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Geo-Environmental Desk Study Report

Little Houghton

for

UK Coal

November 2008

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GEO-ENVIRONMENTAL DESK STUDY REPORT
LITTLE HOUGHTON

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A035220-2/4104/554/01 Site Location Plan
A035220-2/4104/554/02 Site Layout Plan
A035220-2/4104/554/03 Potential Geo-environmental Site Constraints

APPENDICES

Appendix A	Report Conditions
Appendix B	Site Photographs
Appendix C	Historical OS Map Extracts
Appendix D	Ground Sure Report
Appendix E	Coal Authority Report
Appendix F	SYMAS Mineral Report
Appendix G	UK Coal Completion Plan Drawing No. 48/CP/1.

1.0 INTRODUCTION

1.1 General

White Young Green Environmental Limited (WYGE) was commissioned by UK Coal to carry out a Phase 1 geo-environmental desk study on a site located on the northern edge of Little Houghton. The purpose of this study is to provide an initial desk based qualitative assessment of the potential geo-environmental risks and liabilities associated with the site.

The scope of the study is as follows:

- To determine the history of the site and immediate surroundings;
- To obtain environmental information regarding the site and its local area;
- To provide a qualitative risk assessment with regard to potential contamination issues pertaining to the site with consideration towards the site's proposed residential end use.
- To provide an indication of likely ground conditions and any significant ground engineering abnormalities

1.2 Proposed Development

Specific details of the proposed development are not known at this stage. However it is understood to comprise a mixed use housing and employment scheme.

1.3 Report Format

General details about the site are presented in Section 2, including information on the location and layout of the existing site, the surrounding land uses and information from the site walkover survey.

Details of the historical development of the site and its immediate surroundings are presented in Section 3. The general environmental setting of the site is provided in Section 4, including information on the site geology, hydrogeology and hydrology.

A qualitative risk assessment and site conceptual model are discussed in Section 5.

Section 6 summarises the former mine workings and resulting ground conditions

Section 7 summarises the main conclusions of the report and recommendations.

Attention is drawn to the Report Conditions held in Appendix A and the Terms and Conditions of the Engagement.

1.4 Sources of information

The following sources of information have been utilised in the preparation of this desk study:

- Coal Mining Authority Report - Presented in Appendix E
- South Yorkshire Mining Advisory Services (SYMAS) Mineral Report - Presented in Appendix F.
- Babtie Group, Houghton Main Opencast Site – Compaction Certification Report (Draft) dated September 2004.

1.5 Report Conditions

Attention is drawn to the Report Conditions held in Appendix A and the terms and conditions of the engagement.

2.0 SITE DETAILS

2.1 Site Location

The site abuts the northern edge of the settlement of Little Houghton. It is located approximately 1km from Darfield and approximately 11km from Barnsley. The approximate Grid Reference is 442121E, 405824N. The site is accessed through Middlecliff Lane. The site is bound to the north by employment development (Prologis warehouse), to the east by open fields and to the south by the linear village of Little Houghton. The Coalfield Link Road (A6195) runs along the western boundary of the site.

A site location plan is presented as Drawing No. A035220-2/01.

2.2 Site Description

The site has an approximate area of 4.46 ha and situated towards the northern edge of the settlement of Little Houghton.

The site is currently a vacant plot of land. Along the boundary with the A6195 road, a line of hedge has been planted. Around the site, there are rows of planted small trees and shrubs and includes a bus turning area. Along the hedge boundary with the A6195 is a drainage culvert, which runs from off site to a drain. It is thought that this drain flows beneath the A6195 into the River Dearne, approximately 115m south west of the site.

The site has a line of manhole covers on the site, running from the progression of Middlecliff Lane towards the culvert off site. These are assumed to be associated with a surface water drain taking water from the south east of the site.

A pair of overhead electric cables are also present in the southern end of the site carried on wooden poles suspending the cables running across the site.

The layout and key features of the site are shown on Drawing No. A035220-2/02

Photographs of the site are enclosed in Appendix B.

2.3 Site Topography

The site is relatively level at approximately 33m AOD, with the remainder of the site sloping from 34m in the central area of the site to 46m in the southern part of the site.

2.4 Surrounding Area

The current uses of adjoining land are registered as a disused sewage works at 122m North West and livestock farming registered to H.E. Wistow at Middlecliff Lane, Little Houghton.

To the west of the site is a mine gas recovery unit run by Green Park Energy, who are currently extracting methane (mine) gas from abandoned coal mineworkings for electricity generating purposes. Graham White, from GreenPark Energy confirmed that this operation started in January 2007 and the extraction will proceed for the foreseeable future.

To the north of the site is a large currently vacant warehouse owned by Prologis.

2.5 Previous Investigations

We have not been provided with any previous site investigation reports.

3.0 SITE HISTORY

The site was formerly the southern part of the Houghton Main Colliery Complex, with associated rail tracks and associated buildings. The main colliery is located to the north of the site, under the current Prologis Warehouse.

3.1 Historical Maps

Maps & Scale	Land Usages Onsite	Land Usages in Surrounding Area
1890 (1:10 560)	Buildings and 6 No. rail tracks associated with Houghton Main Colliery. Terraced housing along Ings Lane	To the north, Houghton Main Colliery, to the south & west Midland Railway, to the east Manor House; running northwest to southwest River Dearne, south east: the settlement of Little Houghton, south east Mill Farm
1892 (1:2 500)	No change	To the south east, Beech House Colliery
1904 (1:10 560) & 1906 (1:2 500)	No change	South-south east: Dearne Valley Colliery, north Sewage Works (Hemsworth R.D. Council)
1930 - 1931 (1:2 500) to 1929 – 1932 (1:10 560)	The number of rail lines onto the site has reduced to 2 No. An "Institute" is named in the north eastern corner of the site	To the east a recreation ground, north east sludge and filter beds are associated with the Sewage Works; possible spoil heaps to the north of the site. A pump house is evident to the west, on the banks of the river Dearne.
1938 – 1939 (1:10 560) To 1967 (1:10 560)	No change	The pump house on the river Dearne is renamed as "works".
1979 (1:2 500)	Terraced housing along Ings Lane no longer evident, the institute is also no longer evident, the 2No rail lines on the site have also been removed.	No change
1977 – 1981 (1:10 000) To 1983 (1:2 500)	No change	The river Dearne has been straightened to the northwest to southwest.
1988 (1:10 000)	No change	Railway to the south and west dismantled
2002 (1:10 000)	The majority of the buildings on the site are no longer evident	The Dearne Valley Colliery is no longer evident The dismantled railway has been replaced by the A6195 Park Spring Road, also known as the Coal Link Road.
2005 (1:10000) & 2007 (1:2500)	There are no buildings remaining on the site	The "works" to the west on the banks of the river Dearne have been relabelled as sewage works.

3.2 Reclamation Scheme

A phased reclamation scheme was undertaken by UK Coal to create a development platform. Part of the reclamation scheme, an opencast mine operated by UK Coal was scheduled to remove shallow coal seams present beneath the site. The backfilling of the opencast site was designed and supervised by Babtie Group on behalf of UK Coal in order to render the site suitable for potential industrial usage.

All fill material was compacted to an end product specification based on the Department of Transport, Specification for Road and Bridge Works, 1976 (series 600) which required placing and compacting in thin layers to achieve air voids of below 10%.

All compaction works were supervised by Babtie and regular field and laboratory testing indicated that the required backfill characteristics were being achieved.

Post compaction monitoring of groundwater levels and extensometers was carried out. This indicated that following cessation of pumping in February 2000, the groundwater levels within the fill began to rise between August and October 2000. They continued to rise until they stabilised in January 2002.

Monitoring of the extensometers indicated near surface settlements of between 20mm and 50mm during the groundwater inundation. Babtie have stated that most of the settlement associated with the rise in groundwater has already occurred.

Plate load tests indicated that maximum settlements at a load of 110kPa ranged between 4.5mm for a 900mm diameter plate and 5.0mm for a 610mm diameter plate.

Full details of the compaction works are presented in Babtie's Compaction Certification Report produced in September 2004.

3.3 Summary of Site History

The site formed the southern part of the Houghton Main Colliery complex which started operation prior to 1890.

Some terraced housing was also present on the site in 1890 and these were removed between 1967 and 1979.

The colliery closed in 1993.

Reclamation works were carried out between 1997 and 2000 which included demolition of all structures, capping of mine entries and opencast mining operations.

The Coal Field Link Road, A6195, was constructed following the reclamation works.

The surrounding area is historically dominated by collieries: the Houghton Main to the north, the Dearne Valley Colliery (south east) and the Beech House Colliery (east).

4.0 ENVIRONMENTAL SETTING

The following sources have been referenced for identification of the geology, soils, hydrology, hydrogeology and general environmental setting of the site:

- British Geological Survey (BGS) Sheet
- Groundsure Report extracts (see Appendix D)
- The Environment Agency Website
- Environment Agency Ground Water Vulnerability Map Sheet 11 (Scale 1:100,000)

4.1 Published Geology

Superficial deposits are shown to be absent from beneath the site.

The site is within an area that forms part of the Yorkshire Coalfields and lies directly on the Carboniferous Westphalian C series (the Upper Coal Measures). The strata beneath the site comprise a cyclic series of sandstones, siltstones, mudstones and coal with seat earth that have a general dip of 5 degrees towards the east. The Shafton Coal Seam outcrops along the western boundary of the site; the Highgate Rider and Highgate Coal Seams are also present in the adjoining land, to the north. The Meltonfield Coal Seam is beneath the site at approximately 316m, the Silkstone Coal Seam at 790m and the Thorncliffe Coal Seam at approximately 730m.

A fault, trending north east to south west is located in the southern part of the site. It has a small south easterly downthrow of less than 2m that diminishes towards the south west.

4.2 Coal Mining

Information on the coal mining activities that have affected the site have been obtained from a Coal Authority mining report (included in Appendix E) and a SYMAS Mineral Report (included in Appendix F).

Shallow Mining

There are no recorded mineworkings in the Shafton coal beneath the site however there is some partial extraction recorded just to the south east of the site from the former Dearne Valley Colliery dating from the early 1900's.

Deep Mining

Houghton Main Colliery shafts were sunk some 730m deep to the Thorncliffe coal in 1923. The site is in the zone of likely influence from workings in 8 coal seams ranging in depth from the Meltonfield Coal at 316m depth to the Silkstone Coal at 790m depth. The last workings were undertaken in 1982 and any subsidence from these workings will have now ceased.

Opencast Mining

In 1997 the Houghton Main Opencast Site commenced to extract the Shafton Coal Seam beneath the site. The site was completed in 2000 with the opencast backfill being compacted during restoration to provide a development platform.

No evidence of former mineworkings were recorded in the Shafton Coal during the opencast mining operations.

Mine Entries

Within, or within 20 metres of, the boundary of the property there are 2 mine entries, the approximate positions of which are shown on the plan presented in the Coal Authority Report.

One of these is believed to be a mine adit which was discovered on the site area in 1975. It is likely that this feature was excavated during the opencast operations between 1997 and 2000. The other is located just to the east of the site boundary.

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

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

The 3 no. deep Houghton Main Shafts were uncovered during backfilling operations in 2000. At this time new caps were installed at the base of the opencast void, approximately 11m deep, prior to backfilling. These are located to the north of the site.

4.3 Anticipated Ground Conditions

The ground conditions will vary across the site depending on the position in relation to the opencast site.

Inside the former opencast site the ground conditions will comprise variable depths of compacted opencast backfill (typically a firm to stiff, mixture of weathered mudstones, siltstones and sandstones) overlying Coal Measures rock. The depth of the backfill will vary depending upon the base of excavation however vertical section number 6 shows an original ground level of 31.33m AOD with the base of the

Shafton Coal at 21.69m AOD (i.e. 9.64m of Fill) and vertical section 7 shows an original ground levels of 38.4m AOD with the base of the coal at 22.38 m AOD (i.e. 16.02m of Fill).

Outside the former opencast site, there is likely to be a thin layer of Made Ground associated with former developments overlying weathered Coal Measures strata. The Shafton Coal is likely to be present at shallow depth in the eastern part of the site and is recorded as being around 1.4m thick.

Groundwater monitoring wells installed after completion of open casting recorded levels of around 25m AOD in early 2002, although it is not clear where these wells were located. Groundwater levels may have risen further since this date.

4.4 Hydrogeology

4.4.1 Aquifer Classification and Sensitivity

The site is classified as a minor aquifer, of low leaching potential. The land adjoining the site, to the north west, west and south west, is classified as a minor aquifer of high leaching potential.

4.4.2 Groundwater or surface abstractions

No groundwater or surface water abstraction licences are recorded to within 2000m of the site. The site is also not within a Source Protection Zone.

4.5 Hydrology

4.5.1 Surface Water Courses

The river Dearne runs approximately 115m west of the site. It is classified with a biological grade D and a chemical grade C.

On site, there is a surface water drain, which runs from the neighbouring property onto the property at the western boundary of the site and drains into a storm drain on site. The storm drains to a culvert under the A6915 and drains into the river Dearne.

4.5.2 Flooding

The site is in a flood zone 1 area and a flood risk assessment has been undertaken by others in accordance with the requirements of PPS25.

4.5.3 Discharge Consents

There are 2no. discharge consents within 115m of the site. They are both registered to Little Houghton Sewage Treatment Works for storm discharges and for final treated effluent into the river Dearne.

4.5.4 Pollution Incidents

There are no List 1 and List 2 pollution incidents recorded to within 250m of the site.

4.6 Waste

Registered Landfills. One historical landfill site is registered to 1372m from the site to the north at Quarry Park, Great Houghton. It is registered to accept commercial waste and is operated by Hemsworth Rural District Council.

Waste Management Facility. No waste management facilities are registered to within 500m of the site.

Waste Treatment / Disposal Site. No waste treatment sites are registered to within 1500m of the site.

4.7 Radon

The property is in a radon Affected Area, as between 1 and 3% of properties are above Action Level. The property is not in an area where Radon Protection Measures are required for new properties or extensions to existing ones, as described in the publication BR211 by the Building Research Establishment

4.8 Sensitive Land Uses

The site is not within 1000m of any SSSI, National Nature Reserve, Special Area of Conservation, Special Protection Areas, RAMSAR or World Heritage Site. There is evidence of two underground high pressure oil or gas pipelines within 500m of the site.

4.9 Pollution Controls

There are 5 No. recorded List 2 dangerous substance inventory sites within 500m of the site. These are all registered to RJB Mining Ltd, at 31m W of the site at Dearne at Darfield Bridge. There are no List 1 recorded dangerous substance inventory sites within 500m of the site.

2 No. LAPPC Authorisations are recorded within 500m of the site. The current authorisation is recorded to RJB Mining to process coal, gypsum and carbon processes. This is documented at 379m north of the site. The second has been revoked.

5.0 QUALITATIVE CONTAMINATION RISK ASSESSMENT

5.1 General

The information presented in the previous sections of this report has been collated and evaluated to establish an initial qualitative risk assessment for the site. A conceptual model of the site has been generated based on information derived from this Desk Study, supplemented by information attained during the WYGE initial site reconnaissance undertaken on the 24th November 2006.

The risk assessment identifies environmental hazards posed both by and to the site in its current status as well as potential future risks which may occur when the proposed end use is established. It is understood that the proposals for the site comprise a residential and community and with areas of landscaping.

The site has been considered in line with the current UK guidelines, namely the Contaminated Land (England) Regulations 2000 and Part II A of the Environmental Protection Act 1990, in accordance with current guidance (for example BS10175: 2001).

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- A source, i.e. a substance that is capable of causing pollution or harm;
- A receptor (or target), i.e. something which could be adversely affected by the contaminant; and
- A pathway, i.e. a route by which the contaminant can reach the receptor.

If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

Potential sources, pathways and receptors have been identified and the risks associated with possible pollutant linkages outlined. The site assessment is undertaken based on the proposed end use of the site as a residential and community end use development, with an area of landscaping.

5.2 Potential Sources of Contamination

The potential sources of contamination identified from the existing information are as follows:

- Potential contamination in opencast backfill.

- Potential contamination in areas of Made ground associated with former structures.

- Mine and Land Gases. There are no known issues of fugitive mine gas in the area, however given the presence of shallow mine workings, mine entries, adits and possible uncharted working, alongside the opencast backfill, the possibility of mine gases cannot be precluded. Green Park Energy is currently extracting methane from the former Houghton Main Colliery and their generation plant is installed along the north western edge of the site, *off site,* on the opposite side of the Coal Link Road, A6195. There could be an increase in the release of mine gases to the surrounding area following cessation of Green Park Energy's operations.

5.3 Potential Pathways

The following potential contaminant pathways are considered likely to be active given the contaminants identified, and the proposed future residential and community end-use of the site with landscaped areas.

Human exposure pathways:

- Inhalation / ingestion of dust, gases and vapour
- Ingestion of and dermal contact with soils and / or impacted water
- Ingestion of vegetables grown in impacted soil and / or soil attached to these
- Ingestion of water from impacted services

These pathways are considered as potential exposure pathways across the entire site. The exact layout of the proposed development is not known, however any potential areas of landscaping will have a higher potential for direct contact exposure than those areas which comprise hard standing.

Migration pathways:

The following potential contaminant pathways are considered likely to be active given the potential contaminants identified, and the proposed future mixed community and residential end-use of the site with landscaped areas.

- Ground gas migration
- Leaching of contaminants from soils and migration through unsaturated zone
- Groundwater migration

- Surface water run-off
- Plant uptake

These pathways are considered as potential exposure pathways across the entire site. The exact layout of the proposed development is not known, however any potential areas of landscaping, open space or residential gardens will have a higher potential for direct contact exposure than those areas which comprise hardstanding.

The potential for ground gas generation, migration, accumulation (from soil, historical mining activities, and/or groundwater sources) and inhalation by site users will be higher in those areas where construction is proposed, in particular the lower floors of the proposed properties.

Leaching of contaminants from soils and surface wash will be greatest in areas of open space open to rainfall infiltration.

5.4 Potential Receptors

Potential receptors given the proposed redevelopment of the site for mixed community and residential properties include:

Human Health

- Site construction workers;
- Neighbouring residents e.g. owners/users of the neighbouring commercial and residential properties.

Environmental

- Underlying groundwater within Minor Aquifer;
- Local surface waters (drainage channel)
- Flora and fauna;
- Building and underground services.

5.5 Risk Assessment

By considering the sources, pathways and receptors, an assessment of the environmental risks is made

with reference to the significance and degree of the risk. This assessment is based on the consideration of whether the source of contamination is likely to reach a receptor and hence whether it is of major or minor significance.

The qualitative risk assessment has been undertaken in accordance with BS10175:2001 and CIRIA Document C552: Contaminated Land Risk Assessment, A Guide to Good Practice. The source – pathway – receptor linkages are developed around the information presented above. The risk assessment has been carried out by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories detailed below.

5.5.1 Table Categorisation of Risk

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non sensitive ecosystems or species

The likelihood of an event (probability) takes into account both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given below.

5.5.2 Table Categorisation of Probability

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

5.5.3 Table Risk Matrix Categories

		Potential severity			
		Severe	**Medium**	**Mild**	**Minor**
Probability of risk	**High Likelihood**	Very high	High	Moderate	Low/Moderate
	Likely	High	Moderate	Low/Moderate	Low
	Low likelihood	Moderate	Low/Moderate	Low	Very low
	Unlikely	Low/Moderate	Low	Very low	Very low

Potential risks from onsite sources are considered in relation to on and off site receptors in order to identify potential liabilities of the site owner.

Potential risks from off site sources are considered only in relation to on site receptors to ensure protection of the site development.

The table below provides an initial qualitative risk assessment for the site. Additional details are provided in the subsequent summary section.

5.5.4 Table Qualitative Risk Assessment

Potential Hazard / Pollutant	Pathway	Receptor	Potential Severity	Probability Of Risk	Level Of Risk
Mine Gas	Migration	Site development workers	Medium	Unlikely	**Low**
		Future development (Confined spaces in buildings)	Severe	Unlikely	**Low/ Moderate**
Contamination in Made Ground in opencast backfill or associated with former structures.	Dermal contact, inhalation, ingestion	Site construction workers	Mild	Likely	**Low**
		Future site users	Mild	Low	**Low**
	Leaching from soils (groundwater migration and surface run-off)	Underlying minor aquifer	Mild	Unlikely	**Very Low**
		Surface watercourses	Mild	Low	**Low**
		Buildings and services	Mild	Low	**Low**
		Neighbouring properties & adjacent land	Mild	Unlikely	**Very Low**
	Plant root uptake	Existing vegetation / future establishment/ landscaping	Minor	Likely	**Low**

5.6 Summary

Based upon the information obtained, the qualitative risk assessment has indicated that risks to identified receptors from potential contamination at the site are considered to range between very low to low to moderate.

6.0 GROUND ENGINEERING ISSUES

6.1 Potential Settlement of Backfill

The amount and duration of settlement of opencast backfill is dependent upon a variety of factors including the nature of the backfill, the thickness of the backfill, and the method of placement. The following types of settlement are expected to occur:

- creep
- inundation settlement
- settlement due to imposed loads

A detailed assessment of these has been given in the Babtie Compaction certification report and these are summarised below:

6.2 Creep

On completion of backfilling, long-term settlements can occur under conditions of constant stress and moisture due to self-weight, known as creep settlement. The rate of creep settlement decreases fairly rapidly with time and shows an approximately linear relationship when plotted against the logarithm of the time that has elapsed since placement of the fill. However, there is some uncertainty whether this logarithmic relationship continues over long periods of time (greater than 10 years). A creep compression parameter, α, can be defined as the percentage vertical compression of the fill that occurs during a $\log_{10}$ cycle of time. Typical values of α for compacted opencast backfill are between 0.2% and 0.3%. For example for a fill thickness of 50m and an α value of 0.3%, settlement for the first ten years after completion would be around 150mm with a further 150mm of settlement within the next 90 years.

Babtie have estimated that creep settlement of between 5mm and 10mm may take place in the opencast backfill per log cycle of time.

6.3 Inundation Settlement

Inundation settlement occurs when either ground or surface water saturates fill that has not been saturated previously. It is recognised that settlement upon inundation can be the cause of damaging settlements even after a long period of time has elapsed between restoration and development. Settlement can occur at depth as the groundwater table rises or close to the surface as water penetrates the fill via shallow excavations or land drainage schemes. The magnitude of inundation settlement will depend upon the type of fill, its density and moisture content, and the stress level and stress history.

Inundation settlement for compacted opencast backfill (to <10% air voids) ranges between zero and 0.5%.

Babtie have estimated that inundation settlement has occurred on the site as a result of groundwater recovery, and this ranged between 0.05% and 0.2% of the fill thickness. Unsaturated fill thicknesses of between 9m and 12m remain across the site and further settlement of this material could occur in the future ranging between 20 and 45mm.

6.4 Settlement due to structural loads

Settlement will occur due to the imposition of structural loadings. The amount of settlement will be dependent upon the compressibility of the fill and the dimensions and quantity of loads applied. Opencast backfill is generally of medium compressibility. The majority of the settlement due to structural loads should take place within the short term, however some long term settlement will occur following a similar trend to that of creep settlement. It is likely that settlement due to structural loads will be insignificant when compared with settlements due to creep and inundation. Any future developments on the site may results in settlement issues.

Based upon field tests undertaken by Babtie, settlement of shallow spread foundations up to 2m wide would be less than 20mm for loadings of around 100kPa and this would be sufficient for typical low rise structures.

6.5 Differential Settlement

Differential settlements can occur across the site due to variations in composition and depth of backfill. The problems of differential settlements will be exaggerated where structures span the former high wall of the opencast workings and where significant changes in fill thickness occur. The location and dimensions of the opencast highwalls should be able to be obtained from the opencast records. The locations of the main highwalls have been derived from the opencast completion plan and these are shown on Drawing No. A035220-2/03. It is recommended that buildings are positioned away from these areas. The height of the remaining areas of highwalls are considered to be fairly low due to the outcrop of the seam and the risks of damaging differential settlements occurring in these areas are considered to be low.

6.6 Foundation Design

The final choice of foundation design will be dependent upon a variety of factors including the nature and layout of proposed development, the sensitivity of the building to differential settlement and the structural loadings imposed.

The foundations for each individual structure should be designed in detail once the specific details are known. The allowable bearing capacity of the opencast backfill for typical pad foundations would be of the order of 100kN/m^2. However, the potential total and differential settlements of the backfill are likely to be the primary factor governing foundation design.

Foundations will need to be taken below any Made Ground remaining in areas of former structures.

The magnitude of the total settlement is generally of lesser significance to the proposed structures than differential settlements, except with regard to neighbouring works such as services. The foundations (and overall structure) must be designed to accommodate the predicted total and differential settlements.

In order to mitigate excessive differential settlements, it is recommended that lightly loaded buildings be constructed on reinforced strip footings in areas underlain by relatively uniform depths and properties of fill. Due allowance should be made for flexible external service connections that can withstand differential movements.

6.7 Shallow Mineworkings

The eastern part of the site outside the limit of excavation of the former opencast coal mine is anticipated to be underlain at fairly shallow depth by the Shafton Coal Seam. However as there are no records of any mine workings recorded in the opencast completion plan, the risk of shallow mine workings being present beneath this area is considered to be low.

6.8 Ground and Mine Gases

In view of the potential for elevated ground gases and mine gases in the area, it is recommended that allowance is made for the incorporation of some basic ground gas protection measures in all future structures until further works can confirm that any remaining risks are low.

7.0 CONCLUSIONS

7.1 Conclusions

The site was formerly the southern part of Houghton Main Colliery and was occupied by several mine buildings, up to six rail lines and a row of terraced housing. The terraced houses were demolished between 1967 and 1979. The colliery closed in 1993.

A large reclamation scheme was carried out between 1997 and 2000, and this included an opencast coal mine which extracted shallow coal seams. The reclamation scheme was supervised by Babtie Group and all filling operations were carried out to an end product specification in order to render the site suitable for future building development.

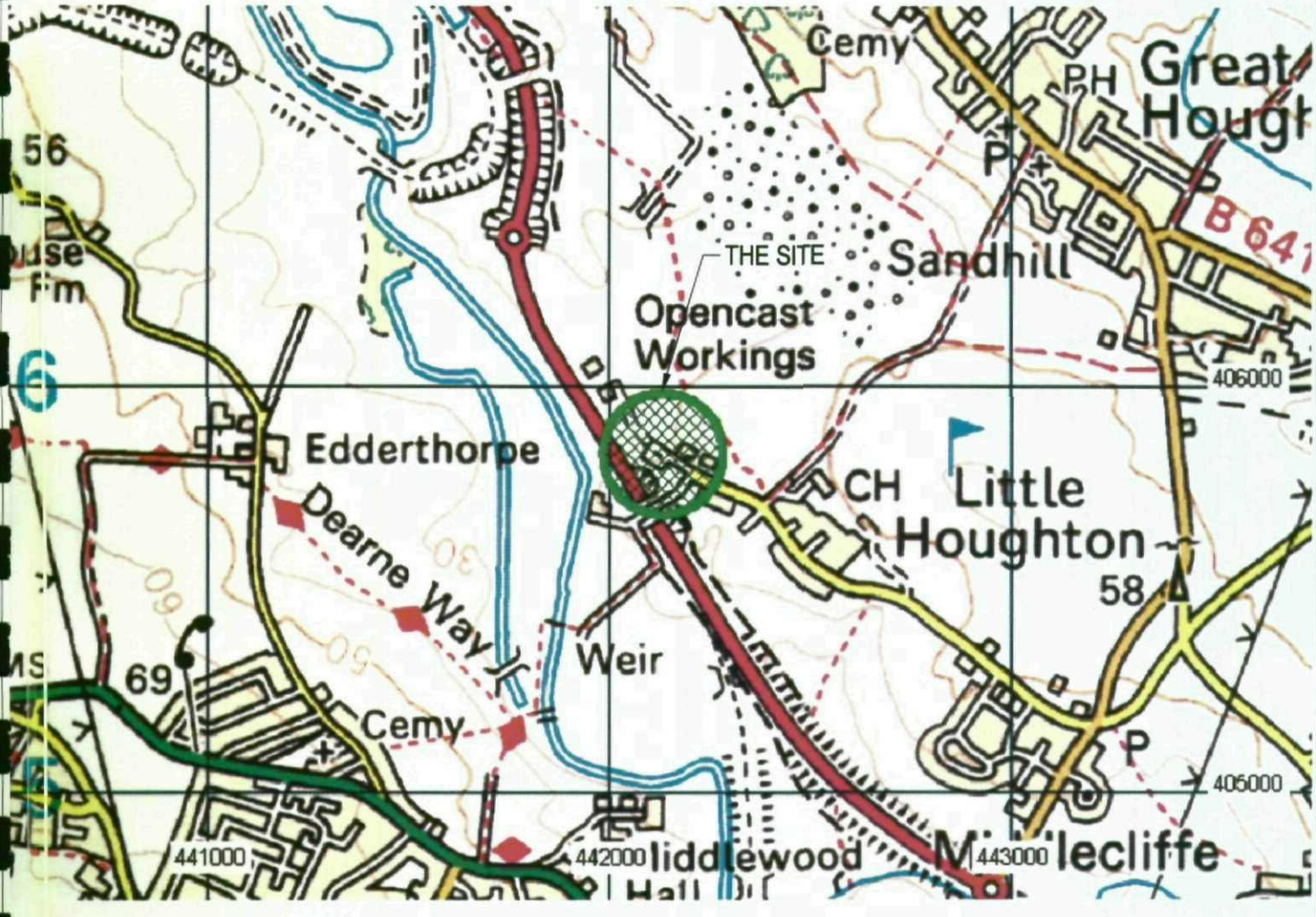
Two areas of the Shafton Coal were extracted from the site and this has resulted in several areas underlain by opencast high walls. These areas could pose a potential risk to future structures due to excessive differential settlements and therefore buildings should not be positioned over these high walls.

The ground conditions will comprise either compacted opencast backfill or weathered Coal Measures, and as such should provide a suitable bearing stratum for typical low rise housing (i.e. shallow spread foundations). If large, heavily loaded structures were to be built on the site, these may require the use of pile foundations which would result in significant additional costs.

Based upon the information obtained to date, significant ground contamination is not anticipated beneath the site.

