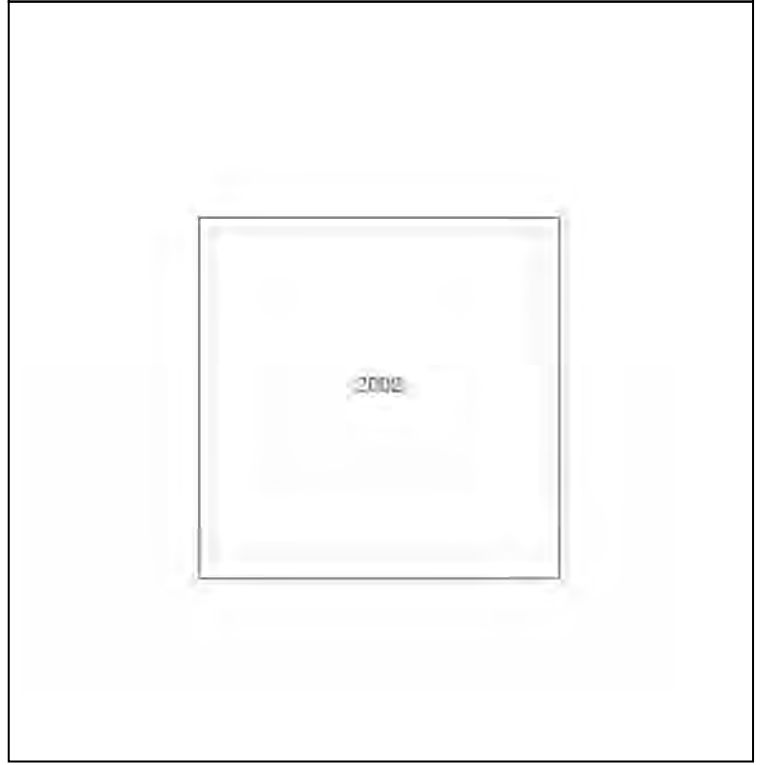
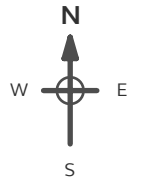
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Site Details:
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Client Ref: SAUL_7309
Report Ref: GS-5269512
Grid Ref: 440291, 404928