DRAWINGS

DO NOT SCALE: Contractor to check all dimensions and report any omissions or errors



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Rev	Description	By	Chk	App	Date

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Tel: 0113 278 7111
Fax: 0113 275 0823
e-mail: enviro.leeds@wyg.com

White Young Green
Environmental
Civil Engineering Environmental Health & Safety Highways Management Services Mechanical Rail Structural Town Planning Transportation

Project: A035220-2
LITTLE HOUGHTON DEVELOPMENT

Client:
UK COAL LTD

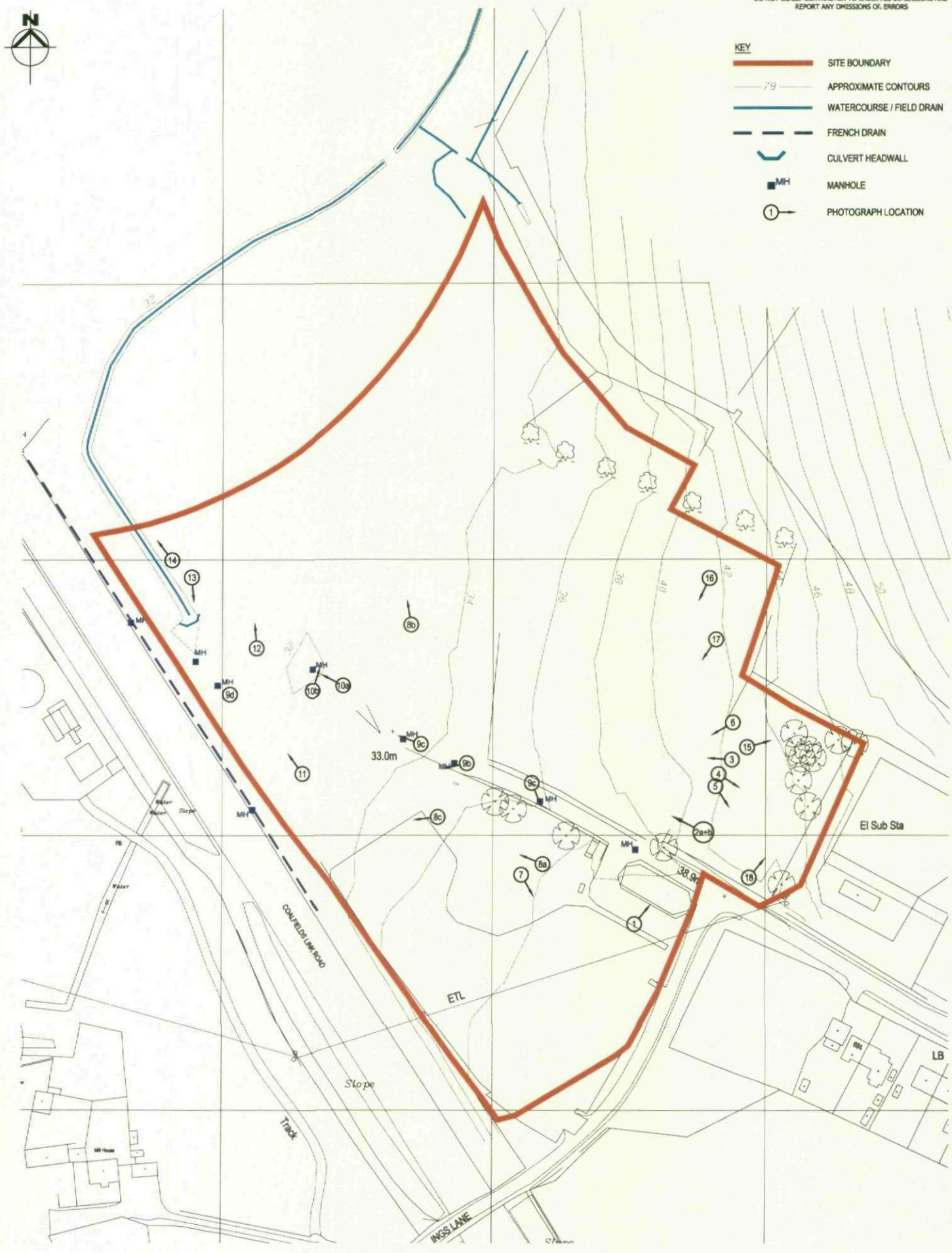
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SITE LOCATION PLAN

Scale at A4	Drawn By	Date	Checked By	Date	Approved By	Date
N.T.S	CM	04.02.08	AL	04.02.08	PRB	04.03.08

Project No.	Office	Type	Drawing No.	Revision
A035220-2	4104	554	01	

APPROVAL ☐ INFORMATION ☒ TENDER ☐ CONTRACT ☐ CONSTRUCTION ☐

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ARNDALE COURT
HEADINGLEY
LEEDS
LS6 2UJ

TEL: +44 (0)113 278 7111
FAX: +44 (0)113 275 0623
e-mail: enviro@wyg.com

Client: UK COAL LTD

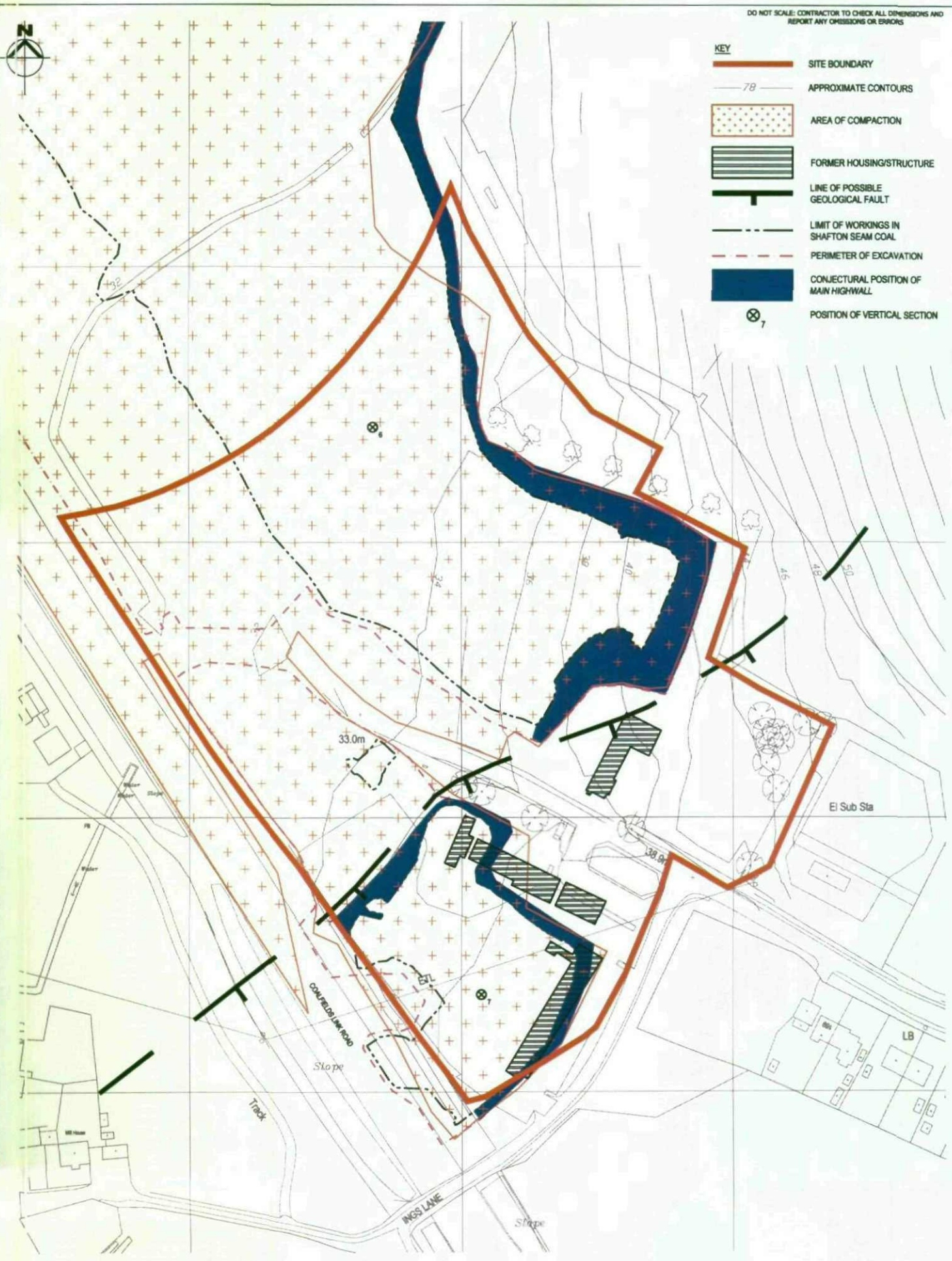
Project: A035220-2
LITTLE HOUGHTON DEVELOPMENT

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Project No.	Office	Type	Drawing No.	Revision
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Client: UK COAL LTD

Project: A035220-2
LITTLE HOUGHTON DEVELOPMENT

Drawing Title:
POTENTIAL GEO-ENVIRONMENTAL CONSTRAINTS

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawing No.	Revision
A035220-2	4104	554	03	A

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APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

GEO-ENVIRONMENTAL DESKTOP STUDY

*This report is produced solely for the benefit of **UK Coal** and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.*

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYGE. In time improved practices or amended legislation may necessitate a re-assessment.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

APPENDIX B

SITE PHOTOGRAPHS



Photograph No.1: Houghton Main Memorial





Photograph No.2A & B: Site Access

Arndale Court
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Environmental Consultancy
Ground Technologies & Investigation

White Young Green

Project :- Little Houghton

Client:- **UK Coal**

Project No. :- A035220-2 **Date :-** March 2008



Photograph No.3: View of the site looking NW



Photograph No.4: View of the site looking SE, towards Electrical Substation

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Photograph No.5: View of site, SE, showing possible drainage channels



Photograph No.6: View NW towards A6195

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Photograph No.7: View SW showing line of pylons and trees crossing the site



Photograph No.8a, b and c: Selected evidence of fly tipping on site

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Photograph No.9a - D: 4 No. Separate manhole covers encountered during site walkover



Photograph No.10: Two views of a manhole cover encountered on site

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Photograph No.11: Drainage channel running parallel to the A6195



Photograph No.12: Evidence of poor drainage on NE area of the site

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Photograph No.13: Storm drainage entrance



Photograph No.14: Major drainage channel running parallel to the A6195 into storm drainage entrance, picture 13.

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Photograph No.15: Landscaped area with tree planting on the Eastern end of the site



Photograph No.16: View of the site, looking west, showing possible gas release tubes

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Photograph No.17: Close up of possible gas release tubes



Photograph No.18: Possible evidence of former structures.

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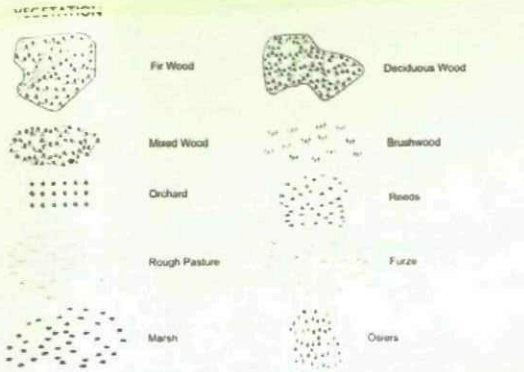
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APPENDIX C

HISTORICAL PLANS

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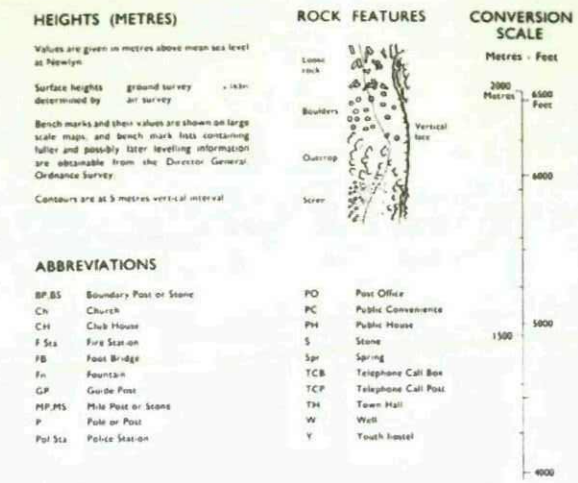


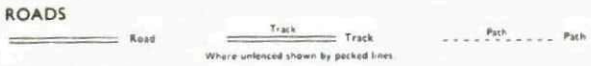


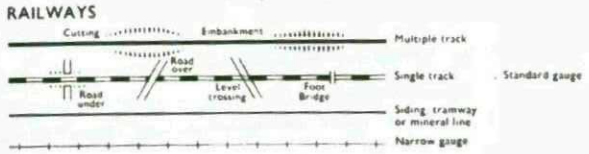


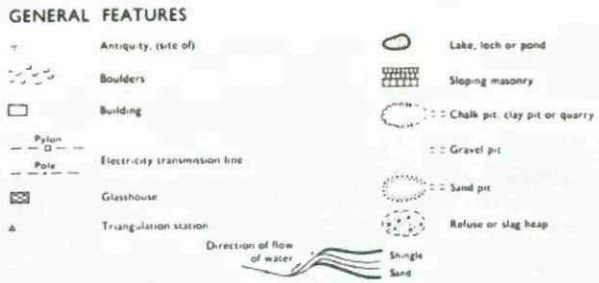


National Grid 1:10,000 scale











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Historical Map Pack Legend

County Series & National Grid

1:10,560 scale & 1:10,000 scale

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County Series 1:2,500 scale



National Grid 1:2,500 / 1:1,250 scale



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Historical Map Pack Legend

County Series

1:1,250 scale

~

County Series & National Grid

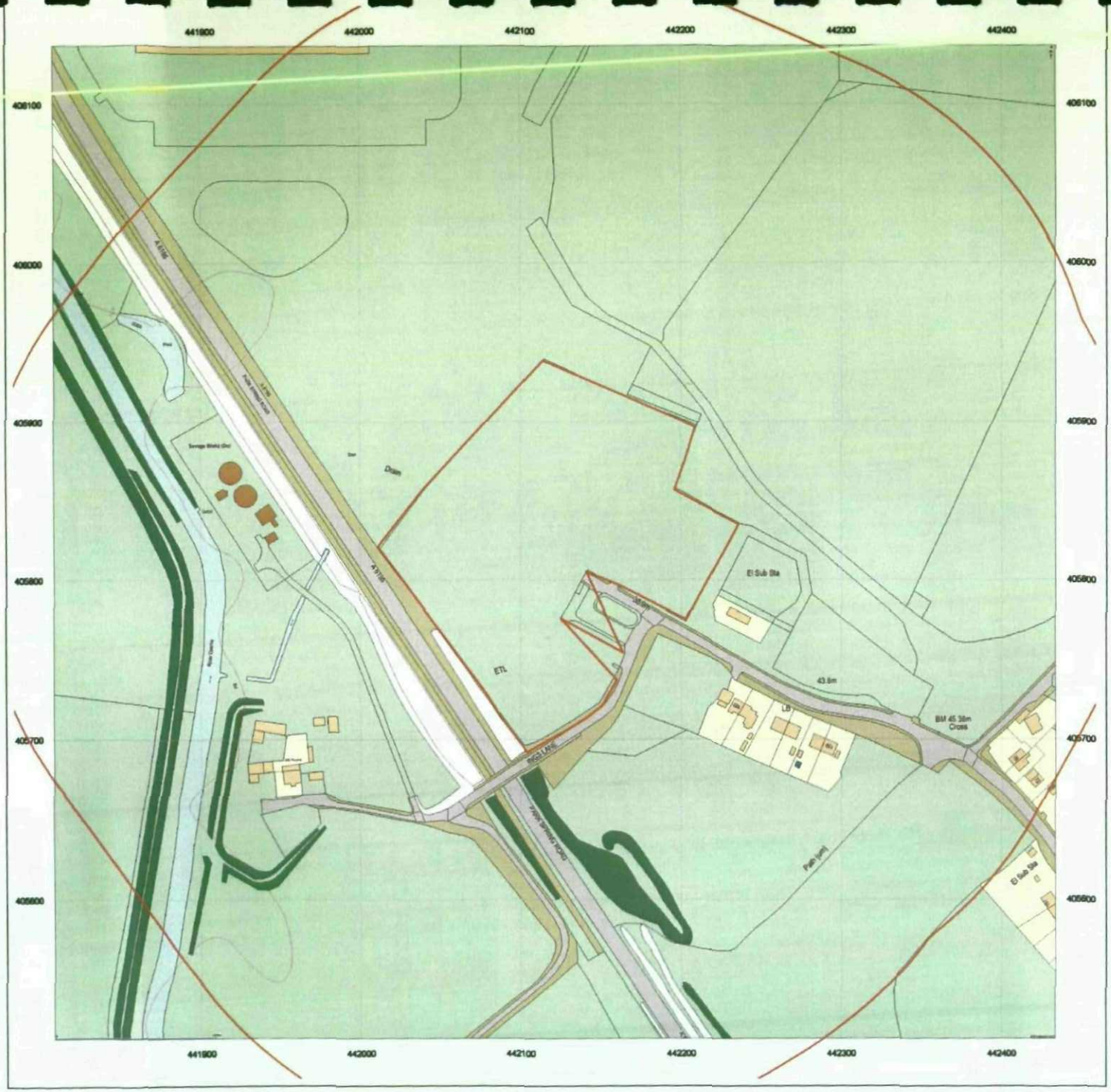
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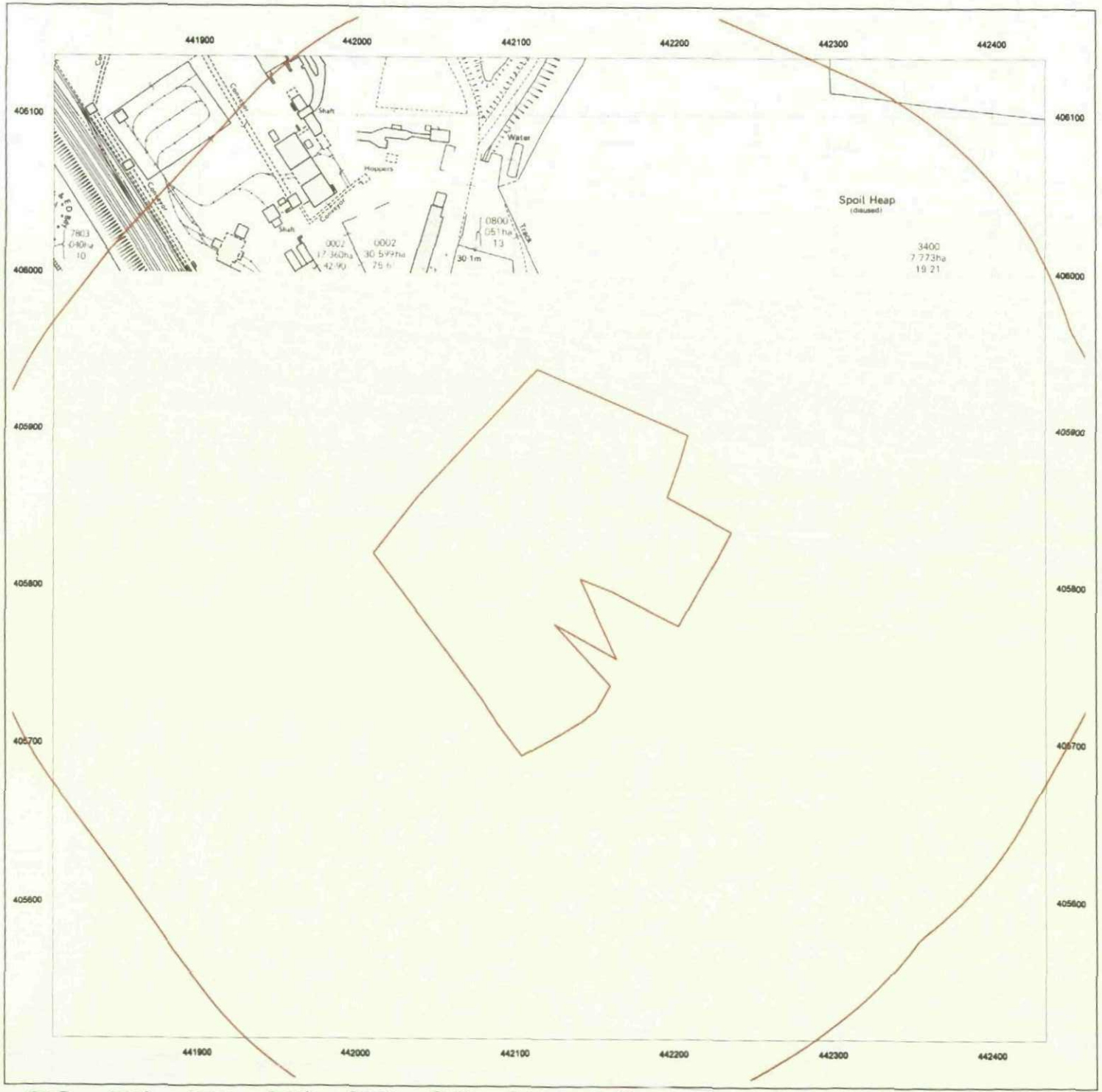
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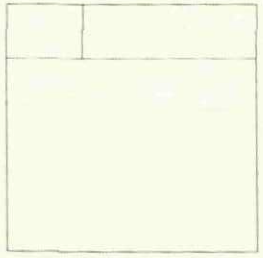
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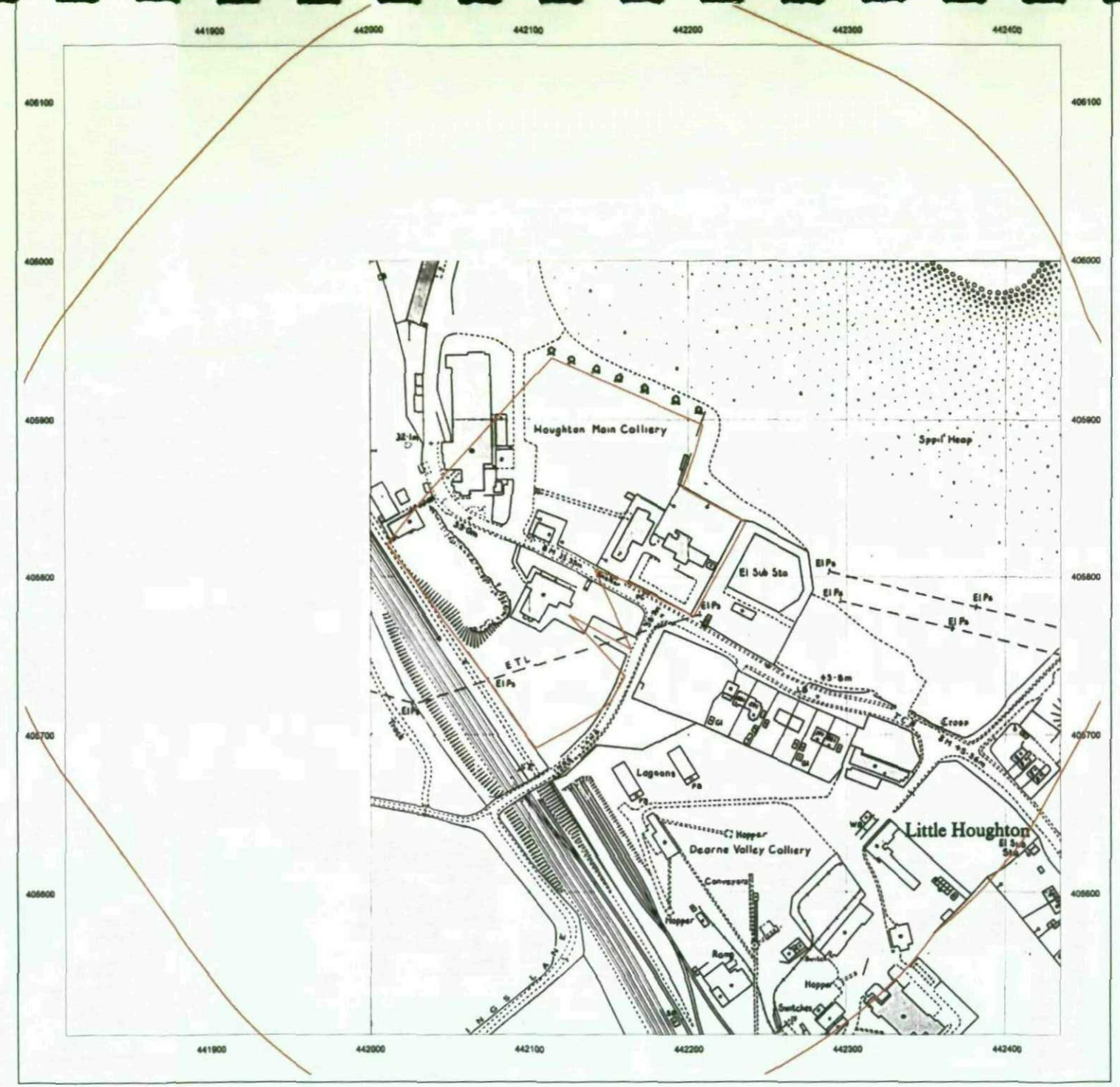


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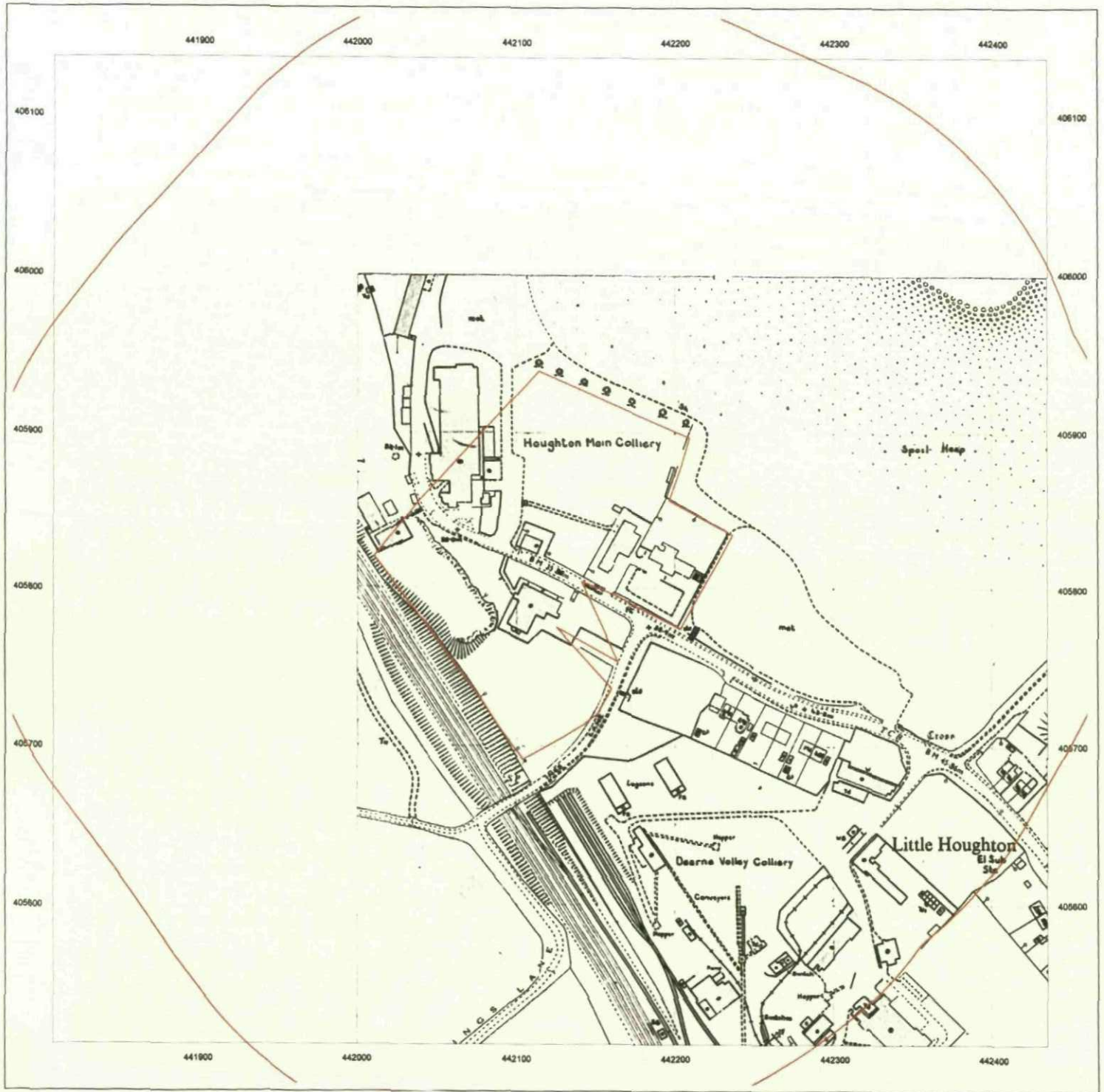
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Map Name: National Grid

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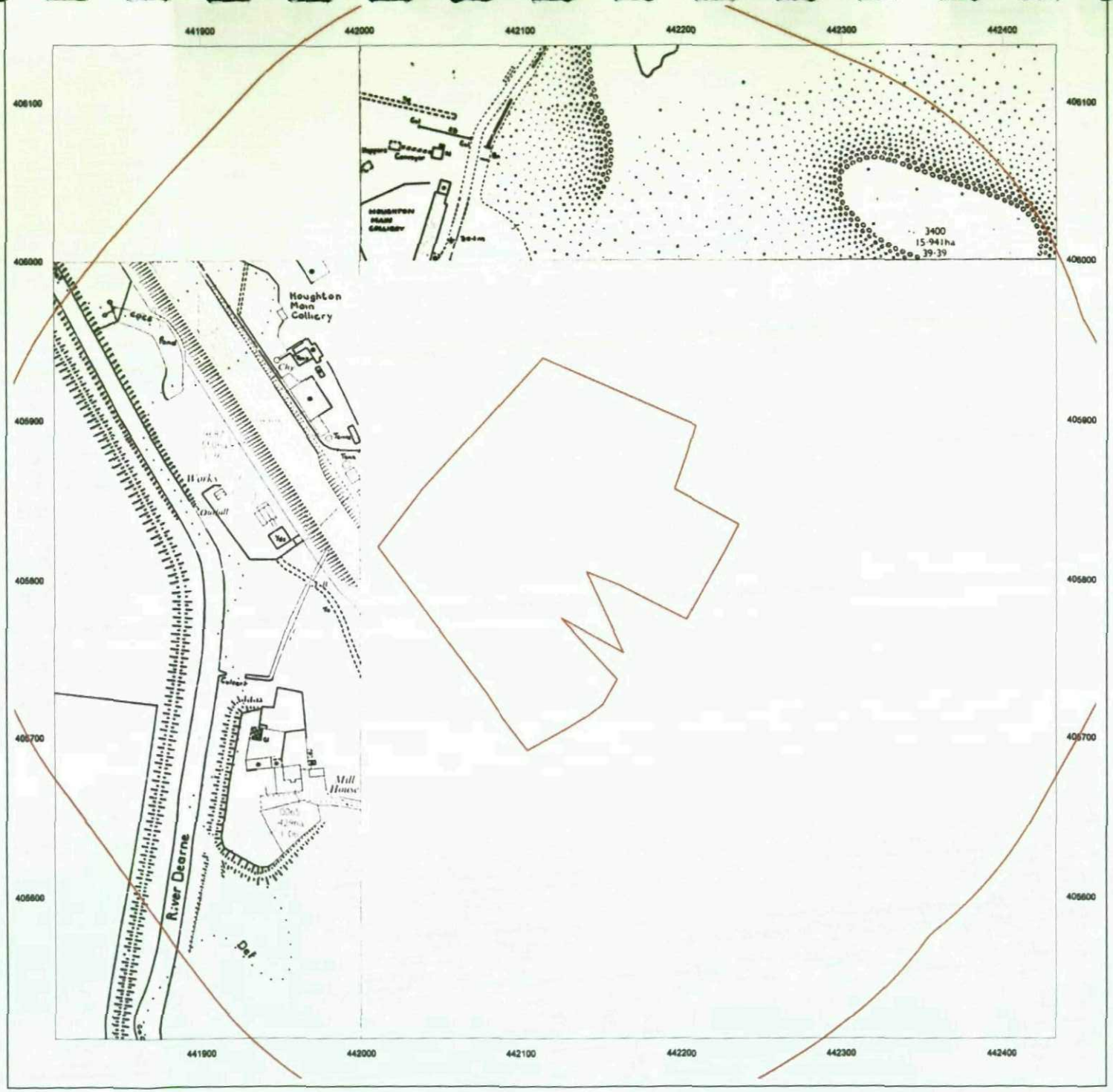
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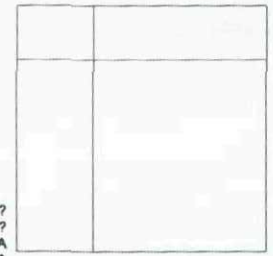
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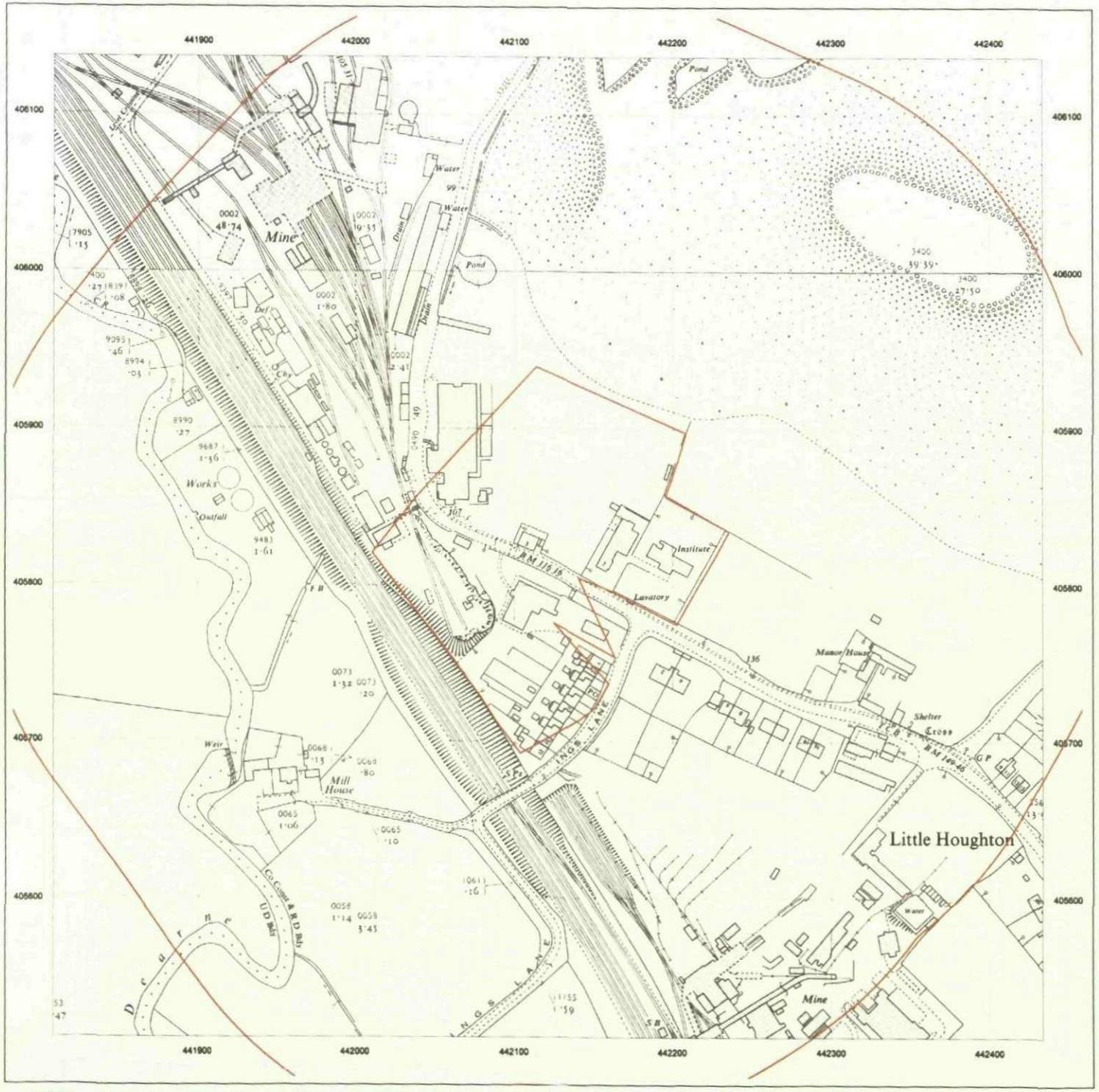
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Map Name: County Series

Map date: **1930-1931**

Scale: 1:2,500

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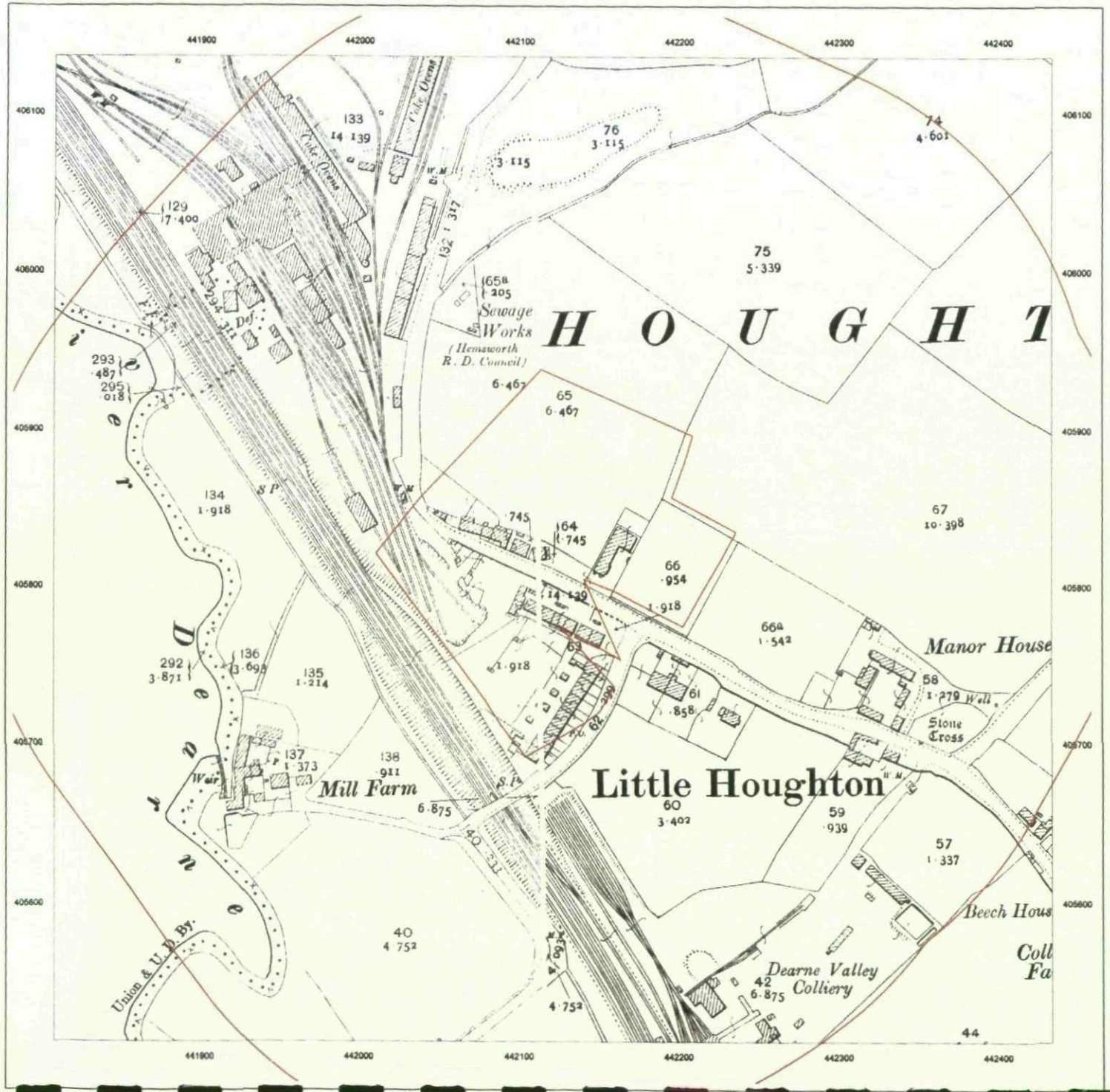
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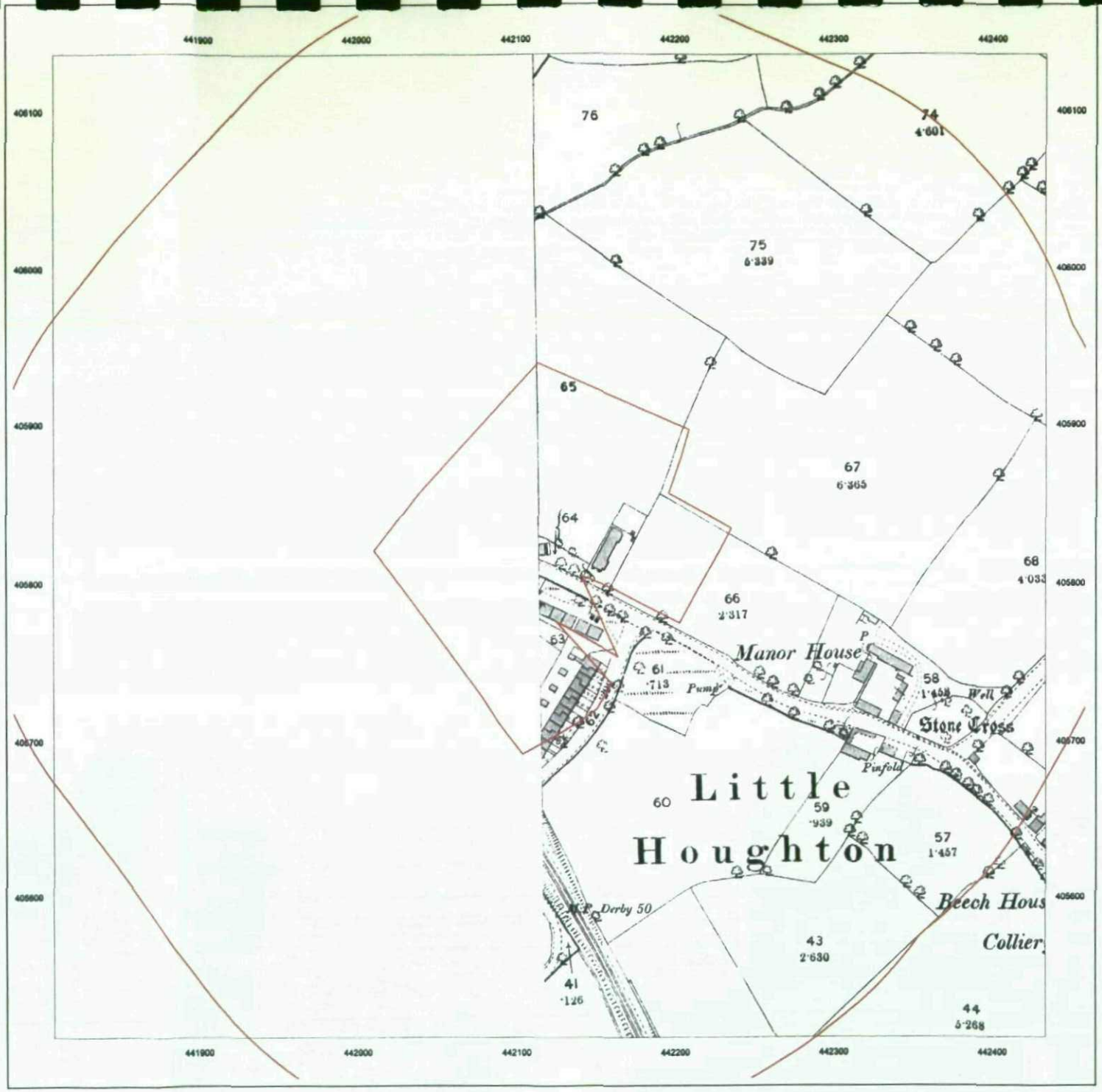
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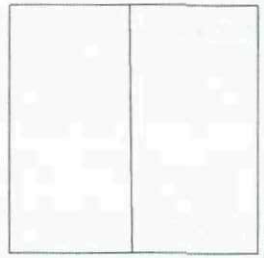
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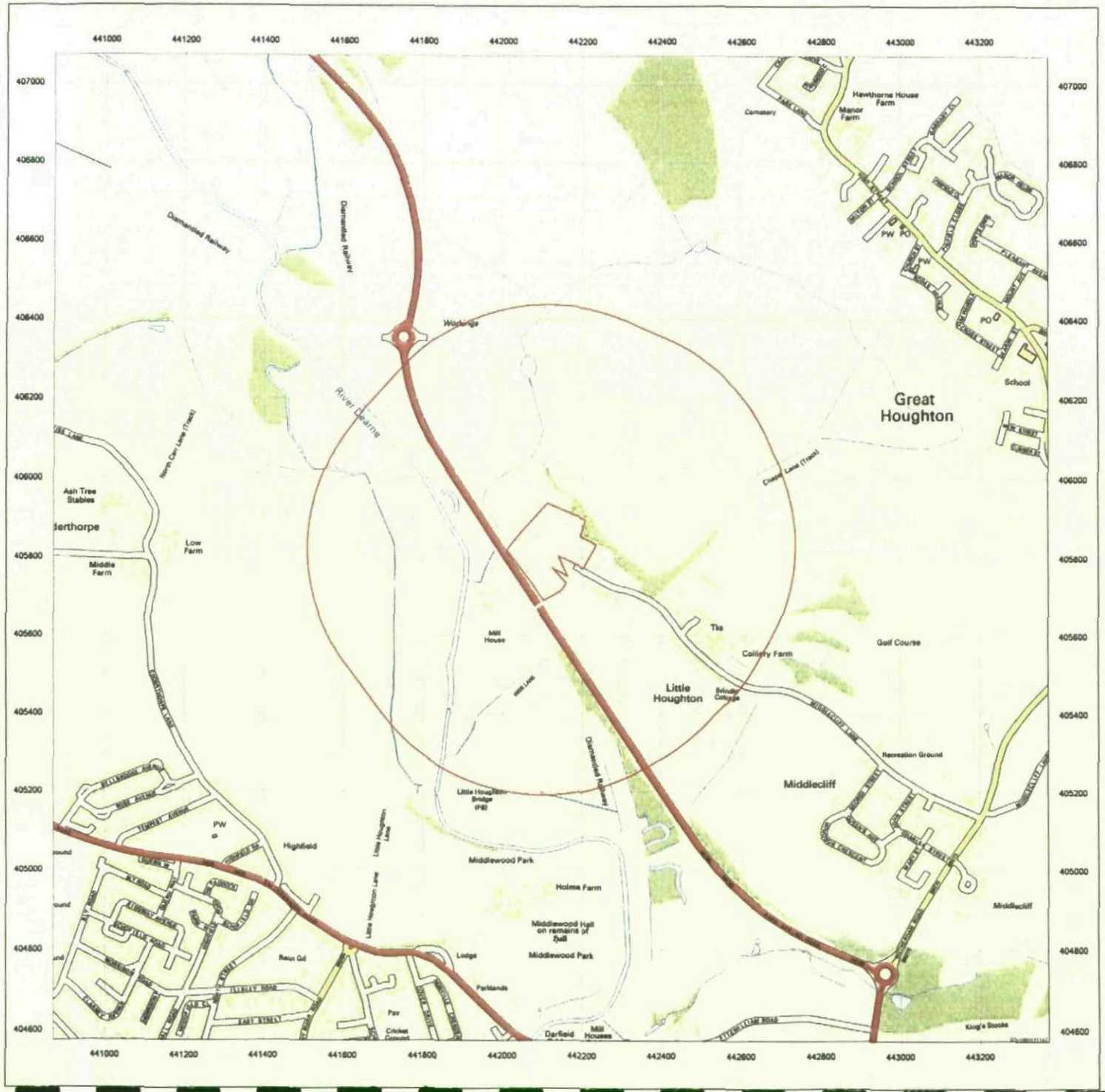
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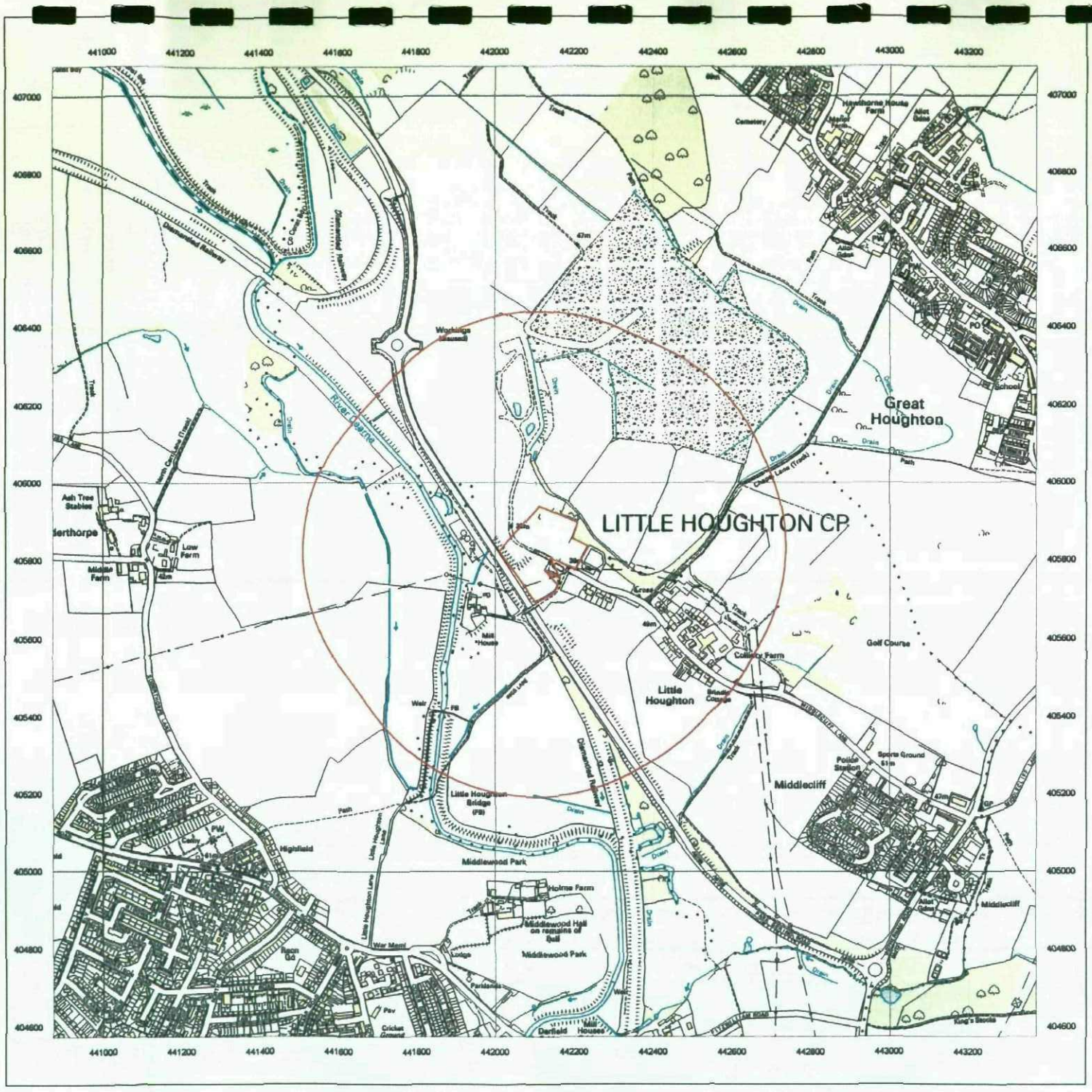
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Grid Ref: 442121, 405824

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

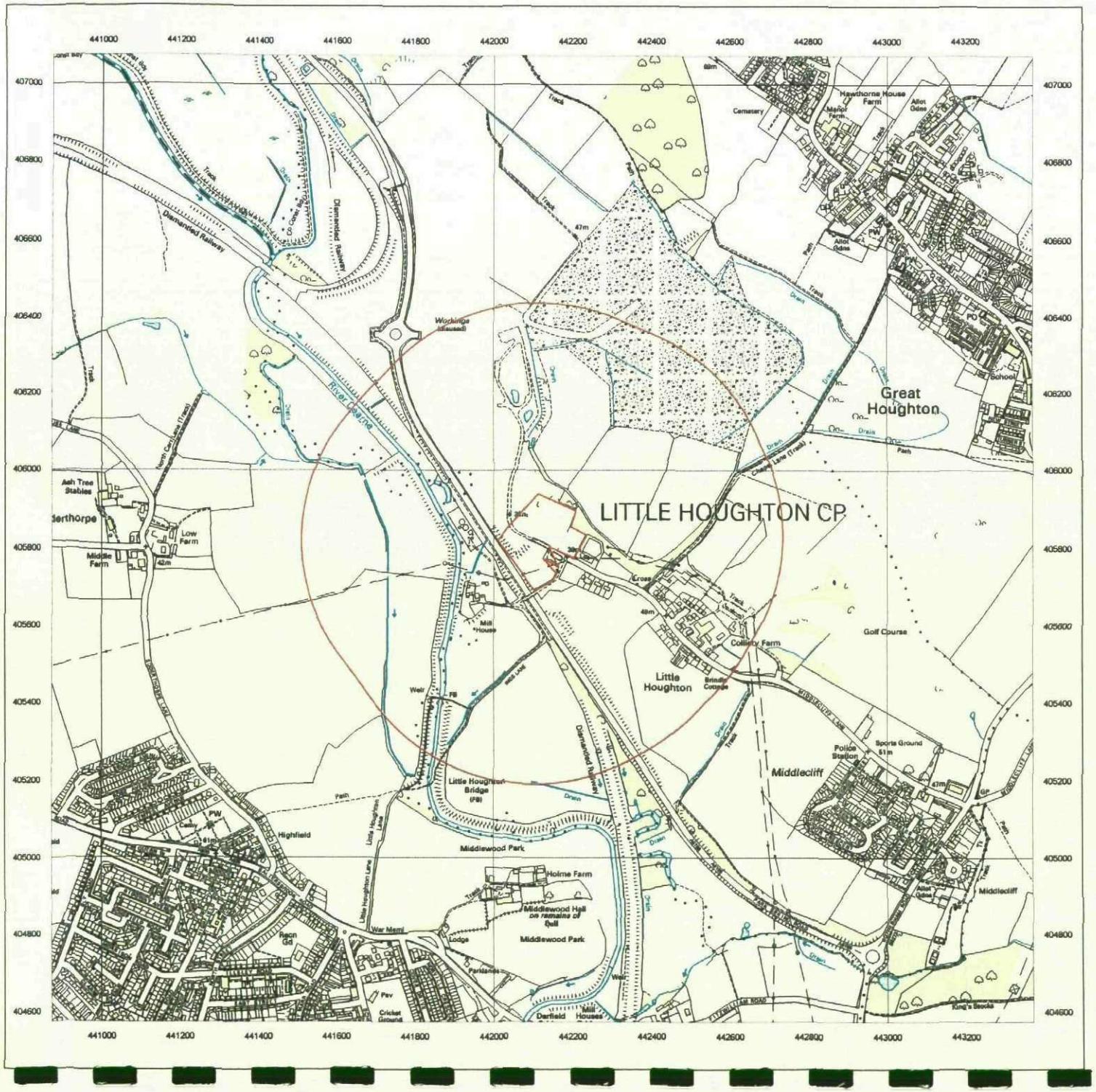
2002

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Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: 1:10,000 Raster
Map date: 2002
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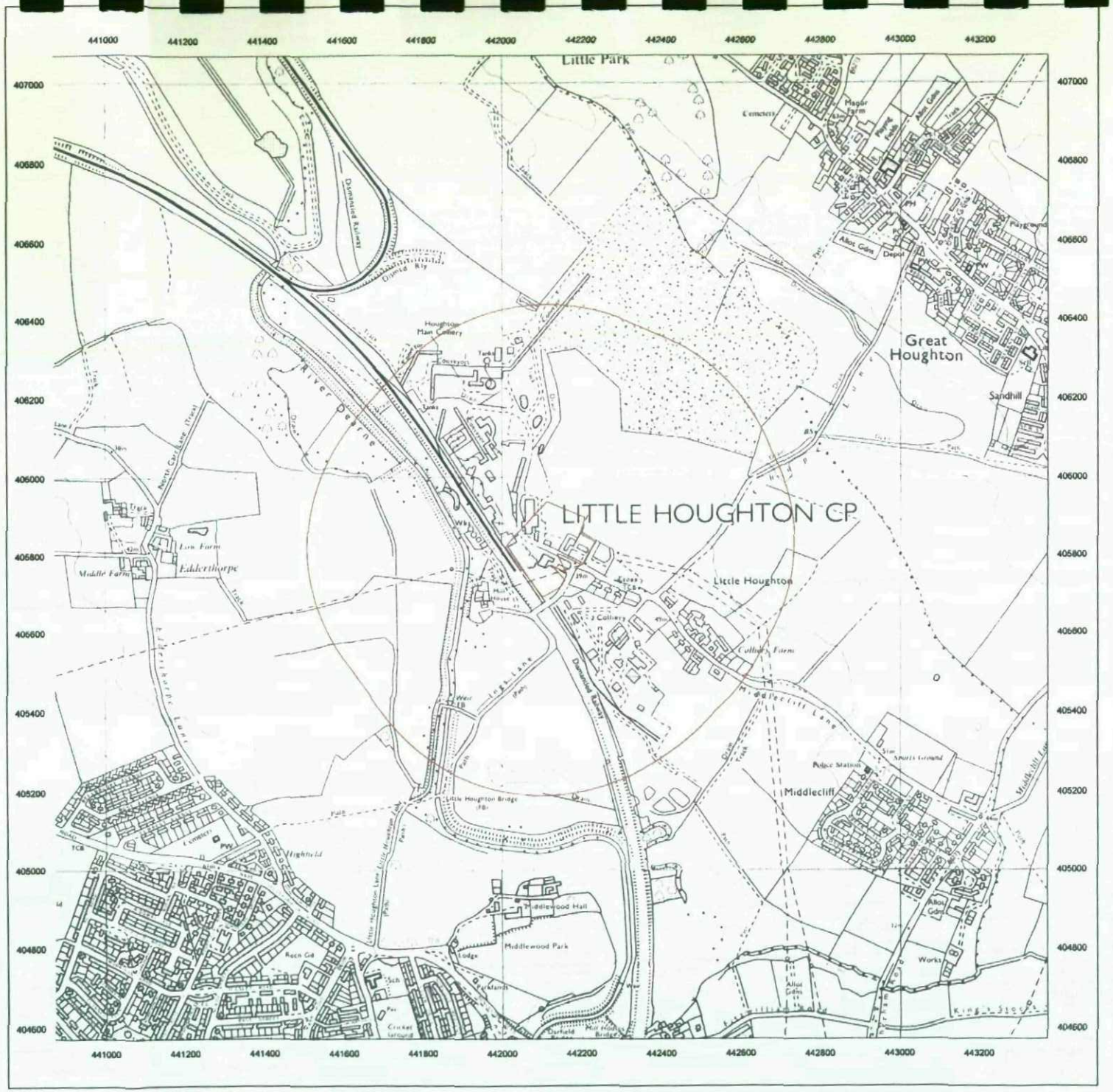
2002

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Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: *National Grid*

Map date: **1988**

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1987
Revised 1988
Edition NA
Copyright NA
Levelled NA

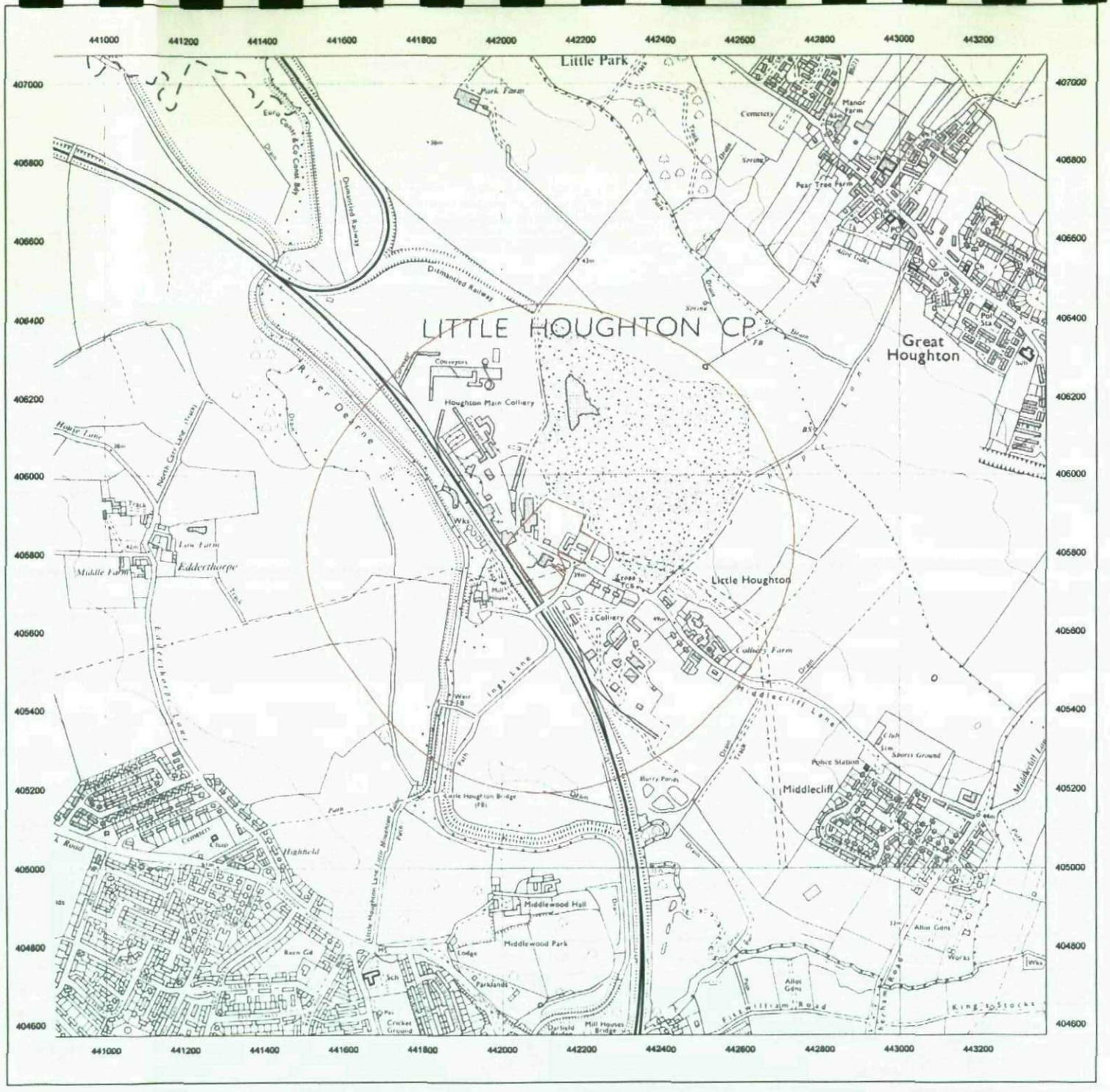
~~Surveyed 1963~~
Revised 1988
Edition NA
Copyright NA
Levelled NA

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Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: National Grid

Map date: **1977-1981**

Scale: 1:10,000

Printed at: 1:10,000

Surveyed 1980
Revised 1981
Edition NA
Copyright NA
Levelled NA

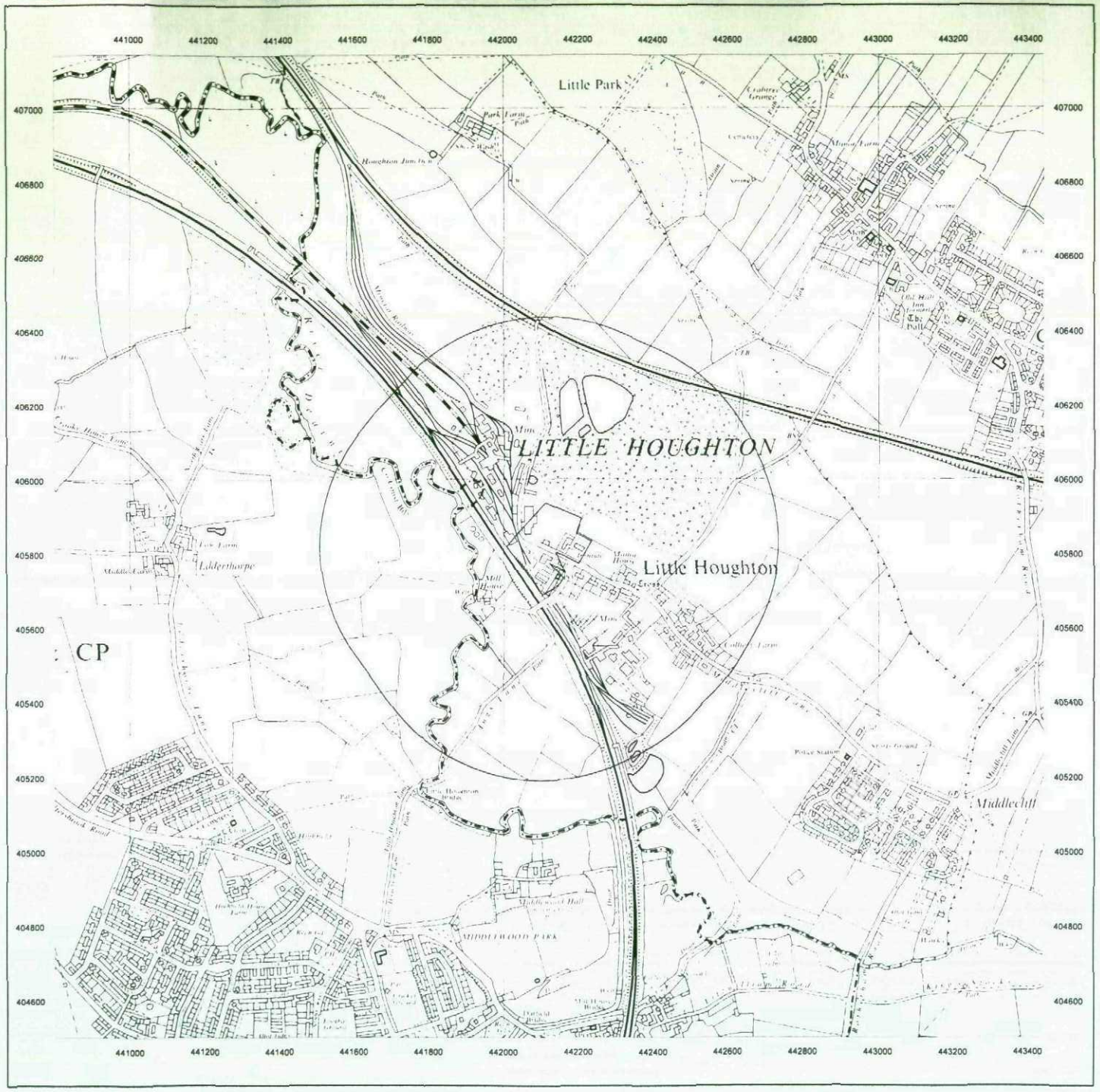
~~Surveyed 1976~~
Revised 1977
Edition NA
Copyright NA
Levelled NA

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Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: Provisional
Map date: 1967
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1967
Revised 1967
Edition NA
Copyright NA
Levelled NA

Surveyed 1967
Revised 1967
Edition NA
Copyright NA
Levelled NA

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GroundSure

EmapSite
Masdar House, 1 Reading Road,
Hants, RG27 0RP

GroundSure Reference:	EMS-54491_67979
Your Reference:	EMS_54491_67979
Report Date	Feb 20, 2008
Report Delivery Method:	Email - pdf

GroundSure Geology & Ground Stability Report

Address:

Dear Sir/Madam,

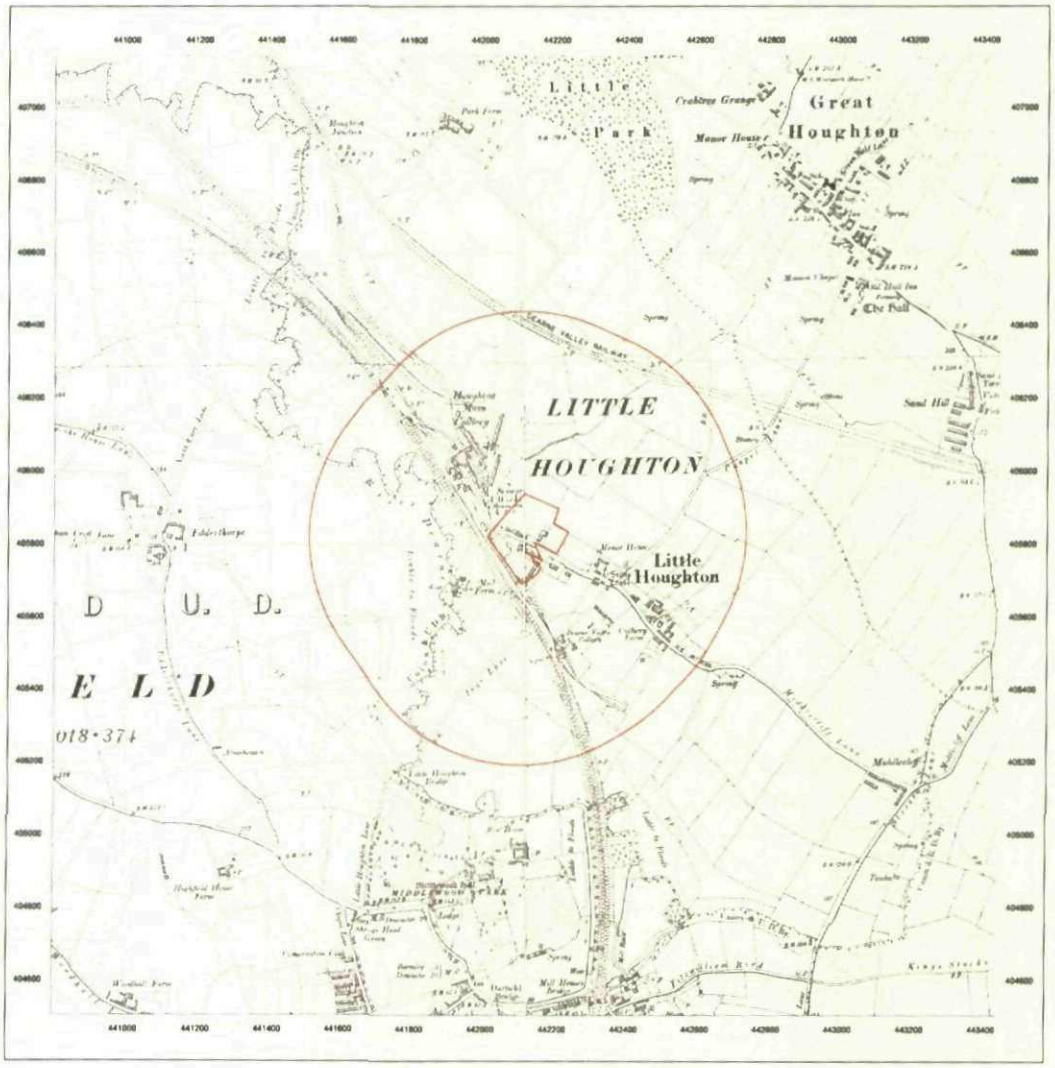
Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Geology & Ground Stability Report** as requested.