Map Name: 1:10,000 Raster
Map date: 2002
Scale: 1:10,000
Printed at: 1:10,000



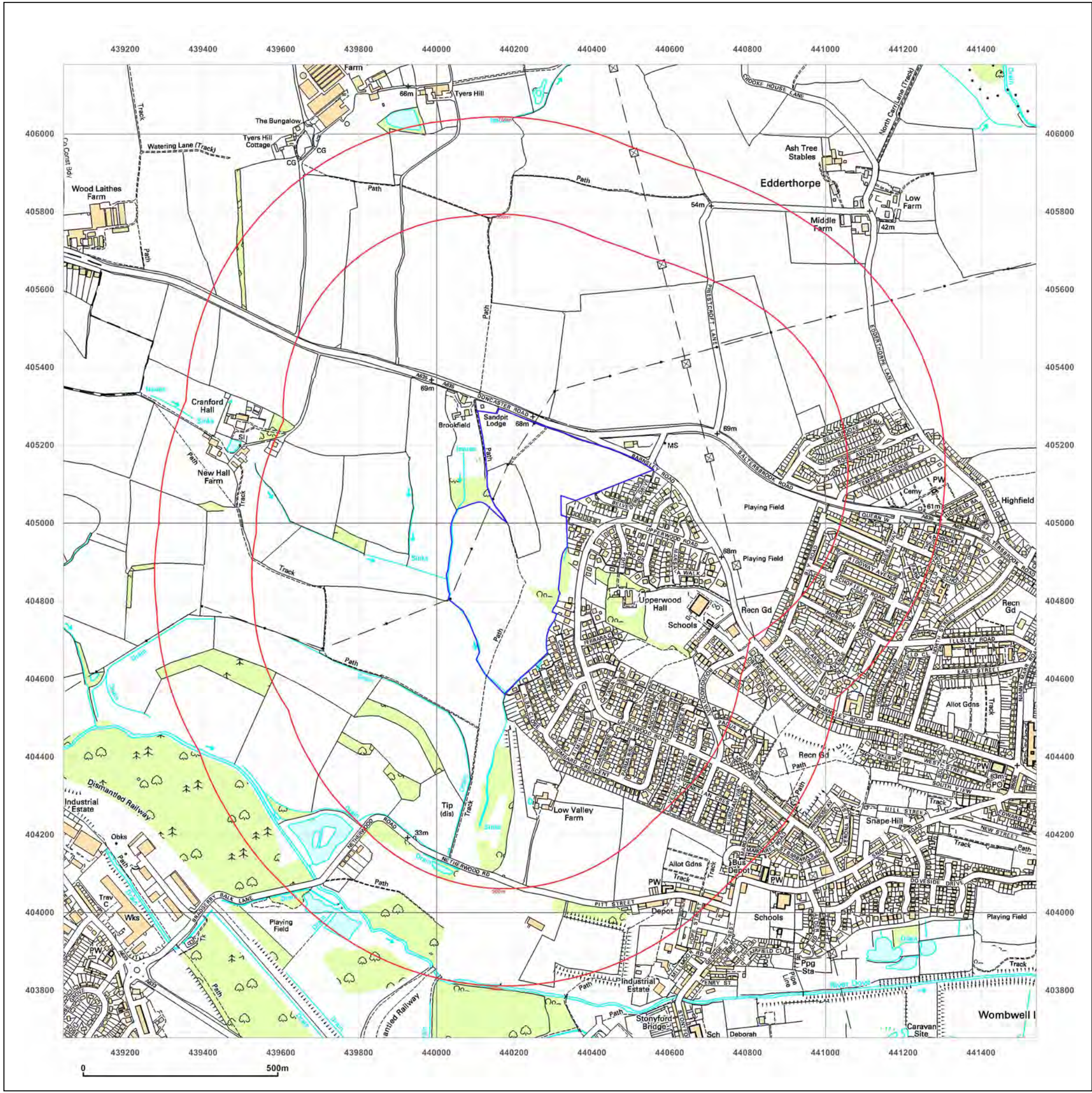
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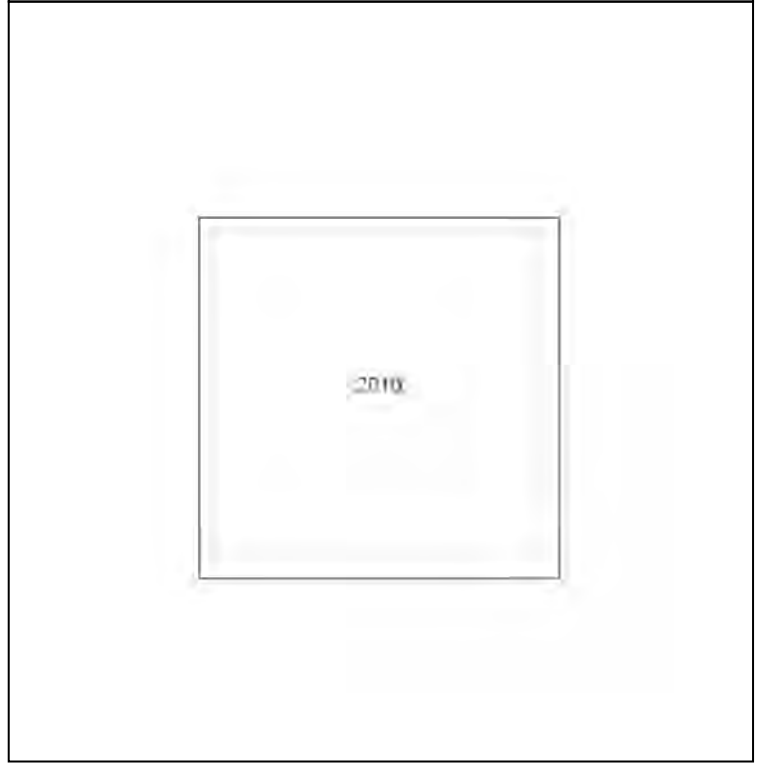
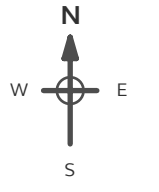
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Site Details:
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Client Ref: SAUL_7309
Report Ref: GS-5269512
Grid Ref: 440291, 404928