If you need any further assistance, please do not hesitate to contact our maps and data helpline on 01273 819700 or email maps&data@groundsure.com quoting the above GroundSure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
GroundSure Geology & Ground Stability Report



GroundSure

Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

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

Surveyed 1890
Revised 1904
Edition NA
Copyright NA
Levelled NA

Surveyed 1891
Revised 1904
Edition NA
Copyright NA
Levelled NA

Surveyed 1890
Revised 1904
Edition NA
Copyright NA
Levelled NA

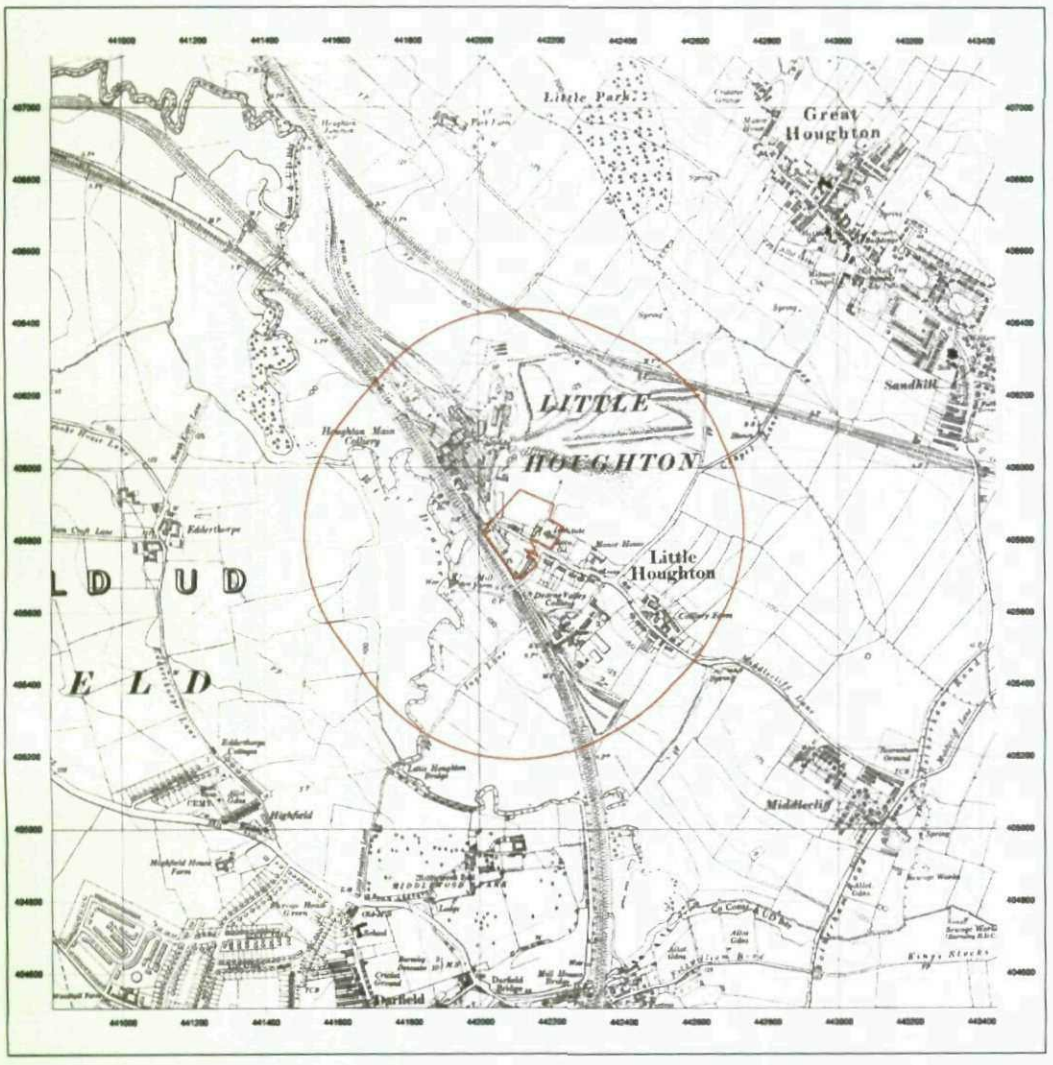
Surveyed 1890
Revised 1904
Edition NA
Copyright NA
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Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: Provisional
Map date: 1951
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA



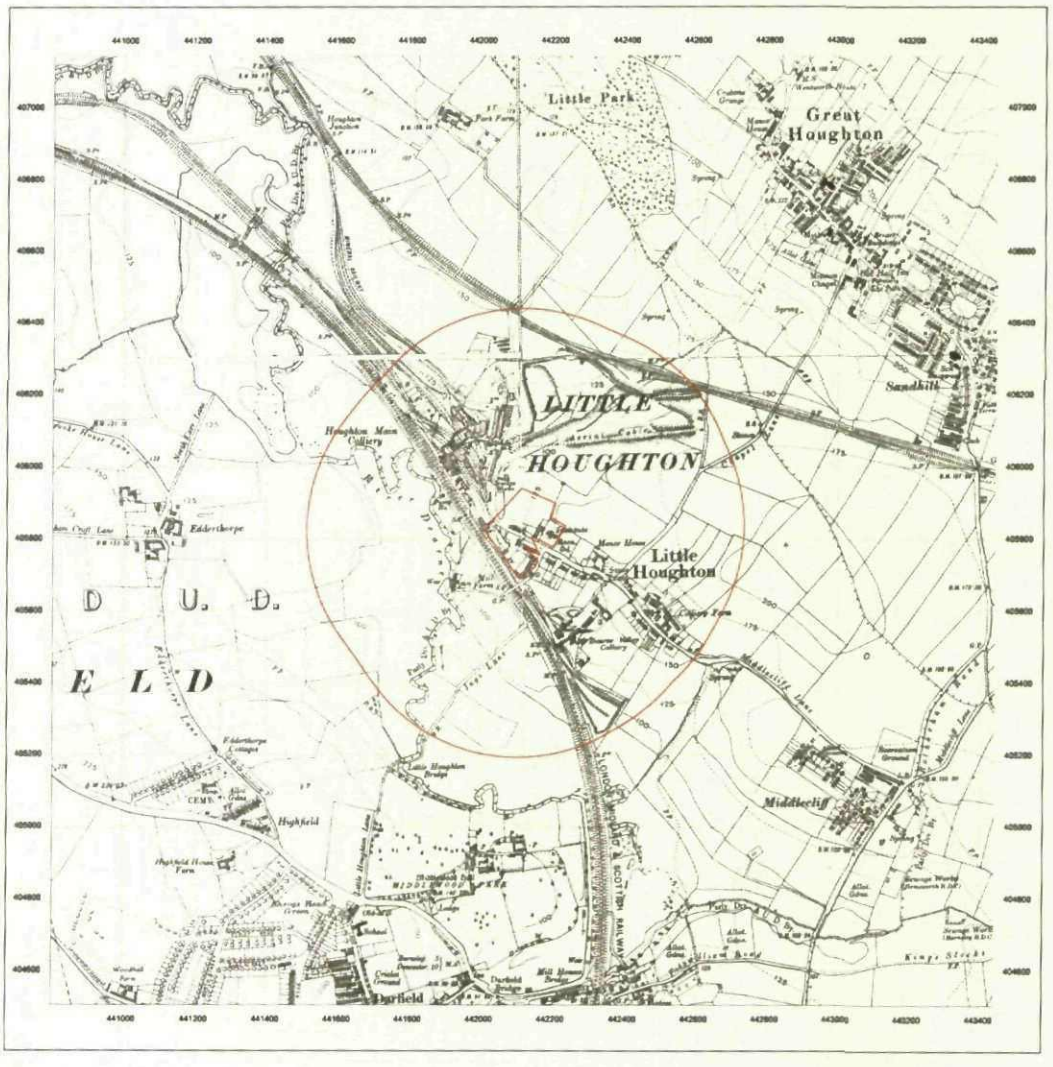
Surveyed 1951
Revised 1951
Edition NA
Copyright NA
Levelled NA

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GroundSure

Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series
Map date: 1948
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1850
Revised 1948
Edition NA
Copyright NA
Levelled NA

Surveyed 1820
Revised 1948
Edition NA
Copyright NA
Levelled NA

Surveyed 1851
Revised 1948
Edition NA
Copyright NA
Levelled NA

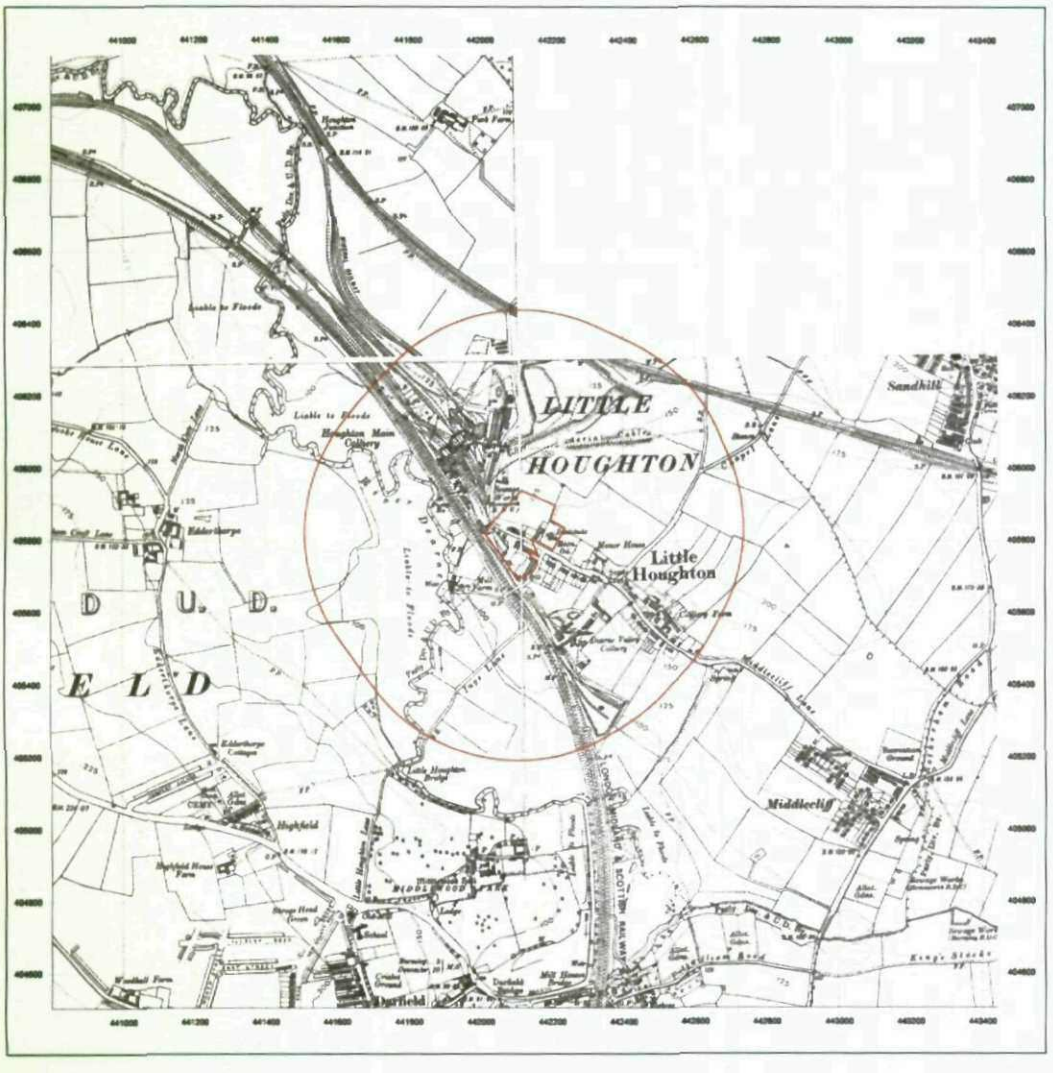
Surveyed 1850
Revised 1948
Edition 1948
Copyright NA
Levelled NA

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Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series
Map date: 1938-1939
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1850
Revised 1938
Edition 1938
Copyright NA
Levelled NA

Surveyed 1851
Revised 1938
Edition 1938
Copyright NA
Levelled NA

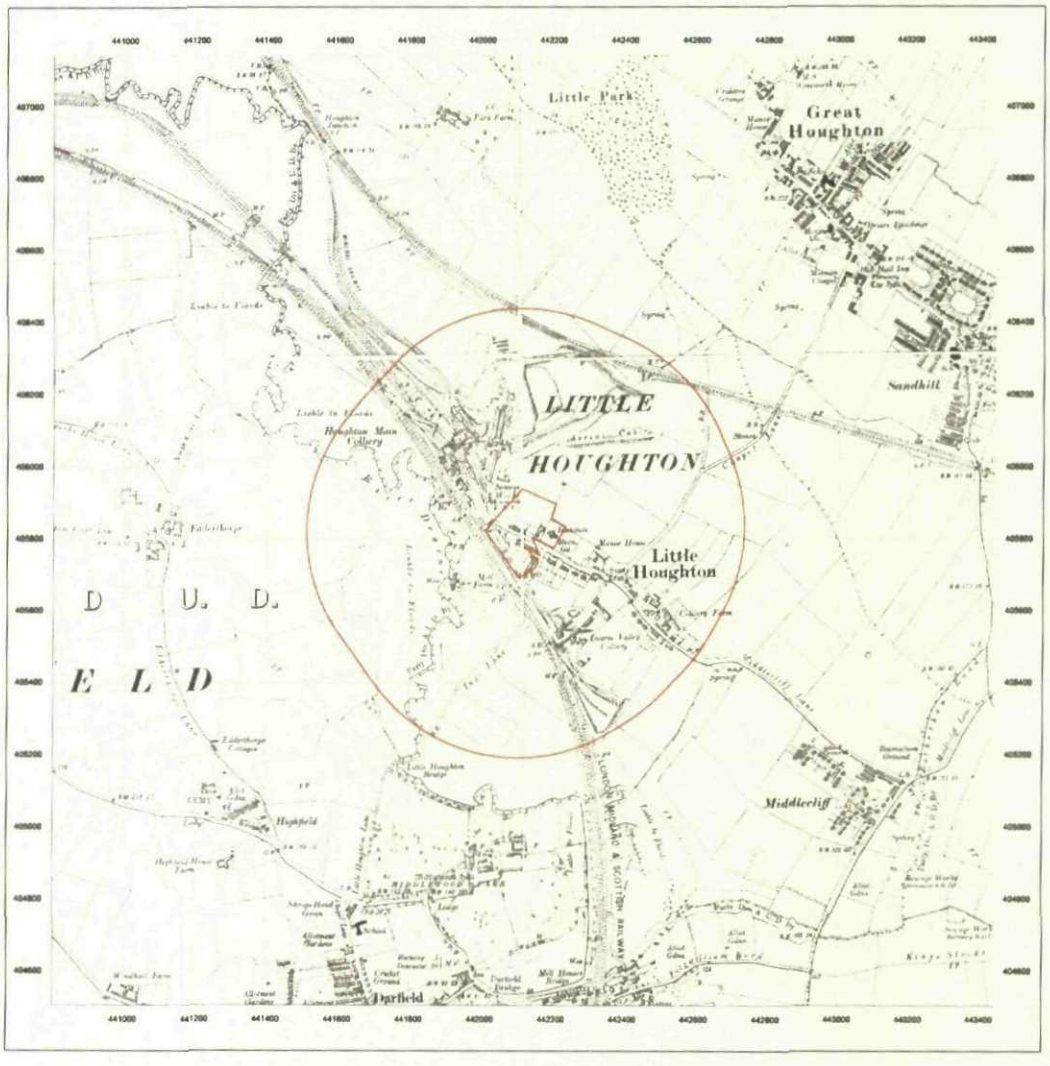
Surveyed 1800
Revised 1938
Edition NA
Copyright NA
Levelled NA

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GroundSure

Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series
Map date: 1929-1932
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1850
Revised 1930
Edition NA
Copyright NA
Levelled NA

Surveyed 1850
Revised 1932
Edition 1932
Copyright NA
Levelled NA

Surveyed 1851
Revised 1929
Edition NA
Copyright NA
Levelled NA

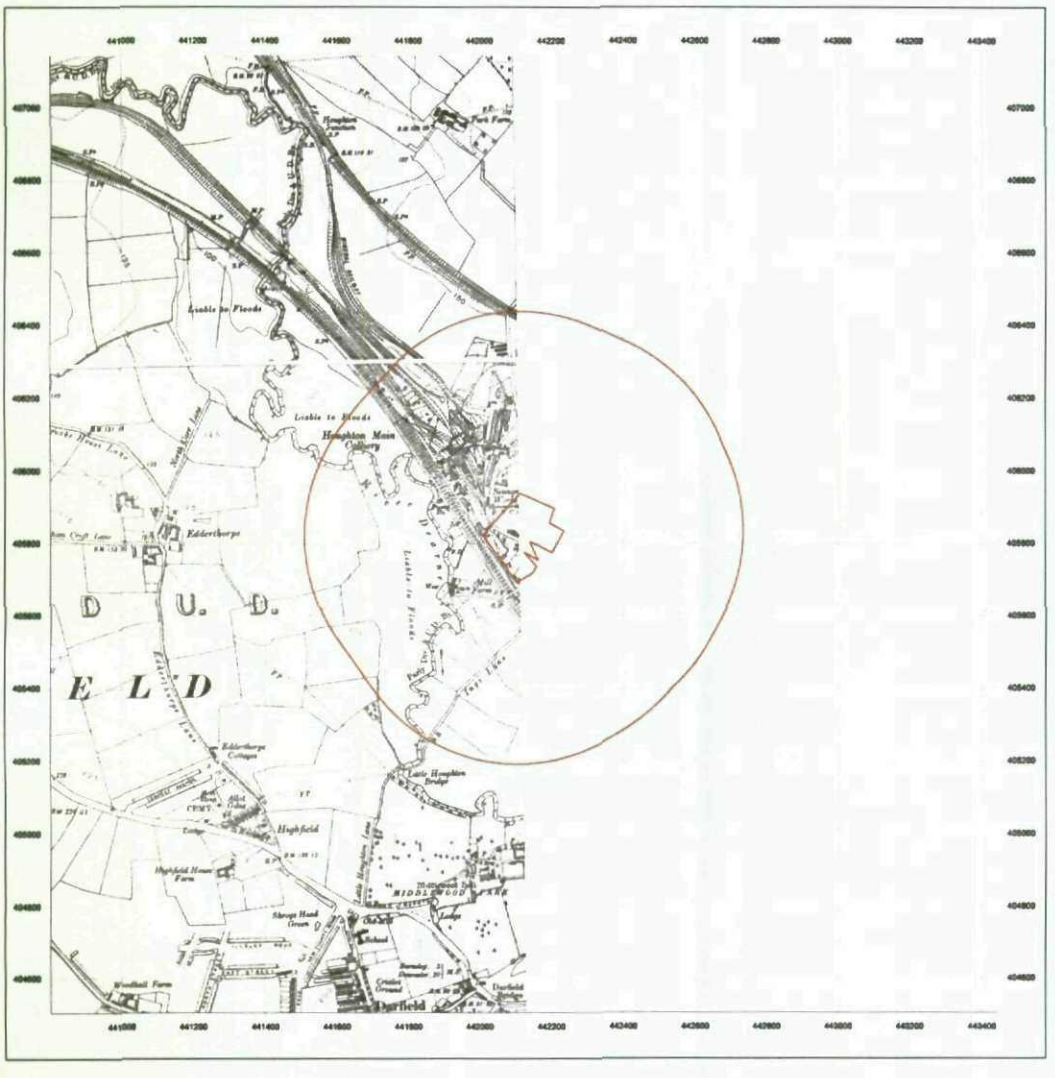
Surveyed 1850
Revised 1929
Edition NA
Copyright NA
Levelled NA

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GroundSure

Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series

Map date: **1929-1930**

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1850
Revised 1930
Edition NA
Copyright NA
Levelled NA

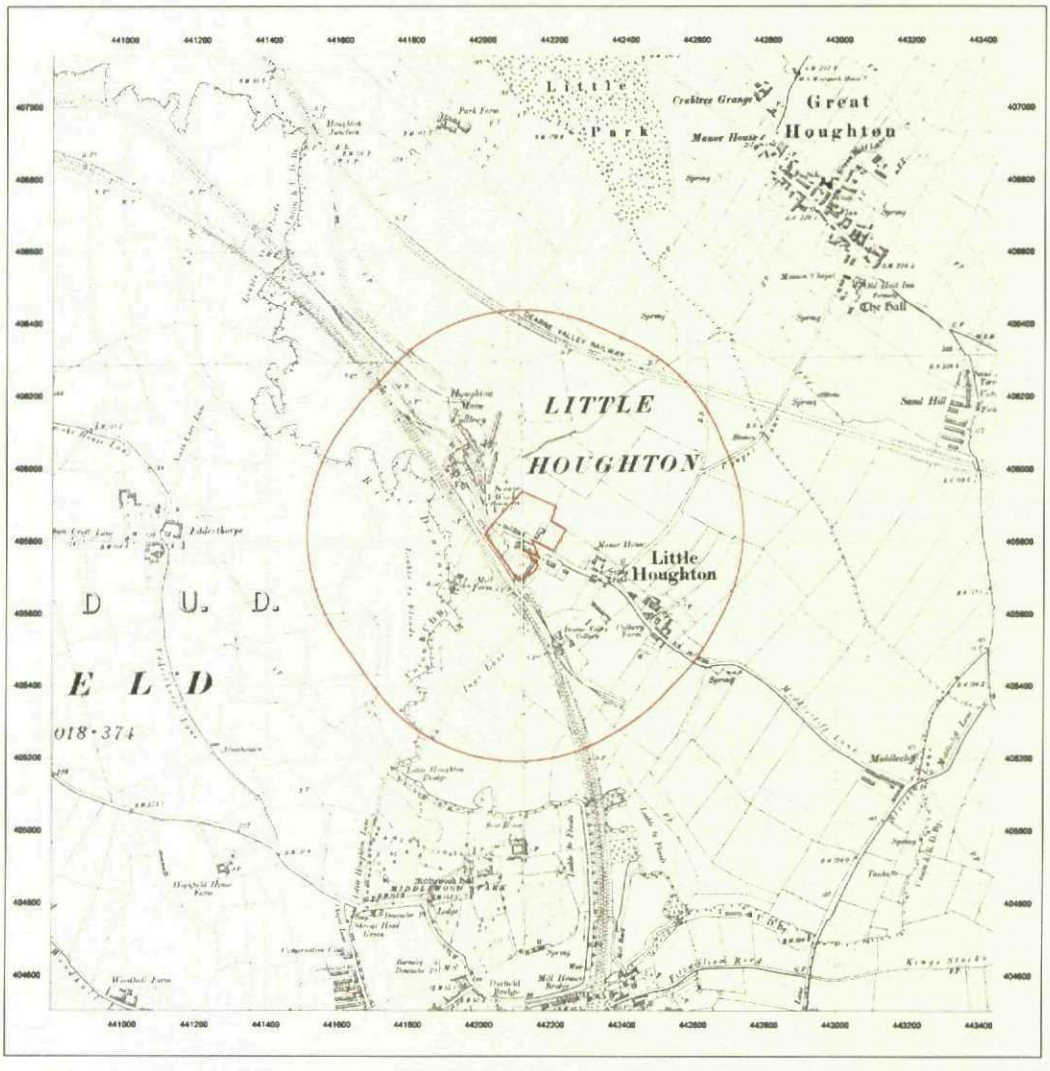
Surveyed 1851
Revised 1929
Edition NA
Copyright NA
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Production date:20 February 2008



GroundSure

Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series

Map date: 1904

Scale: 1:10,560

Printed at: 1:10,560

Surveyed 1890
Revised 1904
Edition NA
Copyright NA
Levelled NA

Surveyed 1891
Revised 1904
Edition NA
Copyright NA
Levelled NA

Surveyed 1890
Revised 1904
Edition NA
Copyright NA
Levelled NA

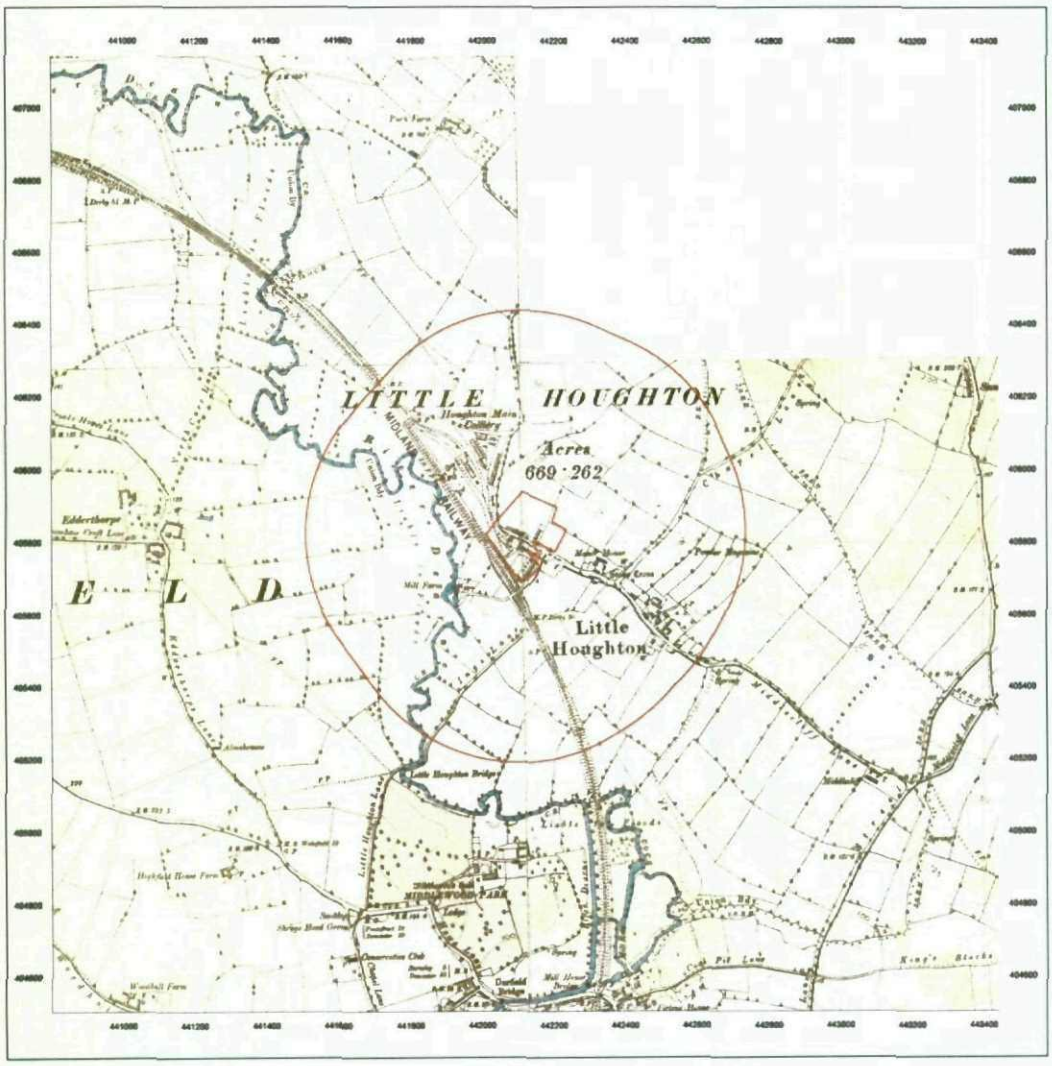
Surveyed 1890
Revised 1904
Edition NA
Copyright NA
Levelled NA

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Site Details:

Client Ref: EMS_54491_67978
Report Ref: EMS-54491-67978
Grid Ref: 442121, 405824

Map Name: County Series
Map date: 1890
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1890
Revised 1890
Edition NA
Copyright NA
Levelled NA

Surveyed 1890
Revised 1890
Edition NA
Copyright NA
Levelled NA

Surveyed 1890
Revised 1890
Edition NA
Copyright NA
Levelled NA

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APPENDIX D

GROUND SURE REPORT EXTRACTS

EmapSite
Masdar House, 1 Reading Road,
Hants, RG27 0RP

GroundSure Reference:	EMS-54491_67979
Your Reference:	EMS_54491_67979
Report Date	Feb 20, 2008
Report Delivery Method:	Email - pdf

GroundSure Geology & Ground Stability Report

Address:

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Geology & Ground Stability Report** as requested.

If you need any further assistance, please do not hesitate to contact our maps and data helpline on 01273 819700 or email maps&data@groundsure.com quoting the above GroundSure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
GroundSure Geology & Ground Stability Report

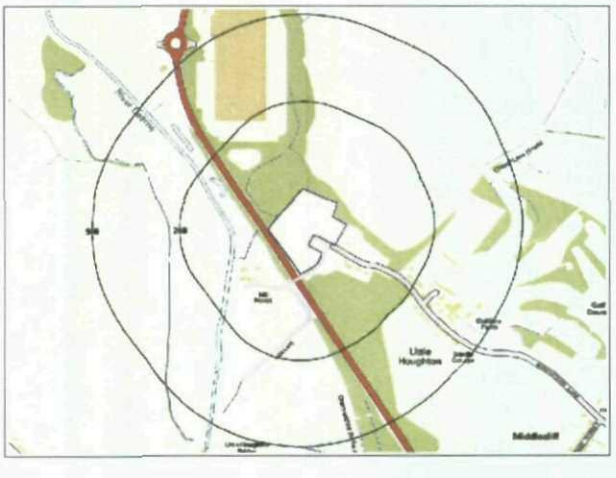
GroundSure Geology & Ground Stability Report

Address:

Date: Feb 20, 2008

GroundSure Reference: EMS-54491_67979

Your Reference: EMS_54491_67979



Aerial Photograph of Study Site

NW N NE



W E

SW S SE

Aerial photography supplied by Getmapping PLC.
© Copyright Getmapping PLC 2003. All Rights Reserved.

Site Name:
Grid Reference: 442121,405824

Overview of Findings

The GroundSure Geology and Ground Stability Report 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 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database 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.

Report Section	Number of records found within (X) m of the study site boundary
1. Geology	Description
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site? *	No
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground /Drift Geology present beneath the study site? *	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.3.4 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 1 and 3% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Resea rch Establishment?	No radon protective measures are necessary

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

Source:Scale 1:50,000 BGS Sheet No:087

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	6	16	22	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	4	6	0	0	0
2.3 Current Ground Workings	0	0	2	3	2

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	4	6	0	0	0
3.2 Coal Mining	1	0	0	0	0
3.3 Shallow Mining*	1	-	-	-	-
3.4 Non - Coal Mining Cavities	0	0	1	1	0
3.5 Natural Cavities	0	0	0	0	0
3.6 Brine Extraction	0	0	0	0	0
3.7 Gypsum Extraction	0	0	0	0	0
3.8 Tin Mining	0	0	0	0	0
3.9 Clay Mining	0	0	0	0	0

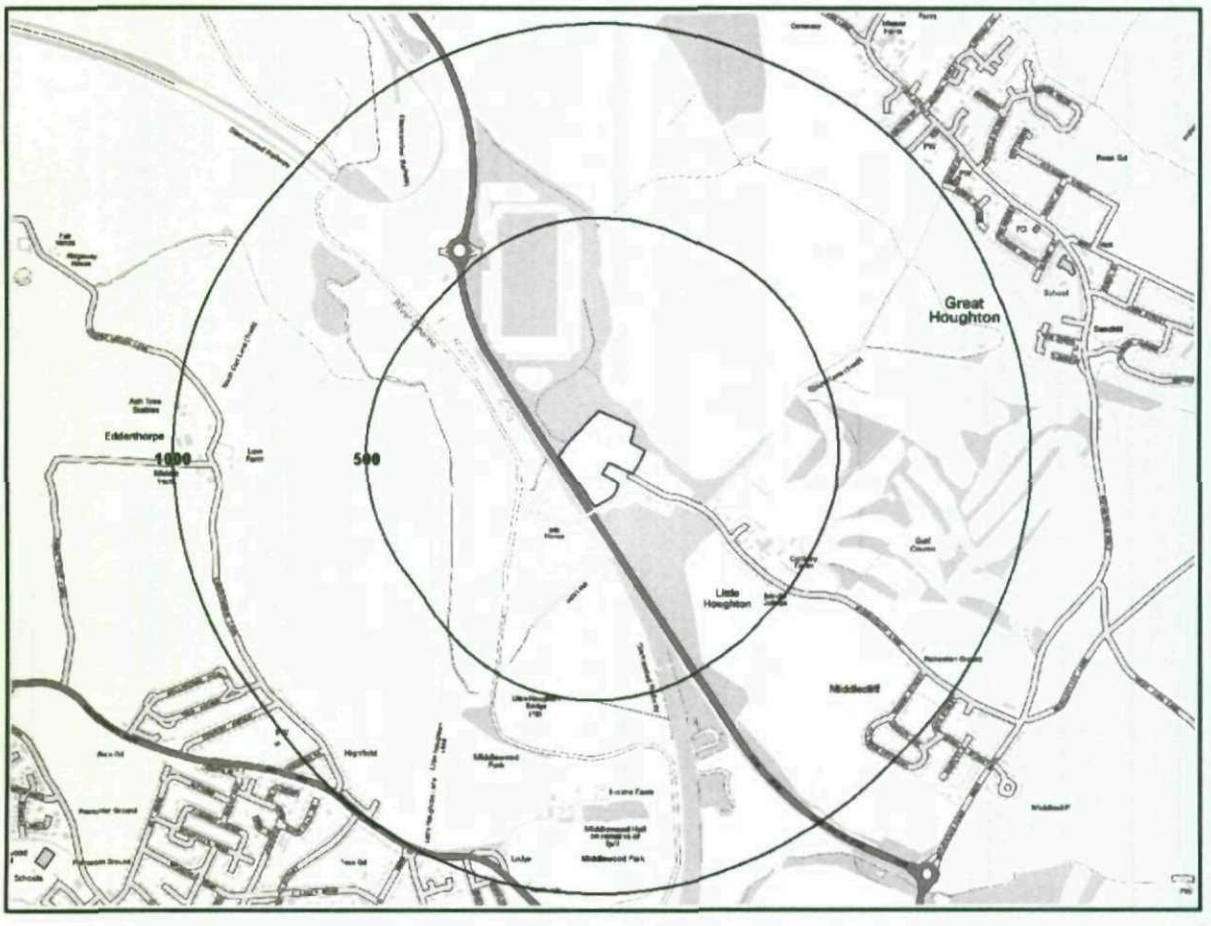
*This includes an automatically generated 150m buffer zone around the site

4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Very Low	-	-	-	-
4.2 Landslides	Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Negligible	-	-	-	-
4.4 Compressible Deposits	Moderate	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Low	-	-	-	-

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

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	2	5	9	-	-

1.1 Artificial Ground Map



Artificial Ground Legend

Mapping sourced from Ordnance Survey

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Site Outline

— 50 —

—250— Search Buffers

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

1.1 Artificial Ground

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

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary: **No**

Database searched and no data found.

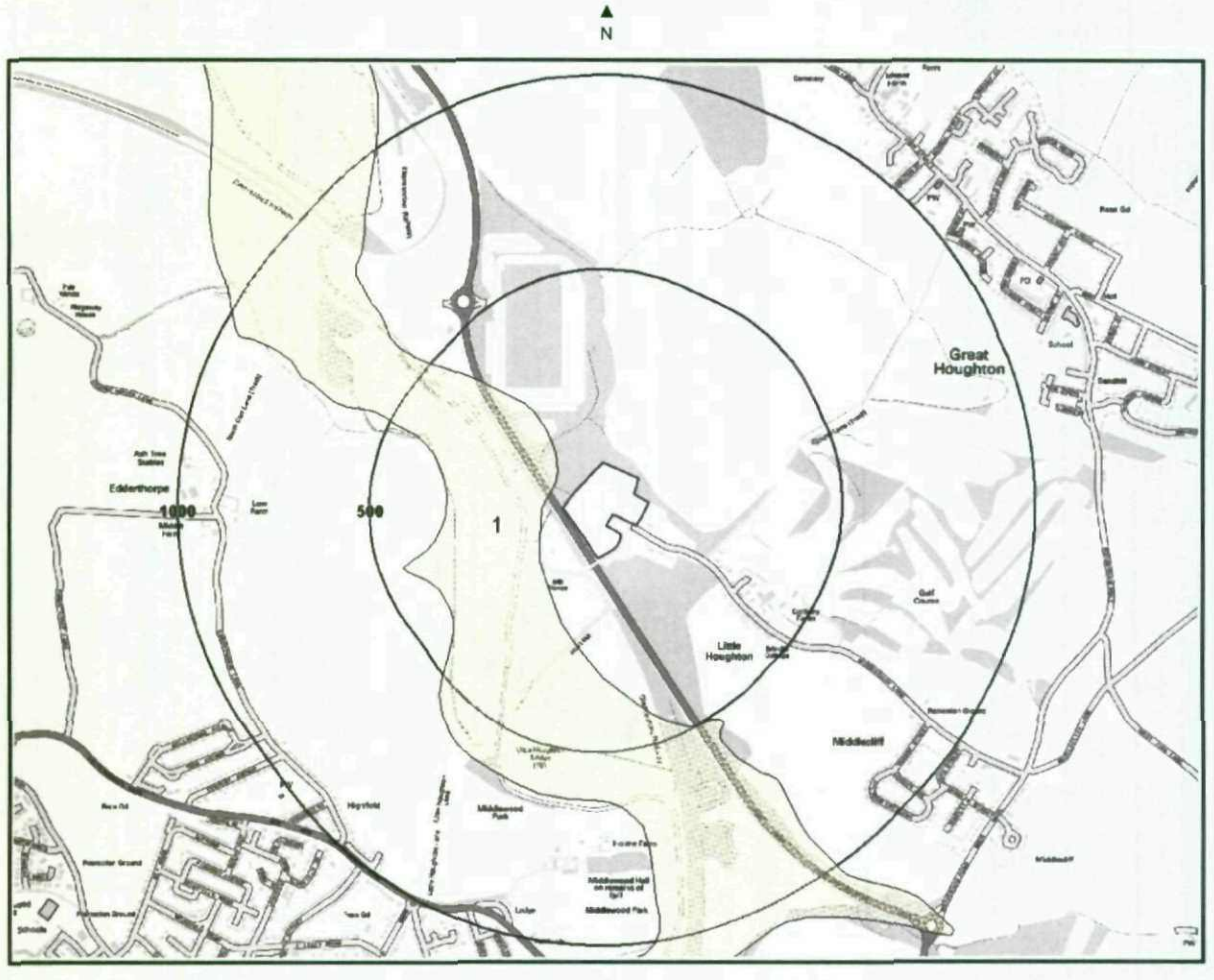
1.1.2 Permeability of Artificial Ground

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

Database searched and no data found.

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

1.2 Superficial Deposits and Landslips Map



Superficial and Landslips Legend

Mapping sourced from Ordnance Survey

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Site Outline

— 50 —

—250— Search Buffers

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

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

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

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	47.0	NW	ALV-CSSG	Alluvium	Clay, Silt, Sand And Gravel

1.2.2 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
47.0	NW	Intergranular	High	Very Low

1.2.3 Landslip

Database searched and no data found.

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

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 discreet 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.

1.2.4 Landslip Permeability

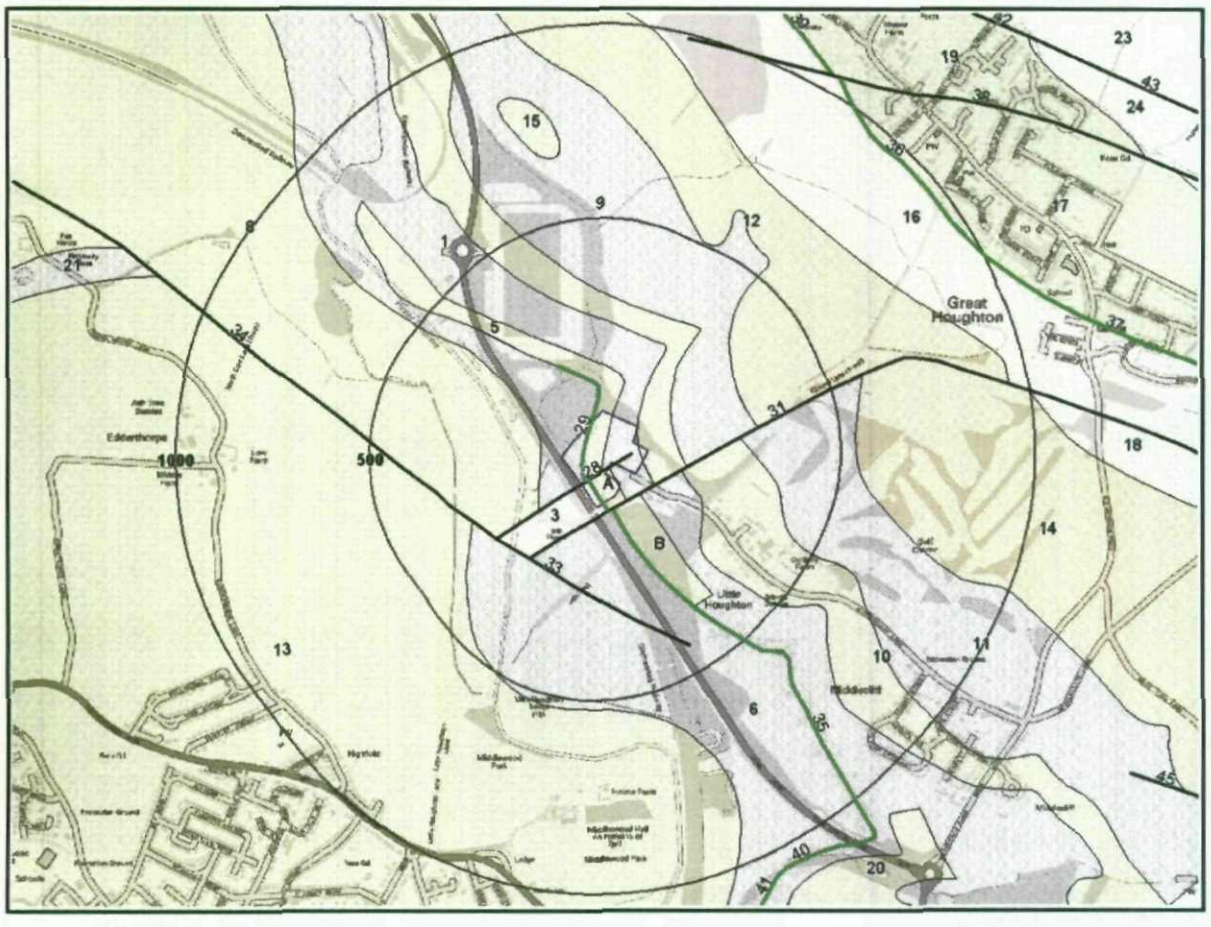
Are there any records relating to permeability of landslips within the study site* boundary: **No**

Database searched and no data found.

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

1.3 Bedrock and Faults Map

NW N NE



W E

SW S SE

Bedrock & Faults Deposits Legend

Mapping sourced from Ordnance Survey
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Site Outline

50

250 Search Buffers

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

1.3 Bedrock, Solid Geology & Faults

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

1.3.1 Bedrock/Solid Geology

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

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
2	0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
3	0.0	On Site	PUCM-MDSS	Pennine Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D / Bolsovian (westphalian C)
4A	0.0	On Site	AR-SDST	Ackworth Rock - Sandstone	Bolsovian (westphalian C)
5	0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
6	24.0	SE	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
7B	25.0	SE	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
8	53.0	W	MXR-SDST	Mexborough Rock - Sandstone	Bolsovian (westphalian C)
9	75.0	E	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
10	98.0	SE	PMCM-SDST	Pennine Middle Coal Measures Formation - Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
11	239.0	E	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian (westphalian C) / Duckmantian (westphalian B)
12	274.0	E	AR-SDST	Ackworth Rock - Sandstone	Bolsovian (westphalian C)
13	285.0	SW	MXR-SDST	Mexborough Rock - Sandstone	Bolsovian (westphalian C)

1.3.2 Permeability of Bedrock Ground

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

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Moderate	Low
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
25.0	SE	Fracture	High	Moderate

1.3.3 Faults

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

ID	Distance (m)	Direction	Category Description	Feature Description
28	0.0	On Site	FAULT	Normal fault, observed
29	0.0	On Site	ROCK	Coal seam, observed
30A	0.0	On Site	ROCK	Coal seam, observed
31	24.0	SE	FAULT	Normal fault, observed

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

32B	25.0	SE	ROCK	Coal seam, observed
33	206.0	SW	FAULT	Normal fault, inferred
34	339.0	W	FAULT	Normal fault, observed
35	351.0	SE	ROCK	Coal seam, inferred

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

This Geology shows the main components as discreet 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.

1.3.4 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?

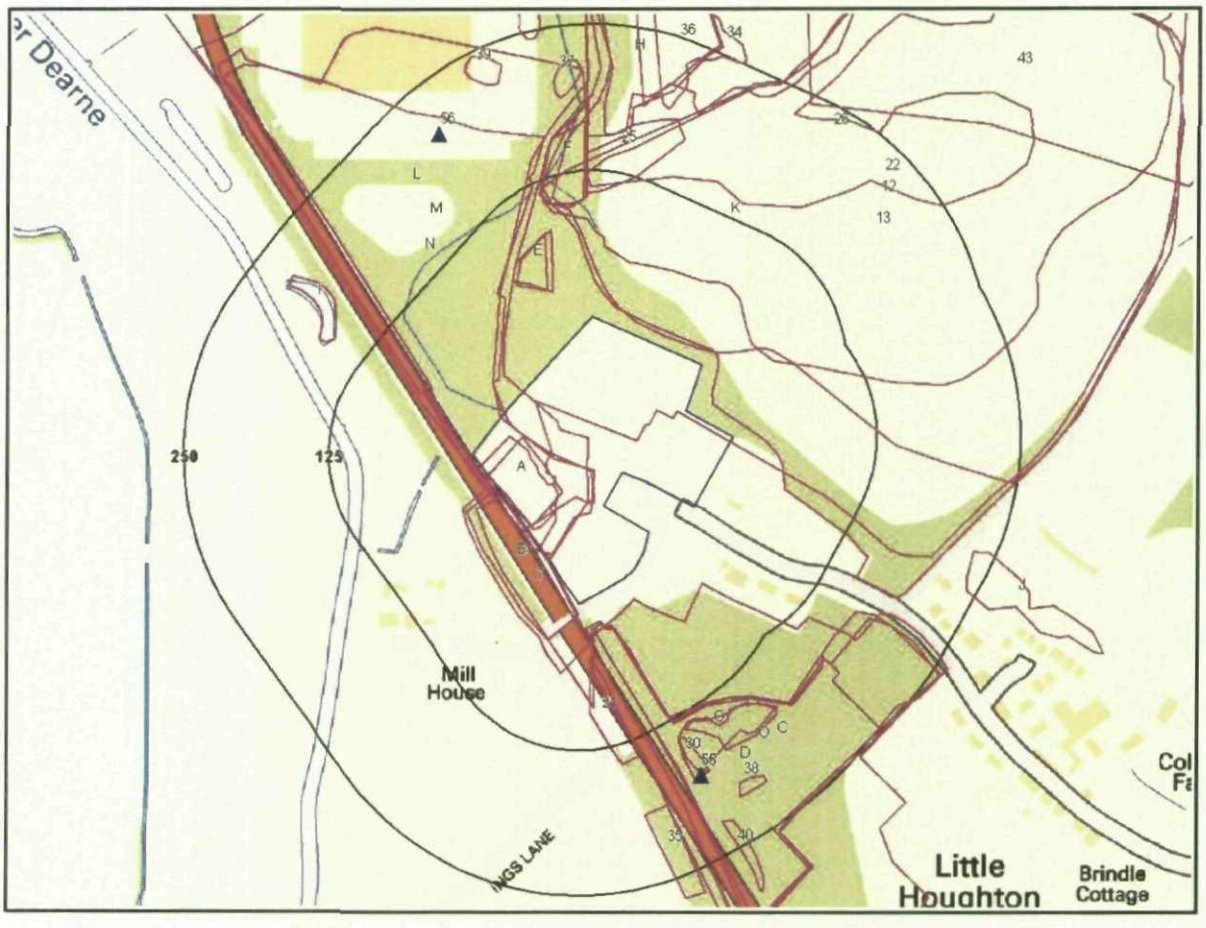
The property is in a radon Affected Area, as between 1 and 3% of properties are above the Action Level

1.3.5 Radon Protection

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

No radon protective measures are necessary

2 Ground Workings Map



Ground Workings Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m) — 250 — 500
- Historic Surface Ground Workings
- Historic Underground Workings
- Current Ground Workings

2 Ground Workings

2.1 Historical Surface Ground Working Features derived from the 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**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1L	0.0	On Site	441891,406018	Colliery	1948
2M	0.0	On Site	441947,405970	Colliery	1904
3N	0.0	On Site	441955,405941	Colliery	1890
4A	0.0	On Site	442050,405796	Cuttings	1951
5K	0.0	On Site	442198,406079	Colliery	1951
6A	0.0	On Site	442057,405797	Cuttings	1967
7	1.0	SW	442057,405712	Cuttings	1890
8B	1.0	SW	442054,405726	Cuttings	1951
9B	1.0	SW	442054,405726	Cuttings	1967
10B	4.0	SW	442057,405712	Cuttings	1904
11B	5.0	SW	442057,405712	Cuttings	1948
12	10.0	NE	442351,406095	Refuse Heap	1967
13	14.0	NE	442345,406044	Refuse Heap	1981
14C	20.0	SE	442310,405405	Colliery	1988
15C	20.0	SE	442310,405405	Colliery	1981
16D	21.0	SE	442253,405445	Colliery	1951
17O	22.0	SE	442266,405496	Colliery	1904
18D	23.0	SE	442266,405442	Colliery	1938
19E	39.0	NW	442064,405987	Sewage Works	1948
20E	44.0	NW	442060,405986	Sewage Works	1904
21	46.0	S	442135,405601	Cuttings	1890
22	46.0	E	442344,406092	Refuse Heap	1951
23F	95.0	N	442091,406076	Refuse Heap	1948
24F	98.0	N	442091,406071	Refuse Heap	1904
25	106.0	N	442151,406076	Refuse Heap	1904
26	112.0	N	442328,406168	Refuse Heap	1938
27G	134.0	SE	442232,405579	Refuse Heap	1951
28G	135.0	SE	442236,405588	Refuse Heap	1938
29H	140.0	N	442166,406190	Refuse Heap	1938
30	142.0	SE	442204,405561	Refuse Heap	1938
31H	155.0	N	442162,406199	Refuse Heap	1951
32I	156.0	NW	441884,405945	Pond	1988
33I	156.0	NW	441884,405945	Pond	1981
34	186.0	N	442249,406197	Ponds	1967
35	189.0	SE	442188,405480	Cuttings	1890
36	189.0	N	442205,406189	Pond	1981
37	190.0	N	442091,406142	Pond	1988
38	202.0	SE	442255,405536	Refuse Heap	1938
39	216.0	NW	442018,406149	Unspecified Pit	1904
40	223.0	SE	442253,405476	Unspecified Ground Workings	1938
41J	231.0	SE	442473,405693	Unspecified Heaps	1967
42J	231.0	SE	442473,405693	Unspecified Heaps	1981
43	242.0	NE	442443,406409	Refuse Heap	1988
44	243.0	N	442057,406193	Pond	1988

2.2 Historical Underground Workings Features derived from the 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
45K	0.0	On Site	442198,406079	Colliery	1951
46L	0.0	On Site	441891,406018	Colliery	1948
47M	0.0	On Site	441947,405970	Colliery	1904
48N	0.0	On Site	441955,405941	Colliery	1890
49C	20.0	SE	442310,405405	Unspecified Mine	1967
50C	20.0	SE	442310,405405	Colliery	1988
51C	20.0	SE	442310,405405	Colliery	1981
52D	21.0	SE	442253,405445	Colliery	1951
53D	22.0	SE	442266,405496	Colliery	1904
54D	23.0	SE	442266,405442	Colliery	1938

2.3 Current Ground Workings

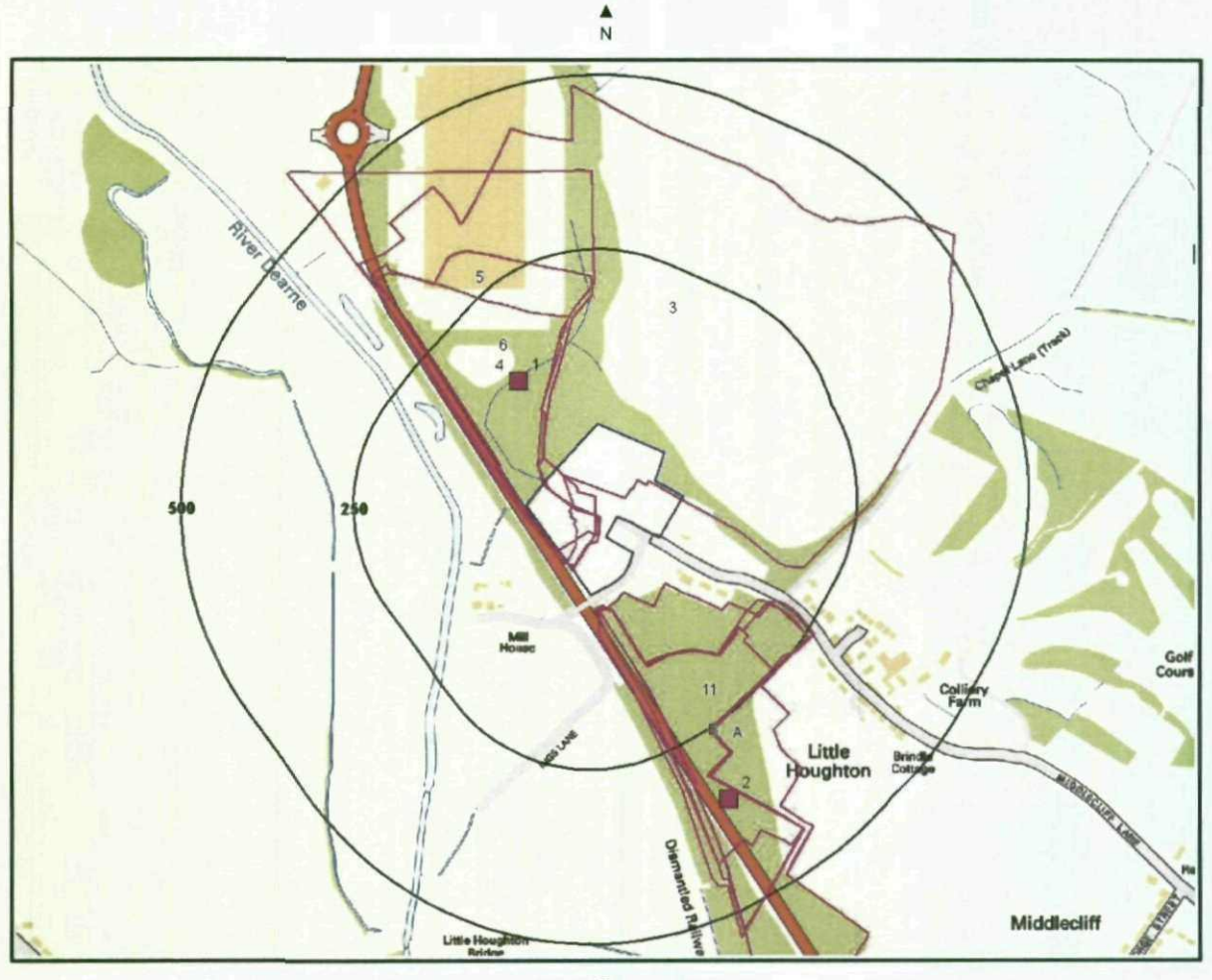
This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

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 Society:

ID	Distance (m)	Direction	NGR	Use	Date Updated
55	180.0	SE	442210.0,405545.0	Coal, Deep	16-Jul-2007
56	206.0	NW	441980.0,406095.0	Coal, Deep	16-Jul-2007
Not shown	307.0	S	442200.0,405400.0	Coal, Opencast	16-Jul-2007
Not shown	338.0	NW	441900.0,406200.0	Coal, Opencast	16-Jul-2007
Not shown	406.0	SE	442400.0,405400.0	Coal, Opencast	16-Jul-2007
Not shown	572.0	N	442000.0,406500.0	Coal, Opencast	16-Jul-2007
Not shown	848.0	SE	442600.0,405000.0	Coal, Opencast	16-Jul-2007

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction & Natural Cavities Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m) — 250 — 500
- Historical Mining
- Non-Coal Mining Cavities
- Natural Cavities

3 Mining, Extraction & Natural Cavities

3.1 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
3	0.0	On Site	442198,406079	Colliery	1951
4	0.0	On Site	441955,405941	Colliery	1890
5	0.0	On Site	441891,406018	Colliery	1948
6	0.0	On Site	441947,405970	Colliery	1904
7A	20.0	SE	442310,405405	Colliery	1988
8A	20.0	SE	442310,405405	Colliery	1981
9A	20.0	SE	442310,405405	Unspecified Mine	1967
10B	21.0	SE	442253,405445	Colliery	1951
11	22.0	SE	442266,405496	Colliery	1904
12B	23.0	SE	442266,405442	Colliery	1938

3.2 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.

3.3 Shallow Mining

This dataset refers to the (largely very old) extraction of mineral deposits by means of near surface underground workings.

What is the maximum hazard rating of subsidence relating to shallow mining within the study site* boundary? **Low - Moderate**

*This includes an automatically generated 150m buffer zone around the study site boundary

The following Shallow Mining information provided by the British Geological Survey is not represented on Mapping:

Distance (m)	Direction	Hazard Rating	Details
0.0	On Site	Low - Moderate	Where low-moderate potential is indicated, this means that the rocks underlying the area are of a type known to have been mined at shallow depth in some parts of the UK, and that such working may be possible in your area. In these cases it is recommended that you seek further advice from a Royal Institute Chartered Surveyor (RICS), the local Building Control Officer, or by ordering a Geological Report from the BGS. It is also recommended that you obtain a Coal Authority mining search, which will provide a comprehensive search of former mining activity, including coal mining at deeper levels.
42.0	W	Low - Moderate	Where low-moderate potential is indicated, this means that the rocks underlying the area are of a type known to have been mined at shallow depth in some parts of the UK, and that such working may be possible in your area. In these cases it is recommended that you seek further advice from a Royal Institute Chartered Surveyor (RICS), the local Building Control Officer, or by ordering a Geological Report from the BGS. It is also recommended that you obtain a Coal Authority mining search, which will provide a comprehensive search of former mining activity, including coal mining at deeper levels.

3.4 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA)/DEFRA 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 Association:

ID	Distance (m)	Direction	NGR	Address	Superficial Deposits	Bedrock Deposits	Extracted Mineral
1	125.0	NW	442000,406000	Houghton Main	-	-	Anthracite, Coal, Culm, Jet, Lignite
2	351.0	SE	442300,405400	Dearne Valley	-	-	Anthracite, Coal, Culm, Jet, Lignite

3.5 Natural Cavities

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

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

Database searched and no data found.

3.6 Brine Extraction

This dataset provides information from the Brine compensation board which has been discontinued and is now covered by the Coal Authority.

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

Database searched and no data found.

3.7 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.

3.8 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records.

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

Database searched and no data found.

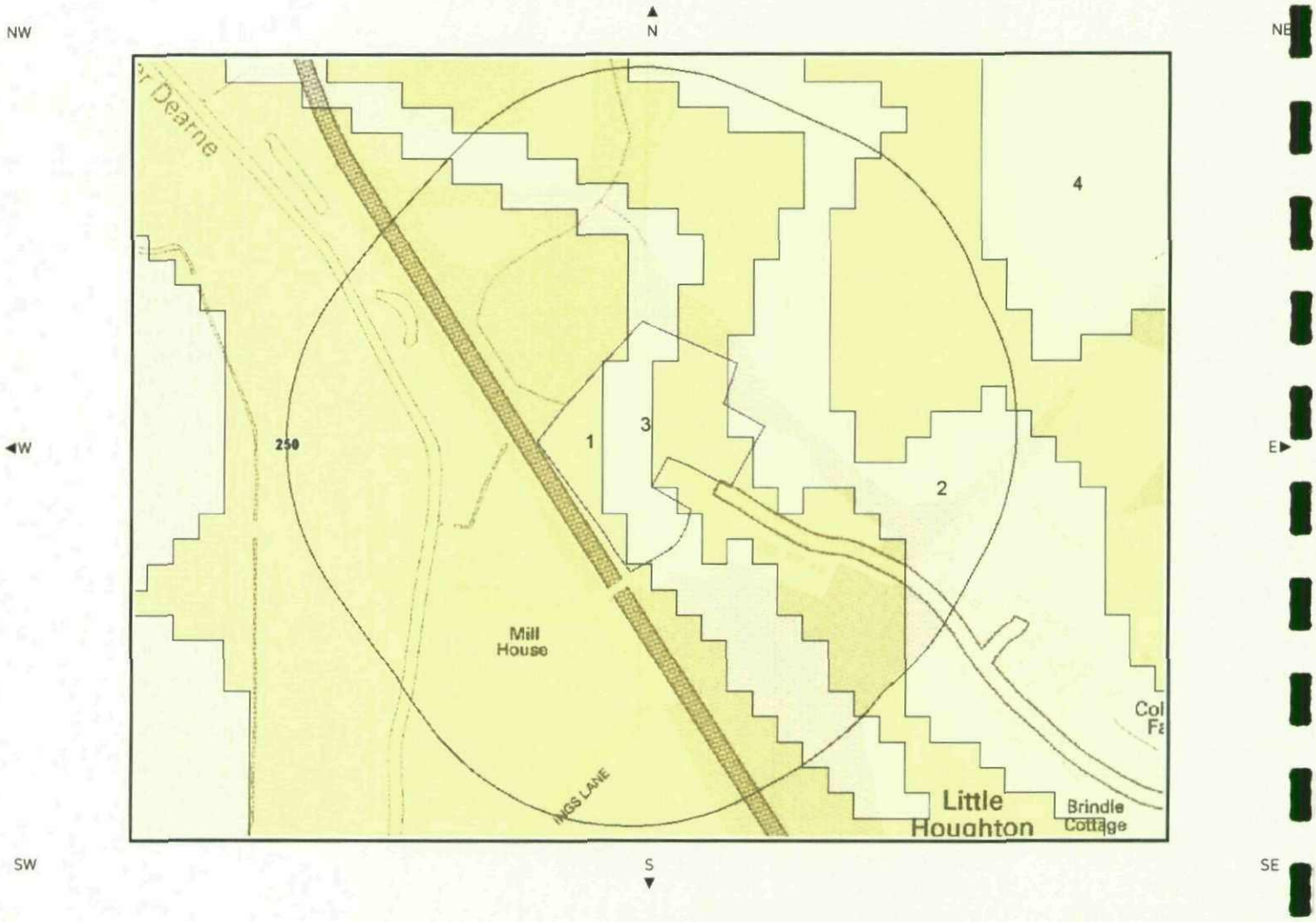
3.9 Clay Mining

This dataset provides information on Kalin 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.