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000

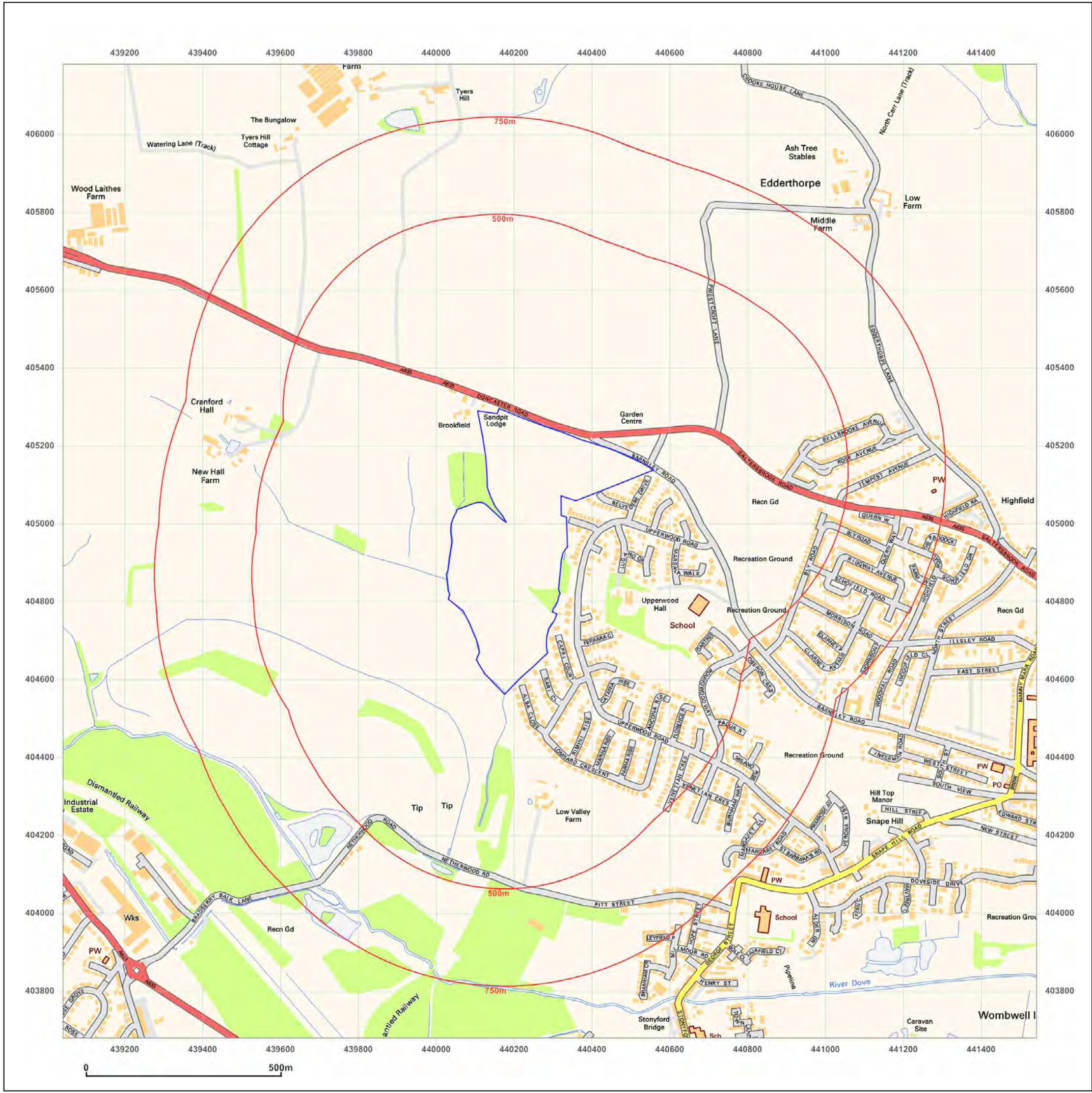


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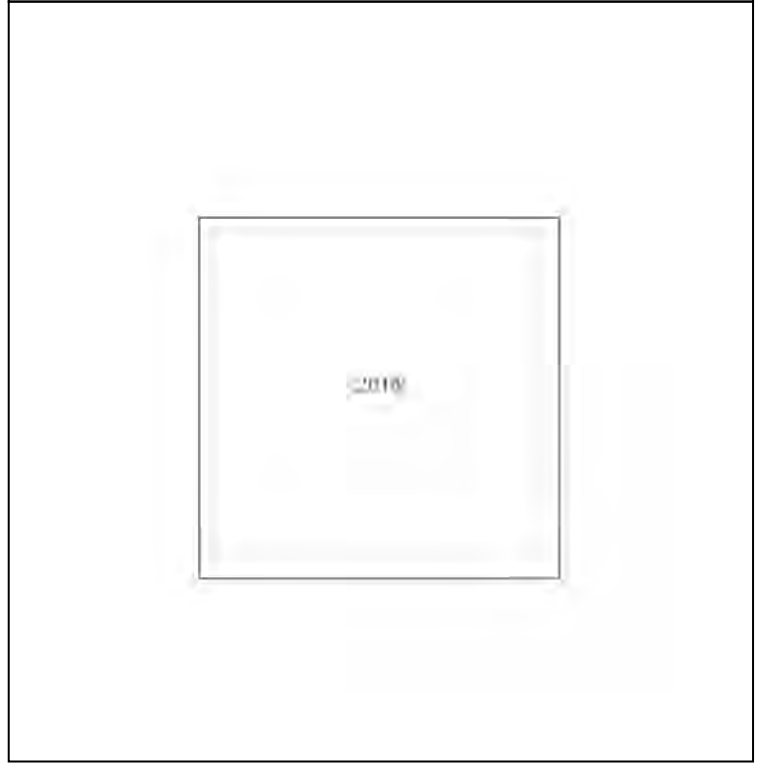
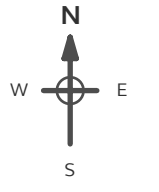
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Client Ref: SAUL_7309
Report Ref: GS-5269512
Grid Ref: 440291, 404928

Map Name: National Grid
Map date: 2014
Scale: 1:10,000
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