4 Natural Ground Subsidence
4.1 Shrink-Swell Clay Map



Shrink-Swell Clay Legend

Mapping sourced from Ordnance Survey

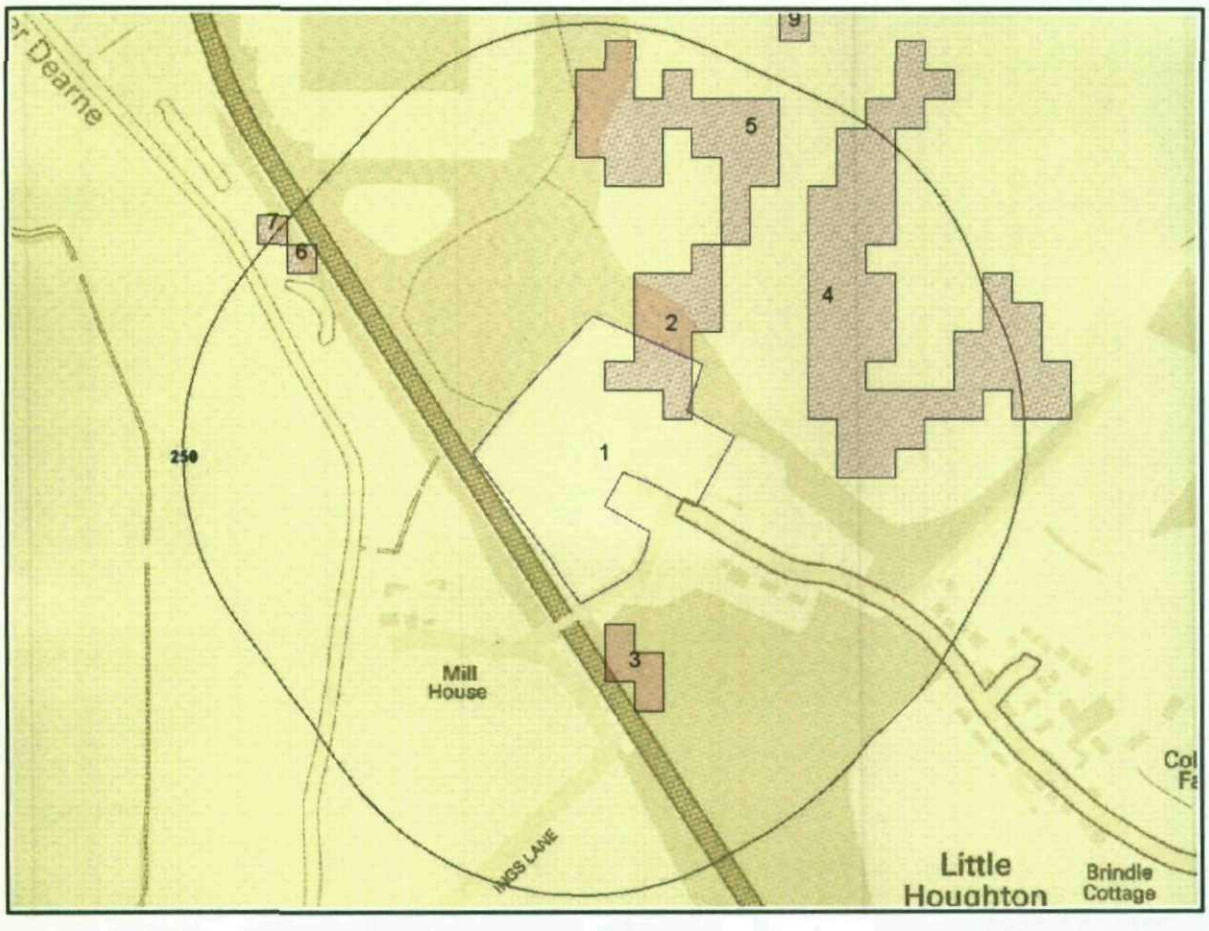
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Site Outline

250
500
Search Buffers (m)

No Data / Null
Negligible
Very Low
Low
Moderate
High

4.2 Landslides Map



Landslides Legend

Mapping sourced from Ordnance Survey
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Site Outline

Search Buffers (m)

No Data / Null

Negligible

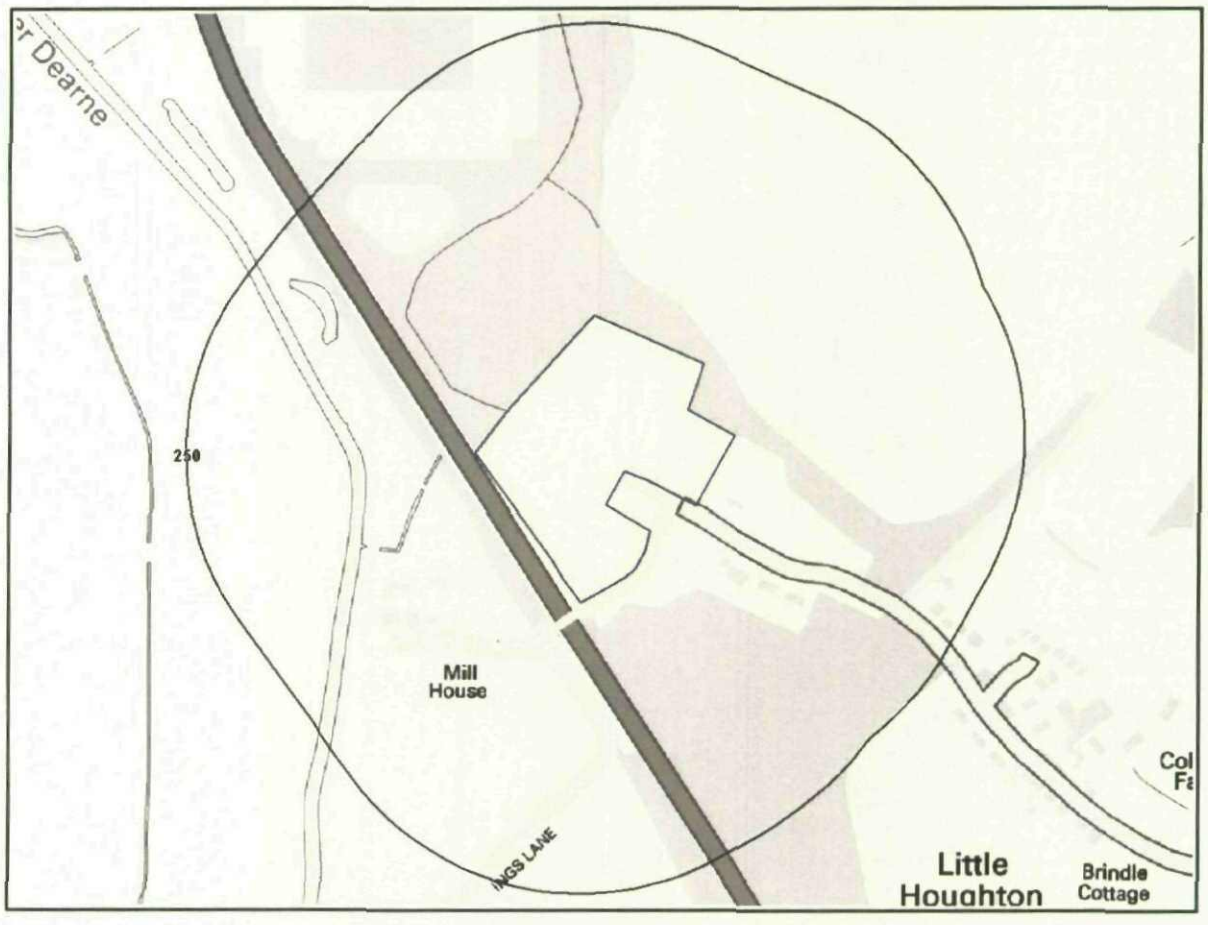
Very Low

Low

Moderate

High

4.3 Ground Dissolution Soluble Rocks Map



Ground Dissolution Soluble Rocks Legend

Mapping sourced from Ordnance Survey

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Site Outline

Search Buffers (m)

No Data / Null

Negligible

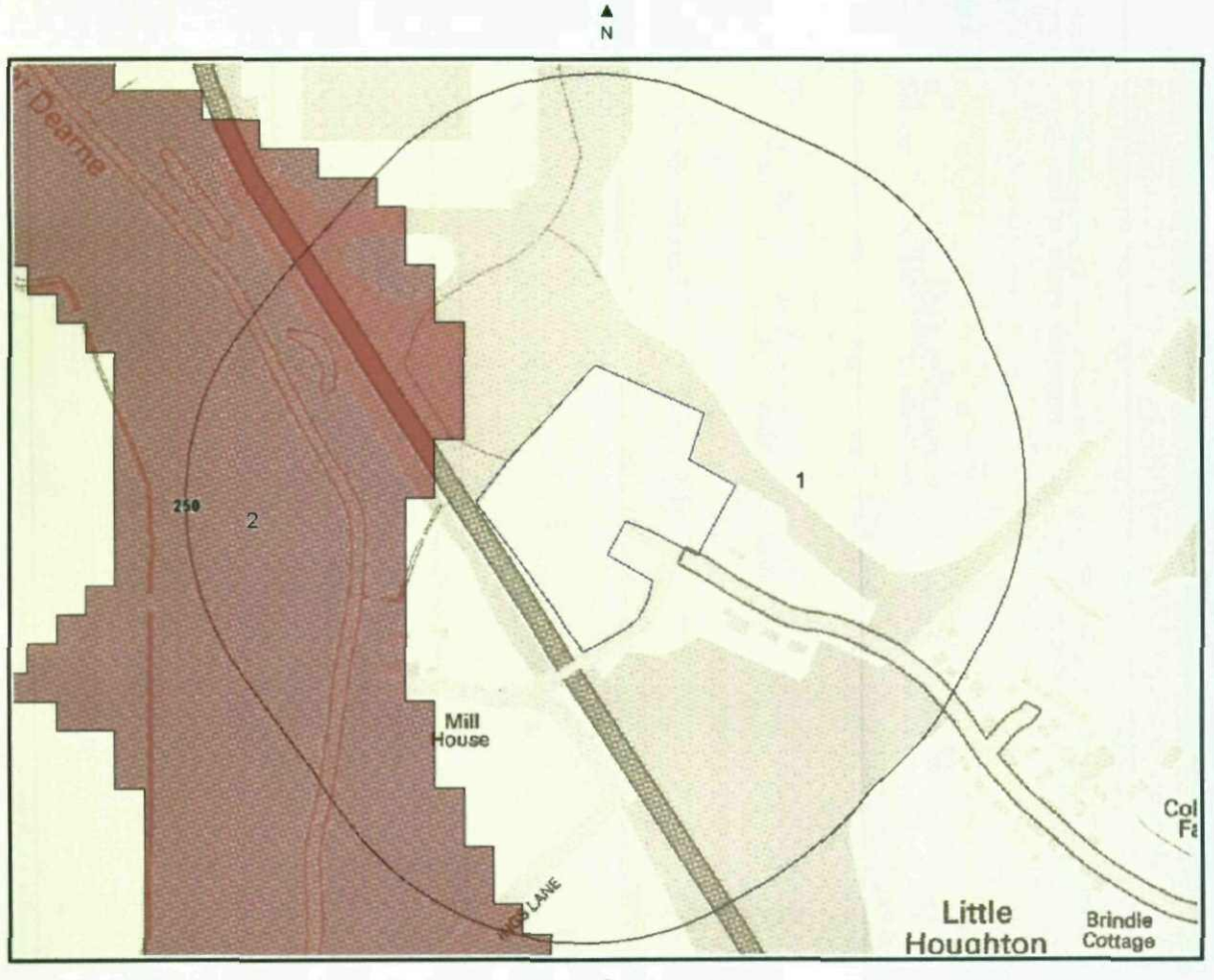
Very Low

Low

Moderate

High

4.4 Compressible Deposits Map



Compressible Deposits Legend

Mapping sourced from Ordnance Survey
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Site Outline

Search Buffers (m)

No Data / Null

Negligible

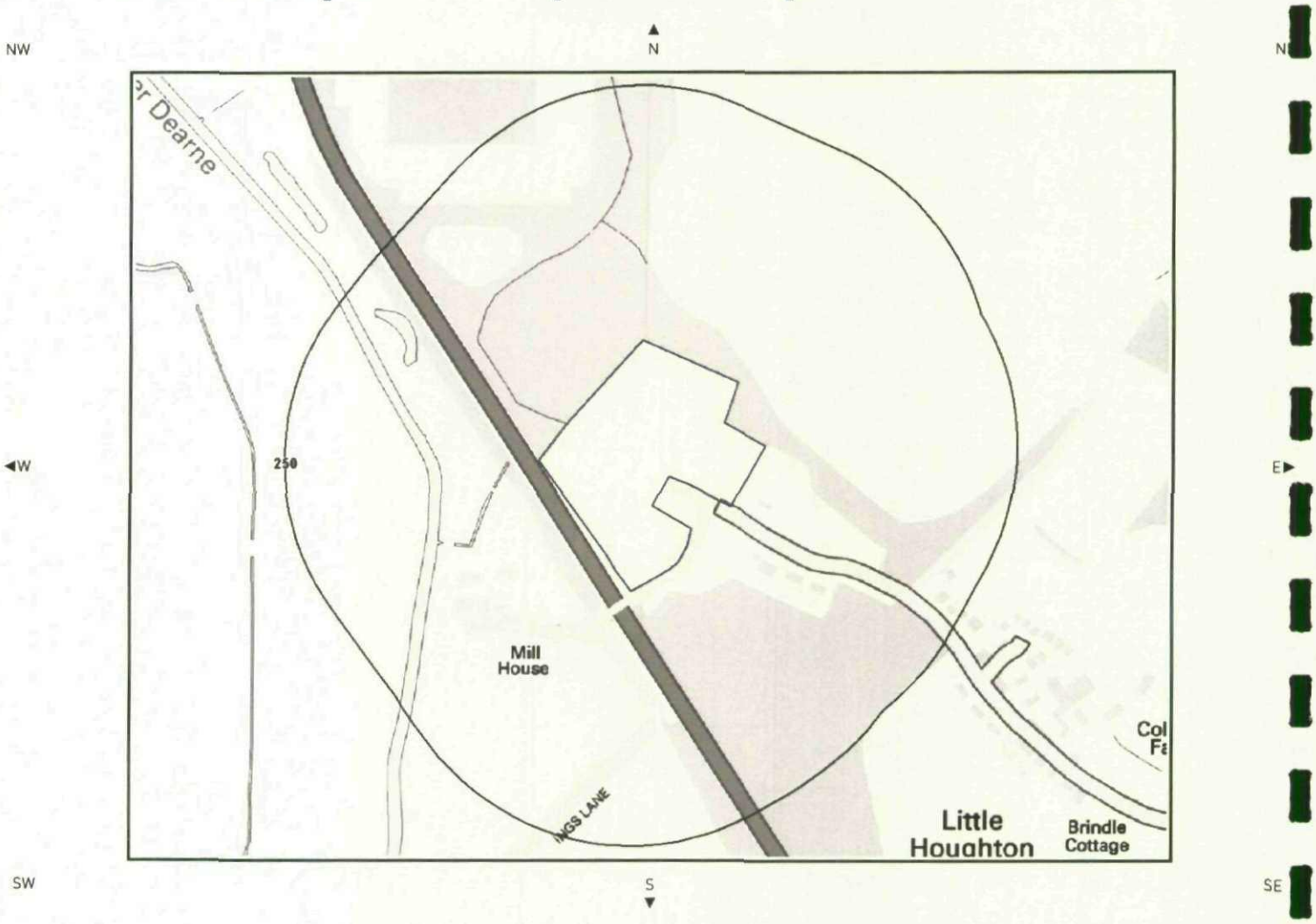
Very Low

Low

Moderate

High

4.5 Collapsible Deposits Map



Collapsible Deposits Legend

Mapping sourced from Ordnance Survey

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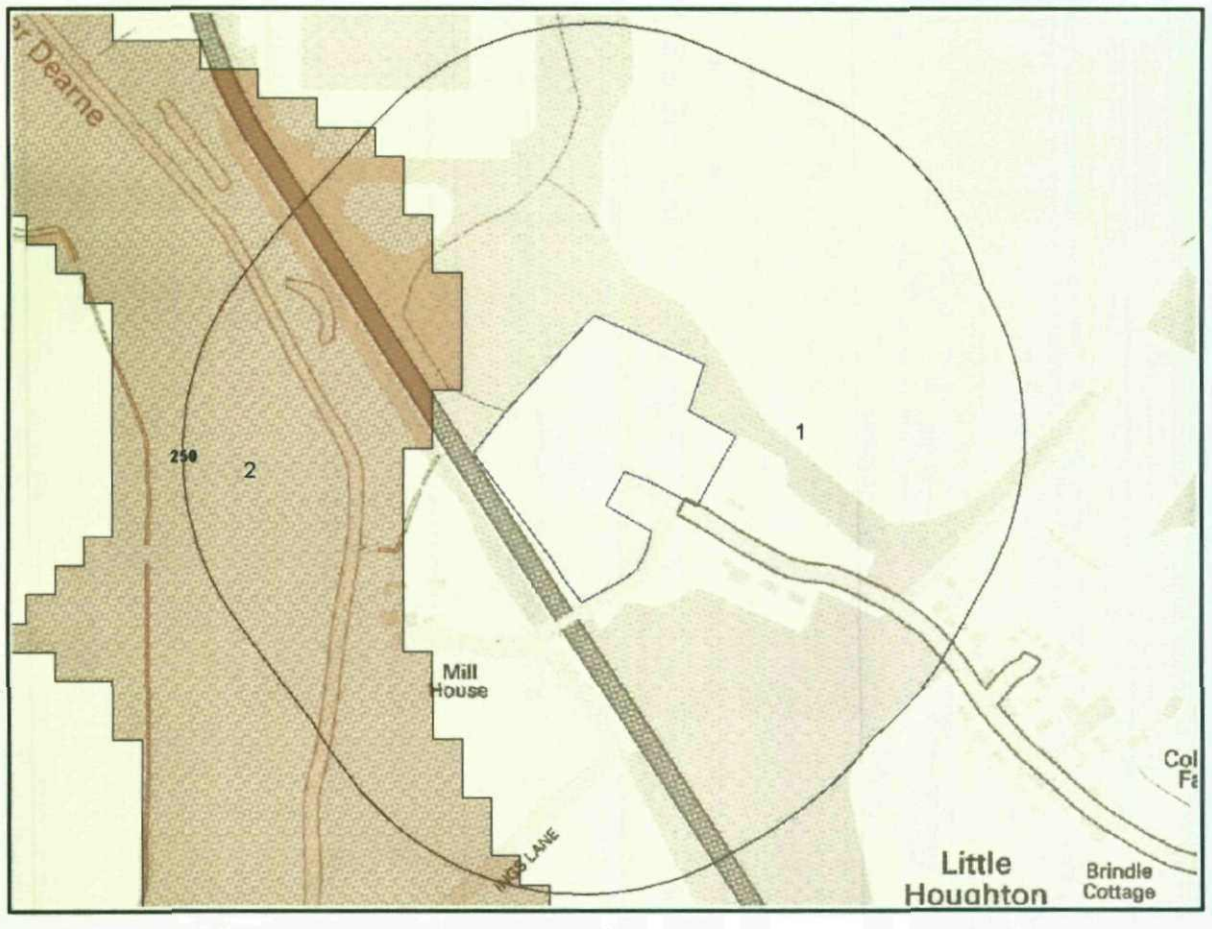
Site Outline

Search Buffers (m)

No Data / Null

Significant

4.6 Running Sand Map



Running Sand Legend

Mapping sourced from Ordnance Survey
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Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

High

4. 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? **Moderate**

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

4.1 Shrink - Swell Clays

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

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

4.2 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	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.
3	25.0	SE	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.

4.3 Ground Dissolution of Soluble Rocks

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

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-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.

4.4 Compressible Deposits

The following Compressible Ground 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	36.0	W	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property -possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

4.5 Collapsible Deposits

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

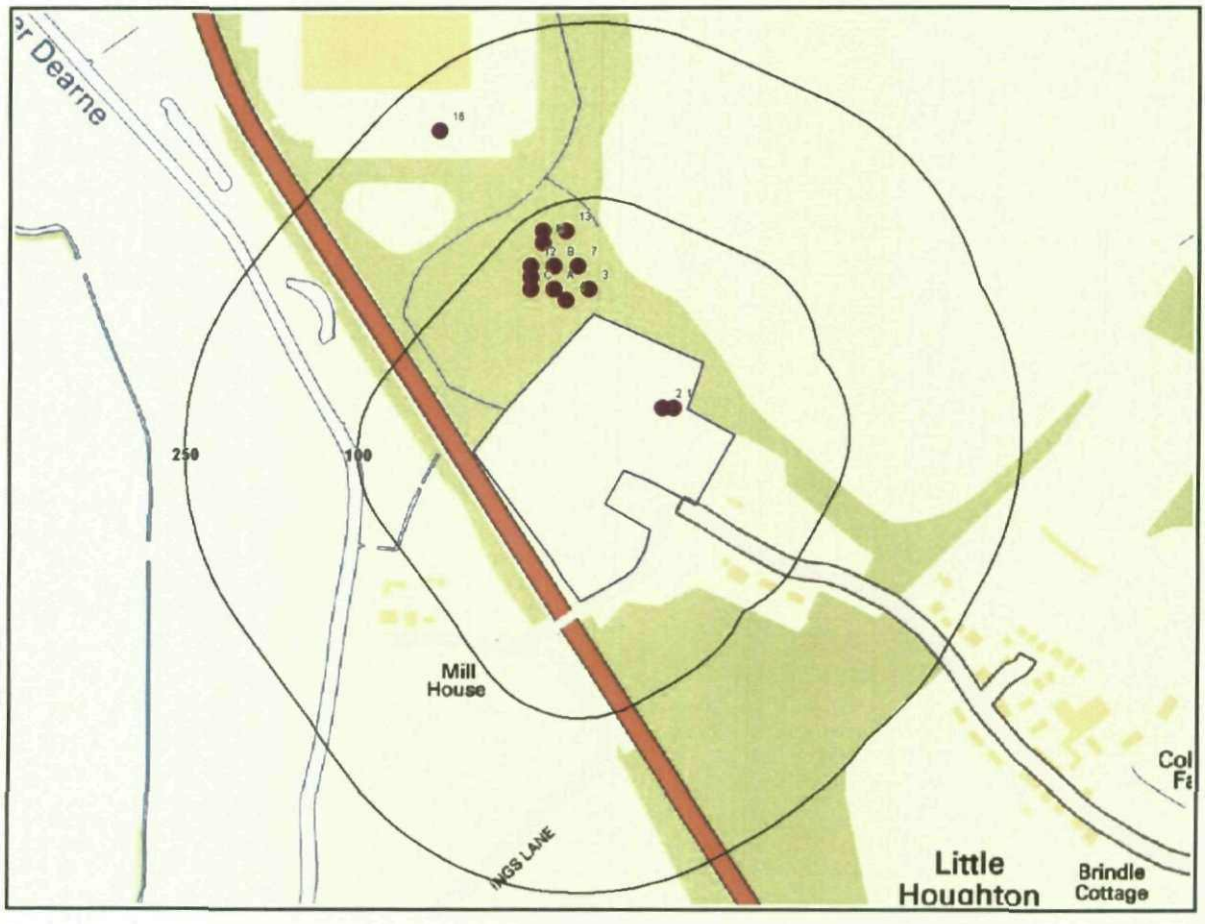
Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.

4.6 Running Sands

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

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	36.0	W	Low	Possibility of running sand problems after major changes in ground conditions. Normal maintenance to avoid leakage of water-bearing services or water bodies (ponds, swimming pools) should reduce likelihood of problems due to running sand. For new build - consider possibility of running sand into trenches or excavations if water table is high or sandy strata are exposed to water. Avoid concentrated water inputs to site. Unlikely to be an increase in construction costs due to potential for running sand. For existing property - no significant increase in insurance risk due to running sand problems is likely.

5. Borehole Records Map



Borehole Records Legend

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Site Outline

Search Buffers (m)

Borehole Locations

5. 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: **16**

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	0.0	On Site	442183,405858	SE40NW27	32.92	HICKLETON MAIN NO.14 UBH
2	0.0	On Site	442174,405858	SE40NW26	80.47	HICKLETON MAIN NO.13 UBH
3	21.0	N	442110,405960	SE40NW337	19.0	HOUGHTON MAON COLL BH3
4	25.0	NW	442090,405950	SE40NW338	8.0	HOUGHTON MAON COLL BH4
5A	39.0	NW	442080,405960	SE40NW345	13.0	HOUGHTON MAON COLL BH10
6A	39.0	NW	442080,405960	SE40NW347	7.0	HOUGHTON MAON COLL BH11A
7	43.0	N	442100,405980	SE40NW336	8.0	HOUGHTON MAON COLL BH2
8B	53.0	NW	442080,405980	SE40NW339	7.0	HOUGHTON MAON COLL BH5
9B	53.0	NW	442080,405980	SE40NW346	9.0	HOUGHTON MAON COLL BH11
10C	54.0	NW	442060,405960	SE40NW344	4.0	HOUGHTON MAON COLL BH9
11C	61.0	NW	442060,405970	SE40NW343	7.0	HOUGHTON MAON COLL BH8A
12	68.0	NW	442060,405980	SE40NW342	13.0	HOUGHTON MAON COLL BH8
13	75.0	N	442090,406010	SE40NW335	7.0	HOUGHTON MAON COLL BH1
14D	75.0	NW	442070,406000	SE40NW340	8.0	HOUGHTON MAON COLL BH6
15D	84.0	NW	442070,406010	SE40NW341	15.0	HOUGHTON MAON COLL BH7
16	206.0	NW	441981,406096	SE40NW17	28.96	HOUGHTON MAIN COLLIERY 3

Contacts

GroundSure Helpline
Telephone: 01273 819700
maps&data@groundsure.com

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Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143 www.bgs.ac.uk

British Gypsum
British Gypsum Ltd, East Leake, Loughborough, Leicestershire, LE12 6HX
Tel: www.british-gypsum.bpb.com

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5 www.coal-authority.co.uk

Ordnance Survey
Romsey Road, Southampton SO16 4GU
Tel: 08456 050505

Getmapping PLC
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Hampshire RG27 8NW
Tel: 01252 845444

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Acknowledgements

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EmapSite
Masdar House, 1 Reading Road,
Hants, RG27 0RP

GroundSure Reference:	EMS-54491_67980
Your Reference:	EMS_54491_67980
Report Date:	Feb 20, 2008
Report Delivery Method:	**xml**
Client Email:	john@emapsite.com

GroundSure Environmental Data Report

Address:

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Environmental Data Report** as requested.

If you need any further assistance, please do not hesitate to contact our maps and data helpline on 01273 819700 or email maps&data@groundsure.com quoting the above GroundSure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
GroundSure Environmental Data Report

GroundSure Environmental Data Report

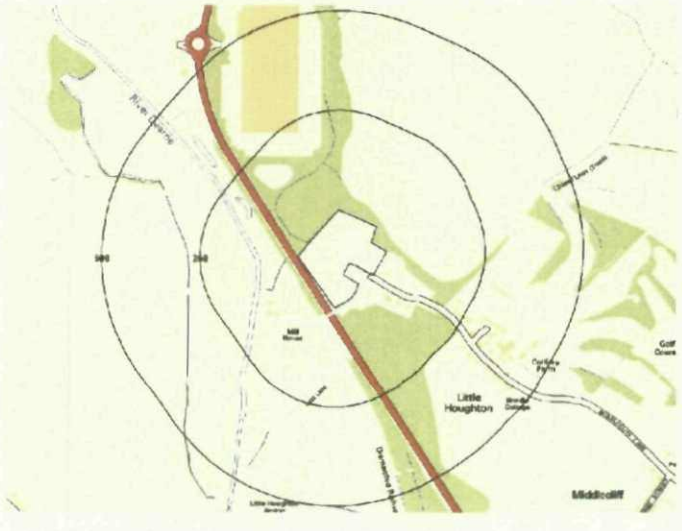
Address:

Date: Feb 20, 2008

GroundSure Reference: EMS-54491_67980

Your Reference: EMS_54491_67980

Client: EmapSite

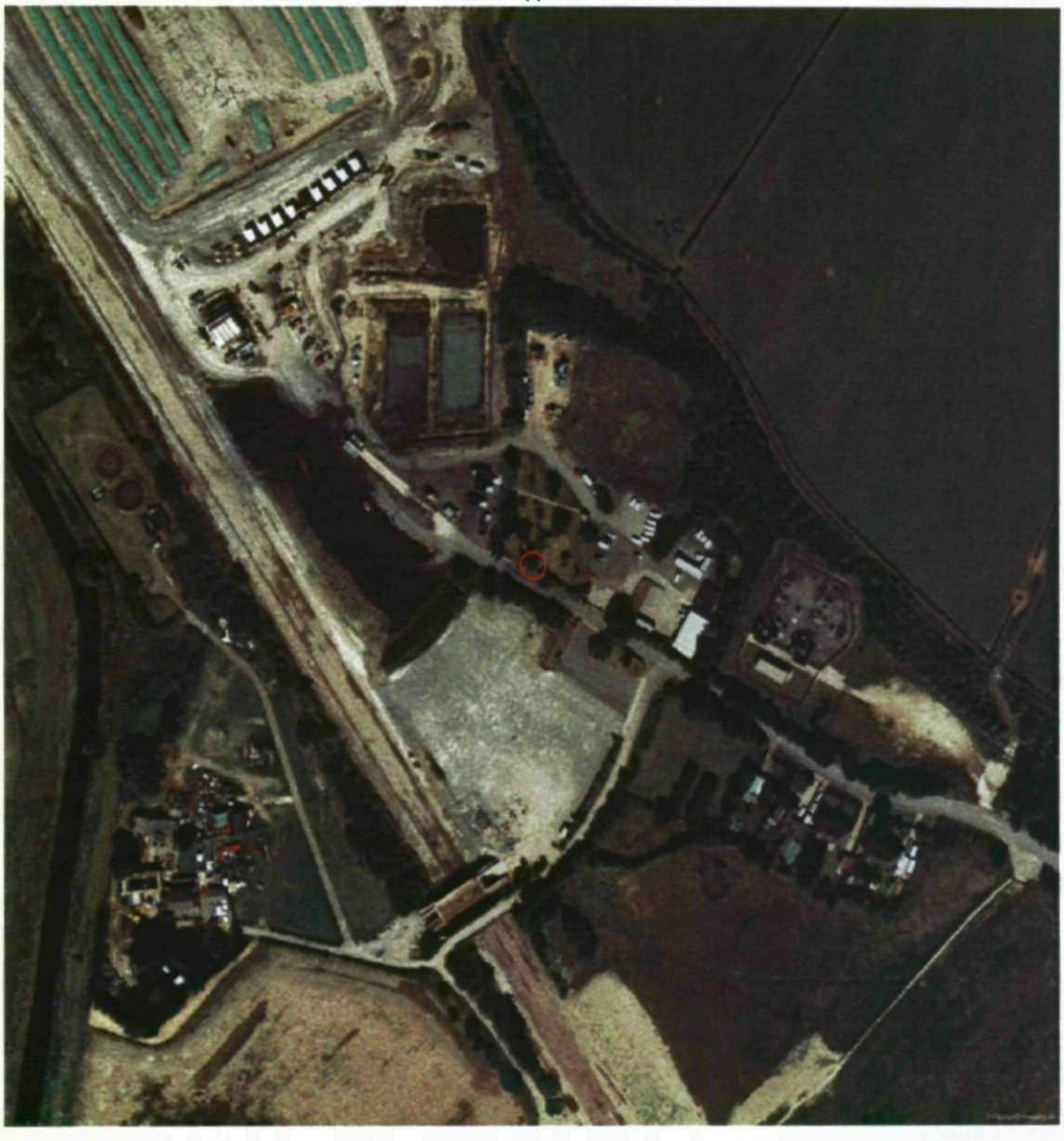


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If you would like any further assistance regarding this report then please contact
GroundSure on (T) 01273 819700, (F) 01273 377902, email: maps&data@groundsure.com

Aerial Photograph of Study Site

NW N NE



◄W E►

SW S SE

Aerial photography supplied by Getmapping PLC.
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Site Name:
Grid Reference: 442121,405824

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.

Report Section	Number of records found within (X) m of the study site boundary					
1. Authorisations, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Licenses and/or Authorisations						
Records of IPC Authorisations	0	0	0	0	0	-
Records of IPPC Authorisations	0	0	0	0	0	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	5	0	0	-	-
Records of LAPPC (LAPC) Authorisations	0	0	0	2	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0	-	-
Records of Licensed Discharge Consents	0	0	2	0	-	-
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	0	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0	0	0	-	-

2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered landfill Sites	0	0	0	0	0	0
Landfill Data - Operational Landfill Sites	0	0	0	0	0	0
Environment Agency Historic Landfill Sites	0	0	0	0	0	1
Landfill Data - Non-Operational Landfill Sites	0	0	0	0	0	0
BGS/DoE Landfill Site Survey	0	0	0	0	0	1
GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency (REGIS) Waste Sites	0	0	0	0	0	0

3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	1	3	3	4	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	0	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	2	-	-

4. Geology

	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	None
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	

Source: Scale: 1:50,000 BGS Sheet 087

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

5. Hydrogeology and Hydrology

	on-site	0-50	51-250	251-500	501-1000	1001-2000*
5.1 Environment Agency Groundwater Vulnerability and Soil Classification						
Minor Aquifer (within 200m)	Yes	Yes	No	-	-	-
Major Aquifer (within 200m)	No	No	No	-	-	-
Soil Classification (within 200m)	Yes	Yes	No	-	-	-
5.2 Groundwater Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.3 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	0	-
5.4 Source Protection Zones						
Source Protection Zones within 500m of the study site.	0	0	0	0	-	-
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.6 River Quality						
Is there any Environment Agency information on river quality within 500m of the study site?	Yes	No	Yes	No	-	-
5.7 Main Rivers						
Main Rivers within 500m of the study site.	0	0	1	0	-	-

6. Flooding

6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Areas benefiting from Flood Defences within 250m of the study site?	No
6.4 Are there any Areas used for Flood Storage within 250m of the study site?	Yes
6.5 What is the maximum BGS groundwater flooding susceptibility within 50m of the study site?	Moderate
6.6 What is the BGS confidence rating for the groundwater flooding susceptibility areas?	Moderately High

7. Ecological Designated Sites

	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI):	0	0	0	0	0	-
7.2 Records of National Nature Reserves (NNR) :	0	0	0	0	0	-
7.3 Records of Local Nature Reserves (LNR):	0	0	0	0	0	-
7.4 Records of Special Areas of Conservation (SAC):	0	0	0	0	0	-
7.5 Records of Special Protection Areas (SPA):	0	0	0	0	0	-
7.6 Records of Ramsar sites:	0	0	0	0	0	-
7.7 Records of World Heritage Sites:	0	0	0	0	0	-

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate

9. Mining

9.1 Are there any coal mining areas within 75m of the study site?	Yes
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Low-Moderate

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. Authorisations, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by the Environment Agency, and sites determined as Contaminated Land. This search is conducted using radii up to 1000m.

2. 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.

3. Current Land Uses

Provides information on artificial andsuperficial deposits and bedrock beneath the study site. These searches are conducted onsiteand includes a 50m buffer zone.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site. These searches are conducted using radii of up to 250m and includes a 50m buffer zone.

5. Hydrogeology and Hydrology

Provides information on groundwater vulnerability, soil leaching potential, abstraction licenses, Source Protection Zones (SPZ) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

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

7. Ecological Designated 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) and World Heritage Sites. These searches are conducted using radii of up to 1000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These searches are conducted using radii of up to 75m.

9. Mining

Provides information on areas of coal and shallow mining. These searches are conducted using radii of up to 150m.

10. 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 (01273 819700) for further information and guidance.

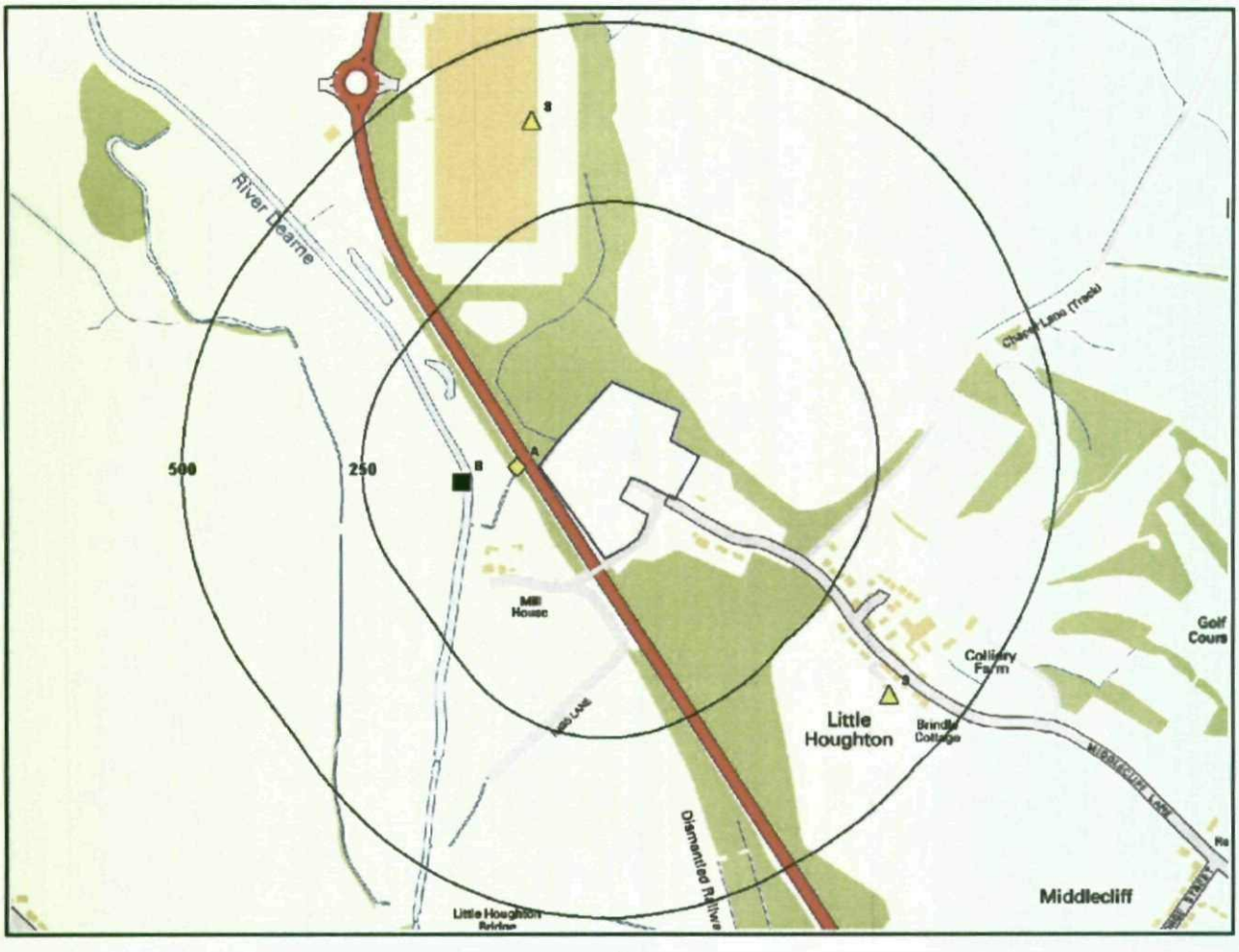
Note: Maps

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. Authorisations, Incidents and Registers Map



Incidents and Registers Legend

Mapping sourced from Ordnance Survey
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- Site Outline
- Search Buffers (m) 250 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- IPPC & IPC Authorisations
- LAPPC Authorisations
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land

1.Authorisations, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of Part A Licences (IPC Processes) within 1000m of the study site: 0

Database searched and no data found.

Records of Part A Licences (IPPC Processes) within 1000m of the study site: 0

Database searched and no data found.

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.

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.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 0

Database searched and no data found.

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 5

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
1A	31.0	W	441980.0,405820.0	Name: Rjb Mining Ltd, Houghton Outlet D1 Sample Site Name: Dearne At Darfield Bridge Sample Site Number: 49301396	Receiving Water: River Dearne Discharge Type: -
2A	31.0	W	441980.0,405820.0	Name: Rjb Mining Ltd, Houghton Outlet D1 Sample Site Name: Dearne At Darfield Bridge Sample Site Number: 49301396	Receiving Water: River Dearne Discharge Type: Trd
3A	31.0	W	441980.0,405820.0	Name: Rjb Mining Ltd, Houghton Outlet D1 Sample Site Name: No Site Sample Site Number: No site	Receiving Water: North Sea Discharge Type: -
4A	31.0	W	441980.0,405820.0	Name: Rjb Mining Ltd, Houghton Outlet D1 Sample Site Name: No Site Sample Site Number: No site	Receiving Water: North Sea Discharge Type: 49301435
5A	31.0	W	441980.0,405820.0	Name: Rjb Mining Ltd, Houghton Outlet D1 Sample Site Name: No Site Sample Site Number: No site	Receiving Water: North Sea Discharge Type: Trd

Records of LAPPC (LAPC) Authorisations within 500m of the study site: 2

The following LAPPC (LAPC) Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details

8	379.0	N	442000.0,406300.0	Address: rjb mining[houghton main occs,little houghton,barnsley,na] Process: Process:coal/gypsum/carbon process	Status: Current Date: 2000
9	405.0	SE	442500.0,405500.0	Address: med contracting[old dearne valley colliery,middlecliffe lane,little houghton,s72 0hw] Process: Process:coal/gypsum/carbon process	Status: Revoked Date: 2000

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: **0**

Database searched and no data found.

Records of Licenced Discharge Consents within 500m of the study site: **2**

The following Licenced Discharge Consents records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
6B	113.0	W	441900,405800	Address: Little Houghton Stw, Little Houghton, Barnsley, South Yorkshire Effluent Type: Sewage Discharges - Final/treated Effluent - Water Company Permit Number: E284 Permit Version: 5	Receiving Water: River Dearne Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 00//2/11/3 Effective Date: - Revocation Date: -
7B	113.0	W	441900,405800	Address: Little Houghton Stw, Little Houghton, Barnsley, South Yorkshire Effluent Type: Sewage Discharges - Stw Storm Overflow/storm Tank - Water Company Permit Number: E284 Permit Version: 5	Receiving Water: River Dearne Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 00//2/11/3 Effective Date: - Revocation Date: -

1.2 Dangerous or Hazardous Sites

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

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: **0**

Database searched and no data found.

Records of National Incidents Recording System, List 1 within 250m of the study site: **0**

Database searched and no data found.

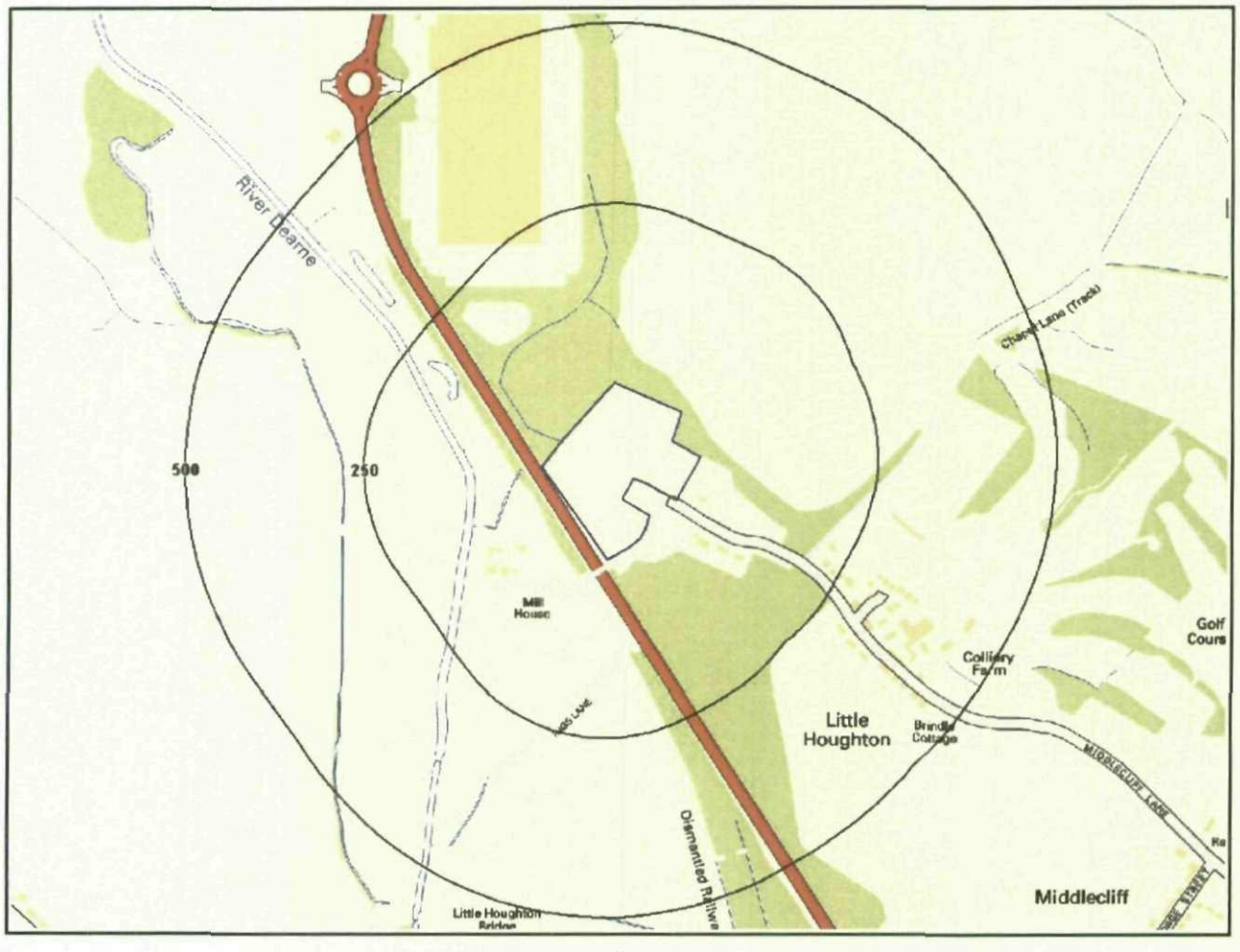
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990[1]

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

Database searched and no data found.

[1]Further information on sites that have been determined under the Contaminated Land Regime is maintained by Local Authorities under Section 78R of the Environmental Protection Act 1990. Information should be available on both sites currently determined as Contaminated Land and Special Sites.

2. Landfill and Other Waste Sites Map



Landfill & Other Waste Sites Legend

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- Site Outline
- Search Buffers (m) — 250, 500
- E.A. Active Landfill
- E.A. Historic Landfill (Area Data)
- E.A. Historic Landfill (Point Data)
- BGS / DoE Survey Landfill
- Local Authority Landfill (Area Data)
- Local Authority Landfill (Point Data)
- Operational Waste Treatment Licence
- Closed Waste Treatment Licence
- REGIS Waste Licence
- Operational Landfill
- Closed Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites[1]

Records from Environment Agency landfill data within 1000m of the study site: **0**

Database searched and no data found.

Records of operational landfill sites sourced from Landmark within 1500m of the study site: **0**

Database searched and no data found.

Records of Environment Agency historic landfill sites within 1500m of the study site: **1**

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

ID	Distance	Direction	NGR		Details
Not shown	1372.0	N	442100,407400	Site Address: Quarry, Park Lane, Great Houghton, Near Barnsley, South Yorkshire Waste Licence: - Site Reference: - Waste Type: Commercial Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Hemsworth Rural District Council

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Records of non-operational landfill sites sourced from Landmark within 1500m of the study site: **0**

Database searched and no data found.

Records of BGS/DoEnon-operational landfill sites within 1500m of the study site: **1**

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

ID	Distance	Direction	NGR		Details
Not shown	1361.0	N	442100.0,407300.0	Address: Quarry, Park Lane, Gt Houghton, nr Barnsley BGS Number: 2524.0	Risk: No risk to aquifer Waste Type: N/A

Records of Local Authority landfill sites within 1500m of the study site: **0**

Database searched and no data found.

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[1]This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.

2.2 Other Waste Sites[1]

Records of operational waste treatment, transfer or disposal sites within 500m of the study site: 0

Database searched and no data found.

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: 0

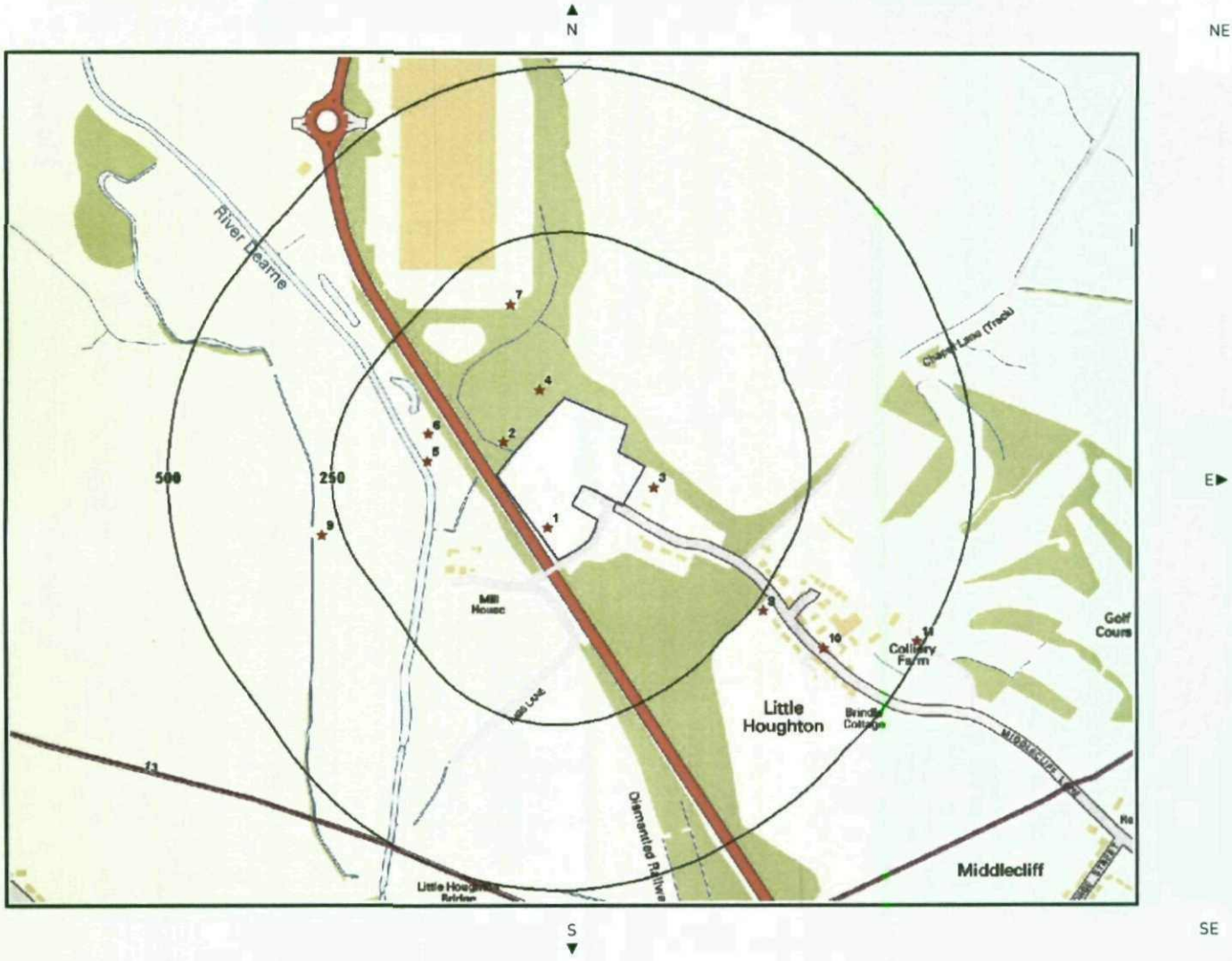
Database searched and no data found.

Records of Environment Agency (REGIS) waste sites within 1500m of the study site: 0

Database searched and no data found.

[1]*This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.*

3. Current Land Use Map



Current Land Use Legend

Mapping sourced from Ordnance Survey

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Site Outline

250 / 500 Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 500m of the study site: **11**

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

ID	Distance	Direction	Company	Address	Activity	Category
1	0.0	On Site	Electricity Transmission Line	-	Electrical Features	Infrastructure and facilities
2	23.0	NW	Quarry	-	Unspecified Quarries Or Mines	Extractive Industries
3	27.0	SE	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
4	36.0	NW	Quarry	-	Unspecified Quarries Or Mines	Extractive Industries
5	108.0	W	Outfall	-	Waste Storage, Processing and Disposal	Infrastructure and facilities
6	122.0	NW	Sewage Works (Disused)	-	Waste Storage, Processing and Disposal	Infrastructure and facilities
7	163.0	NW	Quarry	-	Unspecified Quarries Or Mines	Extractive Industries
8	265.0	SE	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
9	280.0	W	Electricity Transmission Line	-	Electrical Features	Infrastructure and facilities
10	372.0	SE	Herbert E Wistow	68, Middlecliff Lane, Little Houghton, Barnsley, S72 0HW	Livestock Farming	Farming
11	489.0	SE	Electricity Transmission Line	-	Electrical Features	Infrastructure and facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: **0**

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of underground pipelines within 500m of the study site: **2**

4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

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

4.2 Superficial Ground and Drift Geology

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

Distance (m)	Direction	Lex Code	Description	Rock Type
47.0	On Site	ALV-CSSG	Alluvium	Clay, Silt, Sand And Gravel

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

4.3 Bedrock and Solid Geology

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

Distance (m)	*Direction*	*LEX Code*	*Description*	*Rock Type*
0.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation	Mudstone, Siltstone And Sandstone
0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation	Sandstone
0.0	On Site	PUCM-MDSS	Pennine Upper Coal Measures Formation	Mudstone, Siltstone And Sandstone
0.0	On Site	AR-SDST	Ackworth Rock	Sandstone
0.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation	Sandstone
24.0	On Site	PMCM-MDSS	Pennine Middle Coal Measures Formation	Mudstone, Siltstone And Sandstone
25.0	On Site	PMCM-SDST	Pennine Middle Coal Measures Formation	Sandstone

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

For more detailed geological and ground stability data please refer to the "GroundSure Geology and Ground Stability Report". Available from our website.

5. Hydrogeology and Hydrology: - Aquifer and Abstraction Licence Map

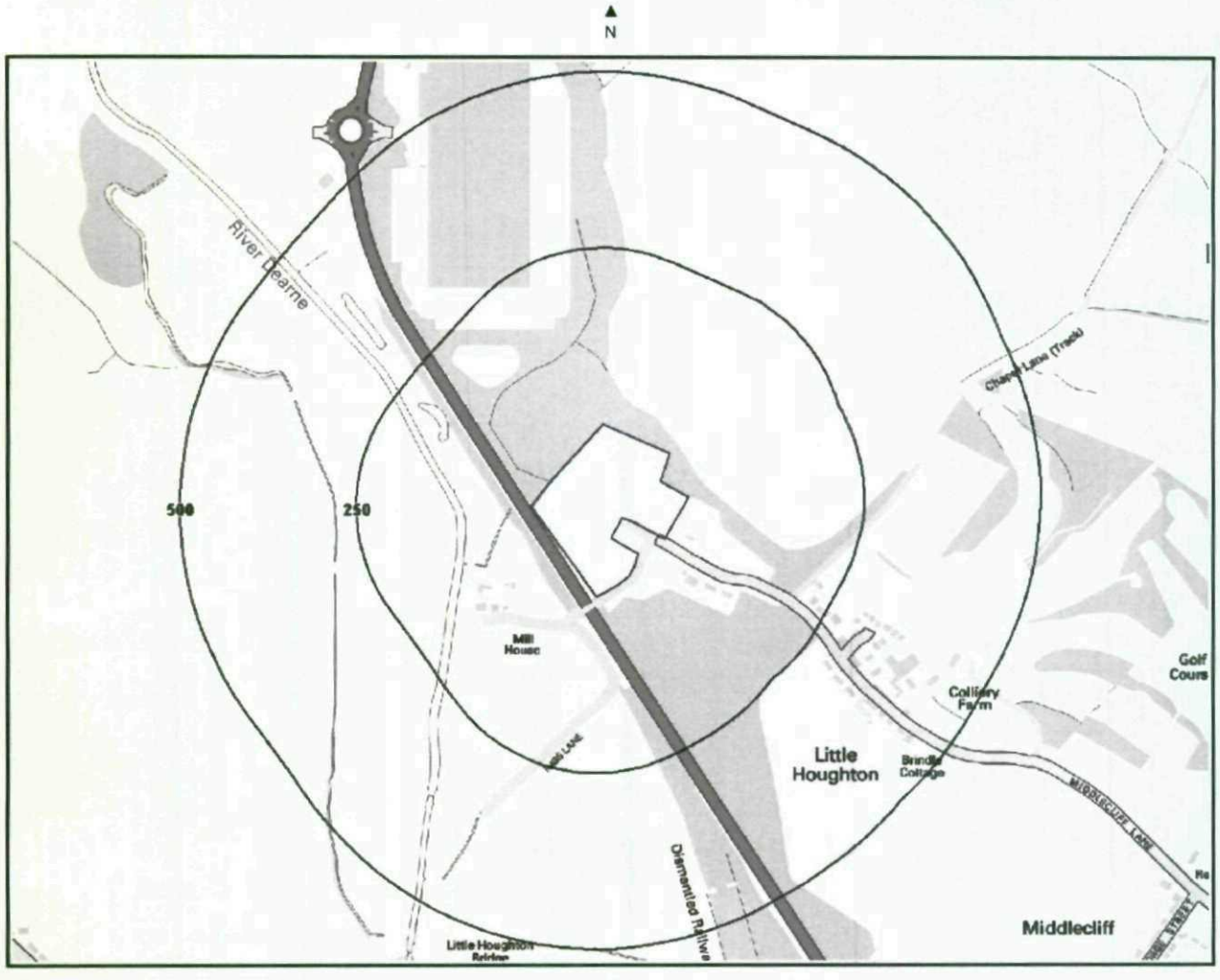


Hydrogeology and Hydrology Legend

Mapping sourced from Ordnance Survey
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- Site Outline
- Search Buffers (m): 100, 250
- Minor Aquifer - Low Leaching Potential
- Minor Aquifer - Intermediate Leaching Potential
- Minor Aquifer - High Leaching Potential
- Major Aquifer - Low Leaching Potential
- Major Aquifer - Intermediate Leaching Potential
- Major Aquifer - High Leaching Potential
- Main River
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

5b. Hydrogeology and Hydrology: - SPZ and Potable Water Abstraction Map



Hydrogeology and Hydrology Legend

Mapping sourced from Ordnance Survey
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Site Outline

Search Buffers (m)
100
250

Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5. Hydrogeology and Hydrology

5.1 Groundwater Vulnerability and Soil Classification

Records of aquifer and soil classification within 200m of the study site: **Yes**

The following groundwater information is represented as polygons on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	Classification
1	0.0	On Site	Minor Aquifer/Low Leaching Potential
2	8.0	W	Minor Aquifer/High Leaching Potential

5.2 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.3 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? **No**

Database searched and no data found.

5.4 Source Protection Zones

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

Database searched and no data found.

5.5 Potable Water Abstraction Licences

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

Database searched and no data found.

5.6 River Quality

Is there any Environment Agency information on river quality within 500m of the study site? **Yes**

The following river quality records are not represented on mapping:

Distance	Direction	River	Reach	Chemical Grade	Biological Grade
115.0	W	Dearne	Grimethorpe Dike Billingley Dyke	C	D

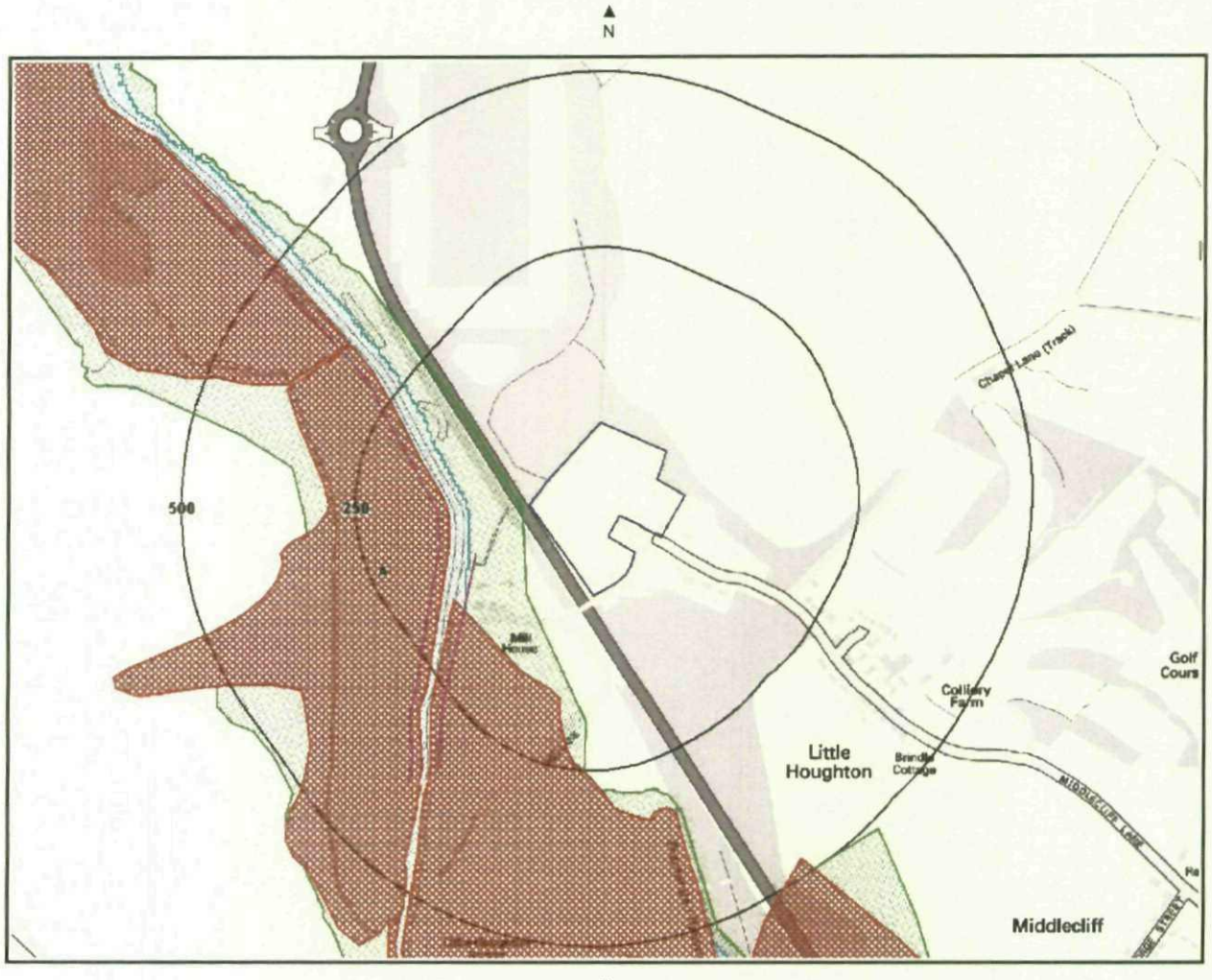
5.7 Main Rivers

Are there any Main Rivers within 500m of the study site? **Yes**

The following main river records are represented on the Aquifer and Abstractions Map:

ID	Distance	Direction
5	111.0	W

6. Surface Water Flood Map



Flood Legend

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Licence Number: 100024198

Site Outline

Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **Yes**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance	Direction	Update
1A	10.0	W	07-Feb-2008

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **Yes**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance	Direction	Update
3A	86.0	W	07-Feb-2008

6.3 Areas benefiting from Flood Defences

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

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.4 Areas used for Storage Areas

Are there any areas used for Flood Storage within 250m of the study site? **Yes**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.5. Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the centre of the study site? **Yes**

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

6.6 Groundwater Flooding Confidence Areas

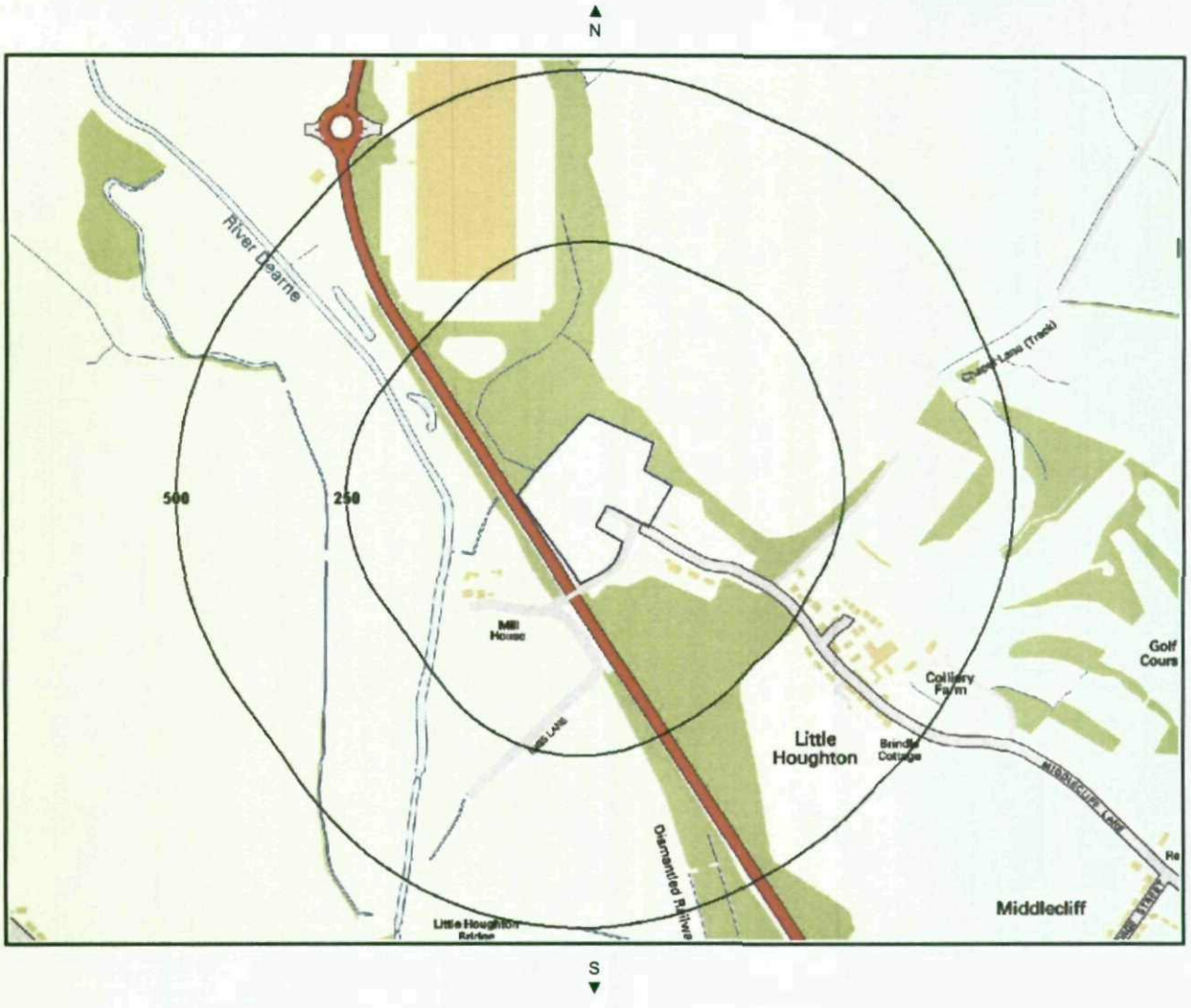
What is the British Geological Survey confidence rating in this result?	**Moderately High**

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 fivefold scale - Low, Moderately Low, Moderate, Moderately High 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.

7.Ecological Designated Sites Map



Ecological Designated Sites Legend

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Licence Number: 100024198

Site Outline
Search Buffers (m)
SAC
SPA
SSSI
Ramsar
NNR
LNR
World Heritage Sites

7 Ecological Designated Sites

Presence of sites of ecological value within 1000m of the study site?	**No**

Records of Sites of Special Scientific Interest (SSSI) within 1000m of the study site: **0**

Database searched and no data found.

Records of National Nature Reserves (NNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 1000m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 1000m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within1000m of the study site: **0**

Database searched and no data found.

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information, please obtain a GroundSure Geology and Ground Stability Report. Available from our website. The following information has been found:

8.1.1 Shrink Swell

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

8.1.2 Landslides

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

8.1.3 Soluble Rocks

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

8.1.4 Compressible Ground

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

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?	**Null - Negligible**

8.1.6 Running Sand

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

9.Mining

9.1 Coal Mining

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

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

Distance	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.

9.2 Shallow Mining

What is the hazard of subsidence relating to shallow mining onsite? (this includes a 150m buffer) **Low-Moderate**

10.Contacts

GroundSure Helpline
Telephone: 01273 819700
mapsandinfo@groundsure.com

British Geological Survey (England & Wales)
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3136. www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency
Ridings
Phoenix House - Global Ave, Leeds, LS11 8PG Tel: (0113) 244 0191
North East Region Tel: (0113) 244 0191

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries

Ordnance Survey
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority
Barnsley Metropolitan Borough Council Tel: 01226 770770

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

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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, English Nature who retain the Copyright and Intellectual Property Rights for the data.

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This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

APPENDIX E

COAL AUTHORITY REPORT

The Coal Authority

Issued by:
The Coal Authority, Mining Reports Office, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire NG18 4RG
On-Line Service: www.coalminingreports.co.uk - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

ANNETTE LAVER,
WHITE YOUNG GREEN,
ARNDALE COURT,
ARNDALE CENTRE,
LEEDS,
WEST YORKSHIRE,
LS6 2UJ

Person dealing with this matter:	**Darren Moody**
Our reference:	**00016094-08**
Your reference:	A035220-2/10784E
Electronic Ref:	EME_00008923270001_005
RRUID:	005.00008923270001
Date of your enquiry:	**28 February 2008**
Date we received your enquiry:	**28 February 2008**
Date of issue:	**29 February 2008**

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

Coal and Brine Report

Land To The North Of, Middlecliff Lane, Little Houghton, Barnsley, South Yorkshire

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

Coal mining	Yes
Brine extraction	No

Information from the Coal Authority

Underground Coal Mining

Past

The property is in the likely zone of influence from workings in 12 seams of coal at shallow to 830m depth, and last worked in 1982.

Present

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

Future

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

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

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

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

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

Mine entries

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

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

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

Coal-mining geology

At the surface, there are no known faults or other lines of weakness due to coal mining that have made the property unstable.

Opencast Coal Mining

Past

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

Present

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

Future

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

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

Coal-mining subsidence

The Coal Authority has not received a damage notice or claim for the property since 1 January 1984. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority has not received a request to carry out preventive work before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

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

Hazards related to coal mining

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

Withdrawal of Support

The property is in an area for which notices of entitlement to withdraw support were published in 1982,1977.

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

Working Facilities Orders

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

Payments to Owners of Former Copyhold Land

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

Comments on Coal Authority information

Where development proposals are being considered, technical advice should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. This is necessary due to the Public Safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

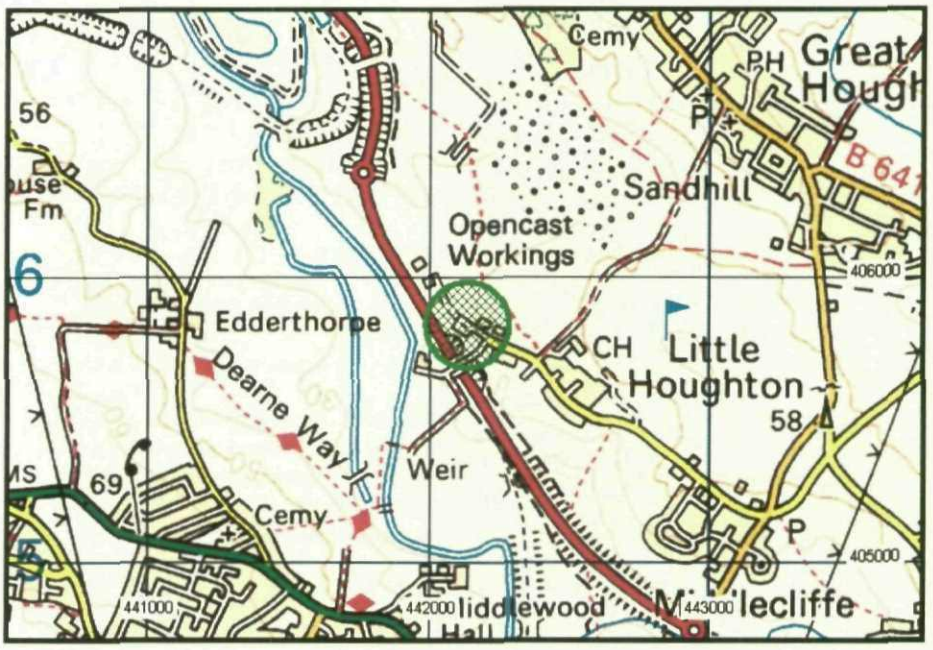
This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The report is compliant with Home Information Pack requirements.

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Ordnance Survey (OS) has carried out a Positional Accuracy Improvement Programme to make sure that the maps it produces are accurate. We have no control over who is using the improved information. In some cases, the position of surface features and mining features on the map may have changed. This is because we have updated our database in line with Ordnance Survey's improved maps.

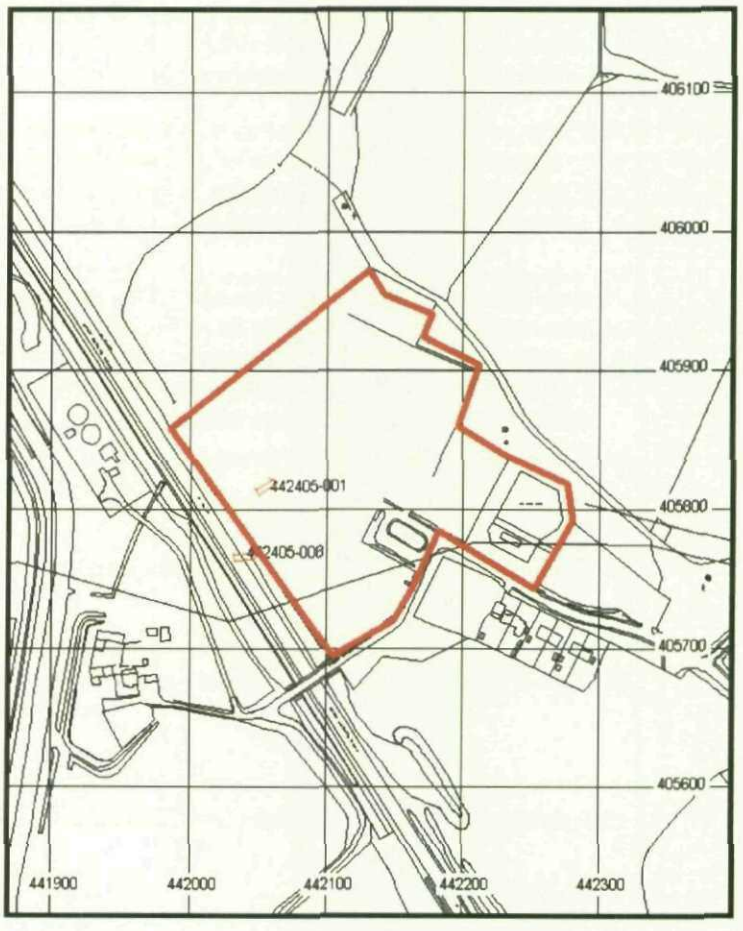
Location map

Approximate position of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown

Disused Adit or Mineshaft

Mapping sourced from Ordnance Survey®

APPENDIX F

SYMAS REPORT

SYMAS

Principal Mining Engineer
Barnsley Metropolitan Borough Council
PO Box 604
Barnsley S70 9FE

Date: 7th March, 2008

Enquiries to: Mr. I. Johnson
Dial Direct: 01226 772690
My Ref: IJ/M461/6
Your Ref:

White Young Green Environmental Ltd.,
1, Arndale Court,
Headingley,
LEEDS.
LS6 2UJ

FOR THE ATTENSION OF ANNETTE LAVER

Dear Sir,

LITTLE HOUGHTON DEVELOPMENT

Further to your consultation request of 4th March, 2008; please find enclosed a mineral report and plans which outline the mining and geological situation for the above site at Little Houghton.

I can also confirm that an invoice will be submitted in due course for the agreed fee of five hours @ £45 per hour +VAT.

Yours faithfully,

P. James,
Principal Mining Engineer.

Enc.

Tel: (01226)772689
Fax: (01226)772688
E-mail: symas@barnsley.gov.uk
Website: www.barnsley.gov.uk/symas

MINERAL REPORT

Date: 7th March, 2008

My Ref: IJ/M461/6

CONFIDENTIAL

HOUGHTON MAIN COLLIERY SITE, LITTLE HOUGHTON
PROPOSED REDEVELOPMENT

PROPOSALS

It is intended to develop the southern end of the disused colliery site, which comprises part of the former pit yard and railway sidings covering the area edged orange on the accompanying 1/2500 scale plan no. M461/6A. The cleared area formed part of the former Houghton Main Opencast Site.

GEOLOGICAL INFORMATION

Records indicate that the site lies on sandstone, shales and mudstones of the Middle Coal Measures Series with the Shafton Coal Seam outcropping along the western boundary as indicated in red on the attached plan no M461/6B.

The conjectured surface position of a geological fault is shown to surface to the south-east of the site, with a small fault also surfacing through the south-east corner of the site as shown in blue on the plan.

MINING INFORMATION

Houghton Main Colliery Shafts were sunk some 730 m deep to the Thorncliffe Coal, during 1922/1923, the colliery closed in August, 1993.

The three mineshafts associated with the colliery are thought to have been filled and capped shortly afterwards, to British Coal specifications.

Records held by SYMAS indicate that Shaft No. 3 is filled from a mid-shaft plug inserted at 234.8 m, and it is likely that the two other deep shafts were similarly treated.

Shallow Mining

The Shafton Coal Seam outcrops along the western boundary as indicated on the attached plan no M461/6B. Although there are no recorded workings in this seam within the area under review a mine adit was discovered in 1975 as indicated on the plan no. M461/6M which would indicate that some extraction of the Shafton Seam had taken place.

Tel: (01226)772689
Fax: (01226)772688
E-mail: symas@barnsley.gov.uk
Website: www.barnsley.gov.uk/symas

BARNSLEY Metropolitan Borough Council Doncaster Rotherham

Deep Mining

The area has been affected by mining in eight seams ranging in depth from the Meltonfield Coal Seam at 316 m down to the Silkstone Coal Seam at 790 m.deep; subsidence resulting at the surface from these workings will have been complete for over 20 years.

These workings are shown on the attached plan nos. M461/6D to M461/6L.

Opencast Coal

The Houghton Main Opencast Site commenced in 1997 to extract the Shafton Coal Seam beneath the site as indicated on plan no. M461/6C, with the opencast section shown on plan no. M461/6P.

The site was completed in 2000 with the opencast backfill being compacted during restoration to provide a development platform.

The three deep Houghton Main Shafts were uncovered and the caps removed during the works, new caps being installed at the base of the opencast void, approximately 11 m deep, prior to backfilling.

MINESHAFTS/ ADITS

The records held by SYMAS indicate that a mine adit to the Shafton Coal Seam was discovered in 1975, although there are no details of how it was treated at that time it is likely that this feature was excavated out during the opencast operations.

The Opencast completion plan indicates that a small area of Shafton Coal was removed from the area of the adit.

The known details of the shafts and adit are as follows:

Houghton Main Shaft No. 1

Diameter	4.7 m
Reinforced Concrete cap	9 m dia.
Thickness	0.4 m
Level	23.0 m
Co-ords	E 441949 N406031

Houghton Main Shaft No. 2

Diameter	4.7 m
Reinforced Concrete cap	8.5 m dia.
Thickness	0.5 m
Level	21.6 m
Co-ords	E 441921 N 406014

Houghton Main Shaft No. 3

Diameter	7 m
Reinforced Concrete cap	10 m dia.
Thickness	0.5 m
Level	21.6 m
Co-ords	E 441966.5 N 406100.5

Adit

Co-ords	E 442056 N 405820

These features are shown on plan no M461/6M.

FORMER LAND USE

The area was associated with the former Houghton Main Colliery and associated activities. It is understood that all contamination associated with these activities was remediated during the opencast activities.

The past industrial development is shown on the attached plan nos. M461/6N and M461/6O.

FUGITIVE MINE GASES

There are no known issues of fugitive mine gas in the area however given the presence of the shallow mineworkings, mine entries, possible uncharted workings and opencast backfill the possibility of fugitive mine gases cannot be precluded.

It is therefore considered prudent to carry out gas monitoring prior to development and during any works on site especially in any deep excavations or confined spaces.

METHANE EXTRACTION

Greenpark Energy applied for planning permission to extract Coal Mine Methane from the former Houghton Main Colliery workings in 2005, with a subsequent generation plant being installed to the north-west of the site.

The generation unit was connected by an underground cable to a sub-station which is located adjacent to the eastern edge of the site.

This cable runs along the south-west and south-east boundary of the site.

The generation unit and sub-station are shown on plan no. M461/6M.

CONCLUSIONS AND RECOMMENDATIONS

1. The site is presently stable from the deep mining subsidence aspect and willremain so in future years.

2. There are two faults or other such geological disturbances known to affect the area concerned together with some smaller faults found in the opencast. It is understood that some coal was left in-situ due to the stability of the 'high wall' along the line of the proposed road.

3. The three former operational mineshafts for Houghton Main Colliery were filled and capped subsequent to the closure of the colliery in late 1993.

   However these shafts were excavated during the opencast operations and new caps installed at the base of the opencast void.

   A mine adit discovered in 1975 is likely to have been excavated out during the opencast operations.

   This should be checked with UK Coal.

4. Following the opencast operations the backfill was compacted to provide a development platform for both industrial development and the proposed A6195, Park Spring Road.

5. The possibilities of no building zones along the opencast high wall and over disused mine entries is considered good building practices to avoid differential settlement.

   It is understood from an adjacent development that UK Coal were to impose exclusion zones over high walls and mine entries which may include areas within the site.

   This should be checked with UK Coal.

6. There are no known instances of mine gas issues in the area, however, considering the possible shallow mining, opencast backfill, etc. the possibility of fugitive mine gas cannot be ruled out.

   It is therefore recommended that the requisite monitoring procedures are carried out in any open excavations or confined spaces.

   THIS REPORT IS BASED ON AND LIMITED TO THE RECORDS IN THE POSSESSION OF SYMAS AT THE TIME THE ENQUIRY IS ANSWERED.

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This report was prepared by Ian Johnson on 7th March, 2008.

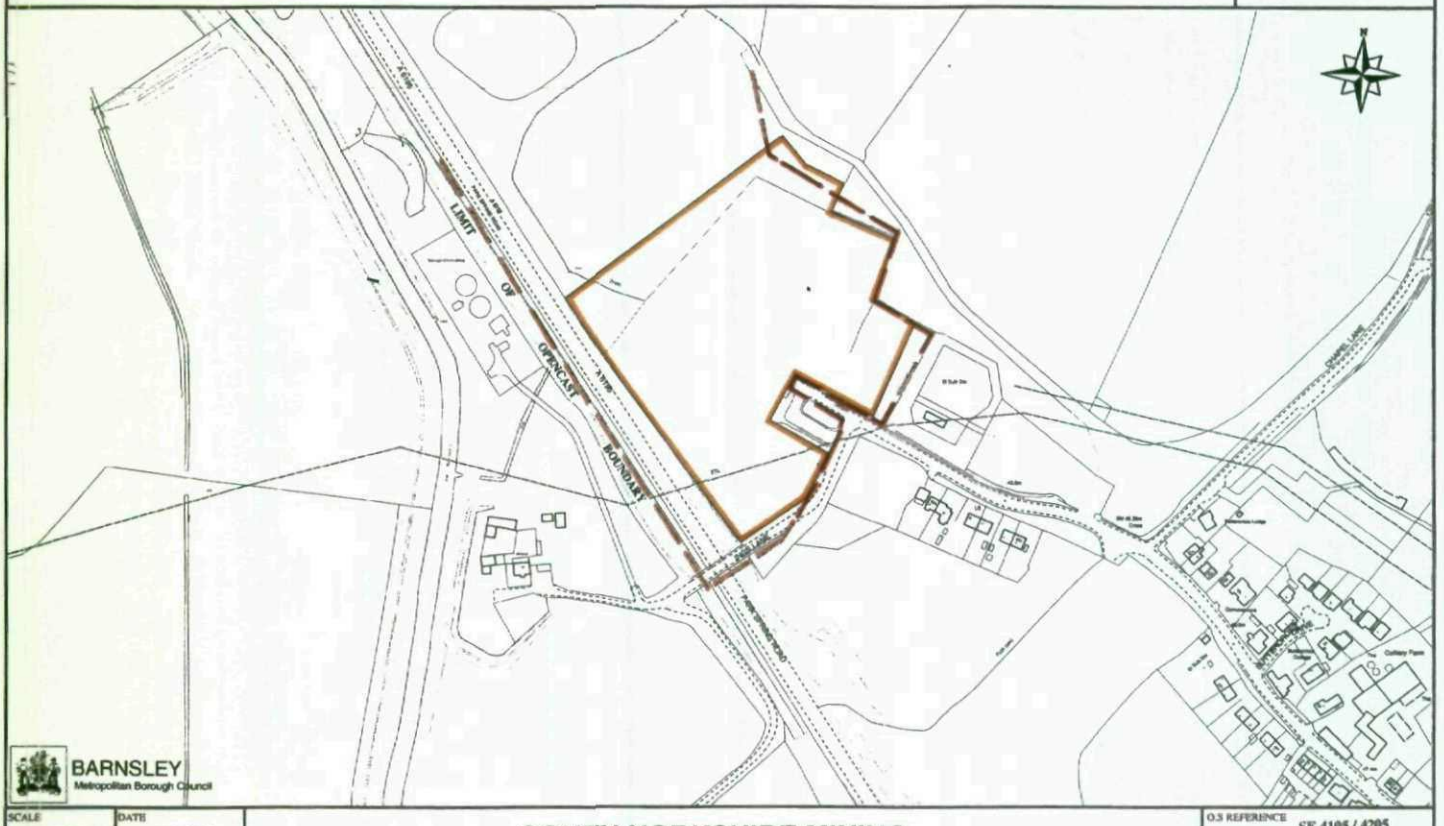
P. James,
Principal Mining Engineer.

DRAWING TITLE

LITTLE HOUGHTON
LOCATION PLAN

DRAWING NO.

M461 / 6A



BARNSLEY
Metropolitan Borough Council

SCALE	DATE	
1 / 2500	6 / 3 / 08	**SOUTH YORKSHIRE MINING ADVISORY SERVICE**
DRAWN BY: SMW	CHECKED BY:	

O.S REFERENCE: SE 4105 / 4205
SE 4106 / 4206

PRINCIPAL MINING ENGINEER.

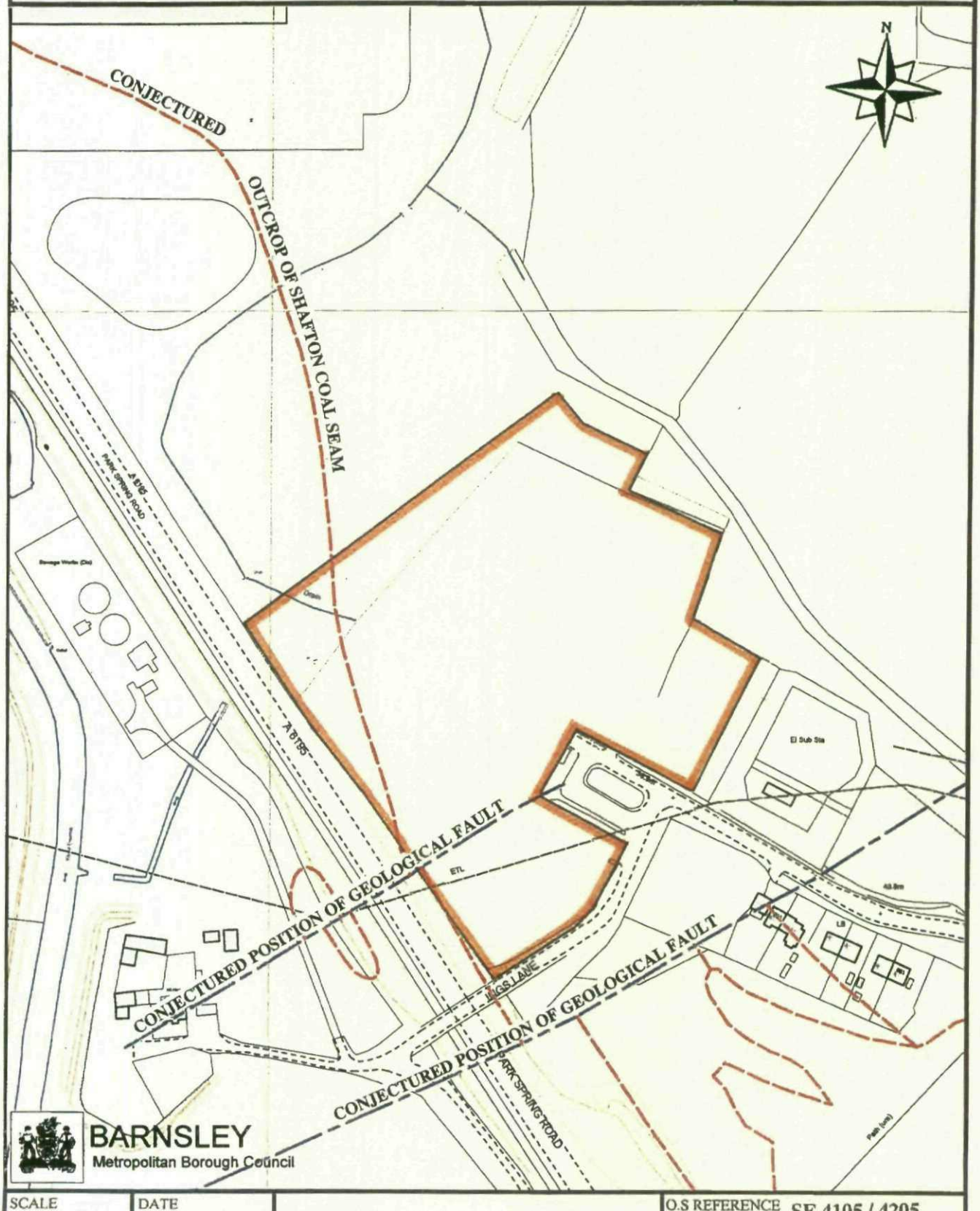
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DRAWING TITLE

LITTLE HOUGHTON
GEOLOGICAL INFORMATION

DRAWING NO.

M461 / 6B



SCALE	DATE		O.S REFERENCE
1 / 2500	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 4105 / 4205 SE 4106 / 4206
DRAWN BY	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER
SMW			

BMBC Licence Number 100022284 2008

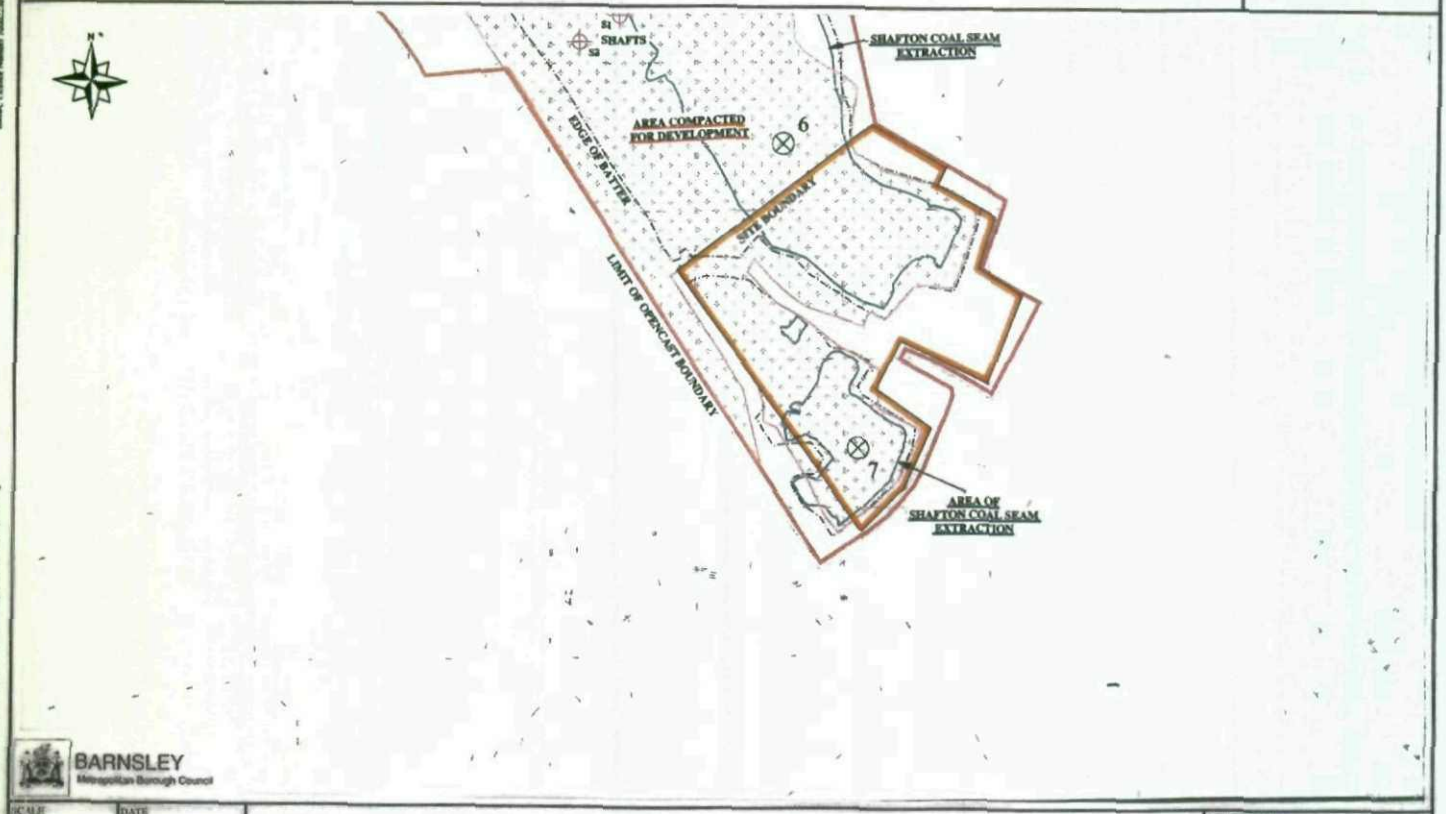
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DRAWING TITLE

HOUGHTON MAIN OPENCAST SITE
LITTLE HOUGHTON

DRAWING NO.

M461 / 6C



BARNSLEY
Metropolitan Borough Council

SCALE	DATE		O.S REFERENCE
1 / 2500	6 / 3 / 08	**SOUTH YORKSHIRE MINING**	SE 4105 / 4205 SE 4106 / 4206
DRAWN BY: SMW	CHECKED BY	**ADVISORY SERVICE**	P. JAMES BSc (Hons) PRINCIPAL MINING ENGINEER

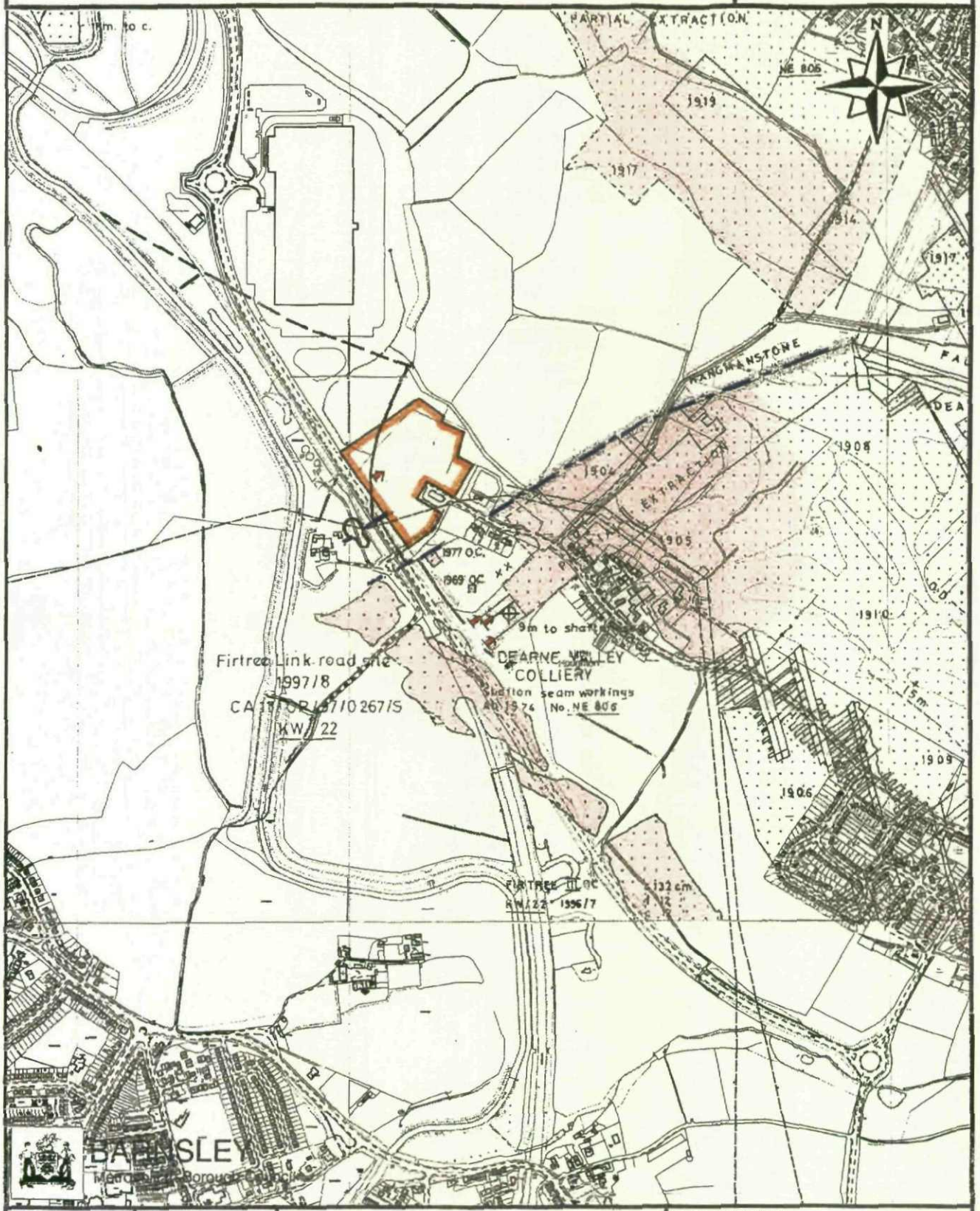
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DRAWING TITLE

LITTLE HOUGHTON
SHAFTON COAL SEAM WORKINGS

DRAWING NO.

M461 / 6D



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY: SMW	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER

BMBC Licence Number 100022264 2008

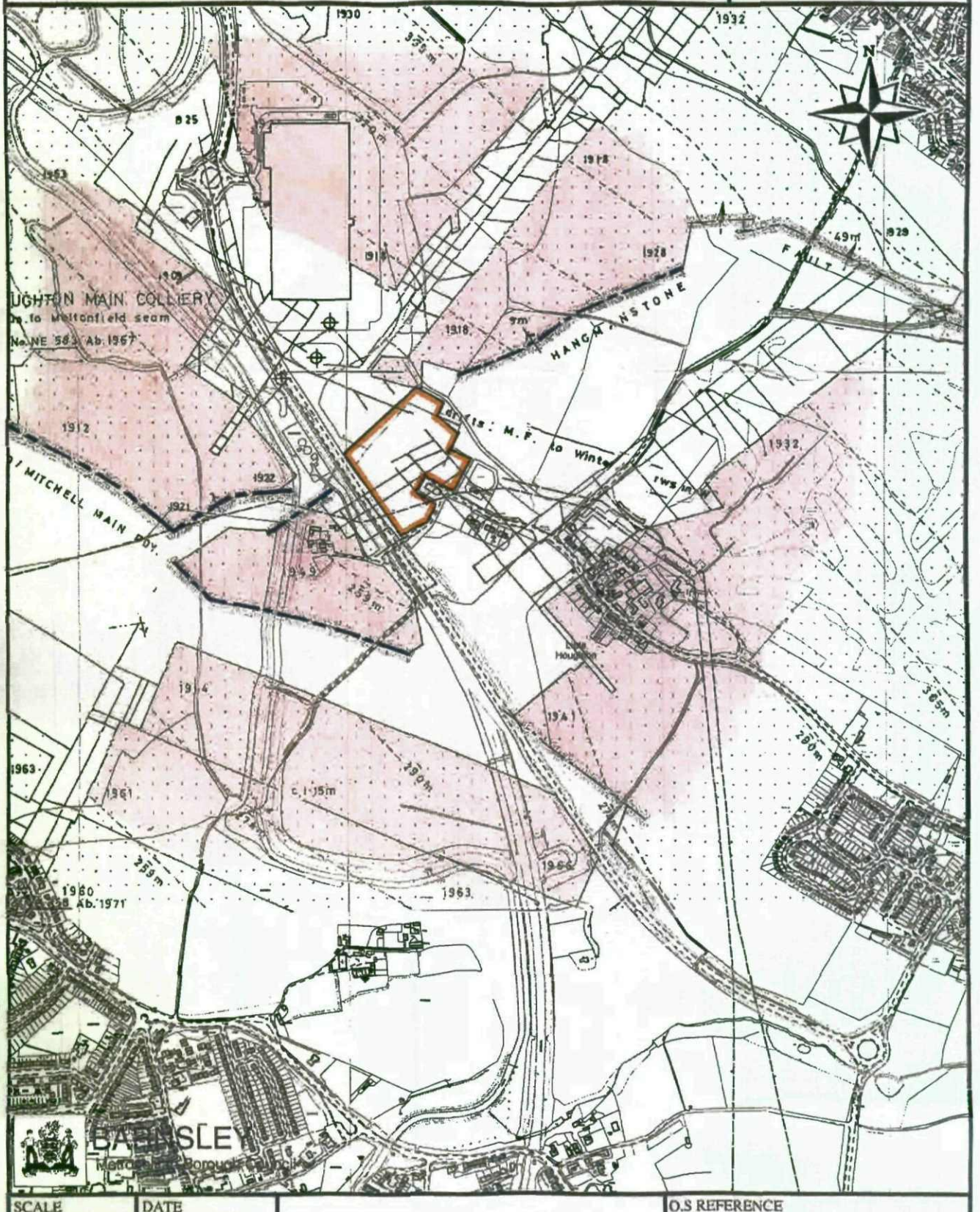
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DRAWING TITLE

LITTLE HOUGHTON
MELTONFIELD COAL SEAM WORKINGS

DRAWING NO.

M461 / 6E



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY: SMW	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER

BMBC Licence Number 100022264 2008

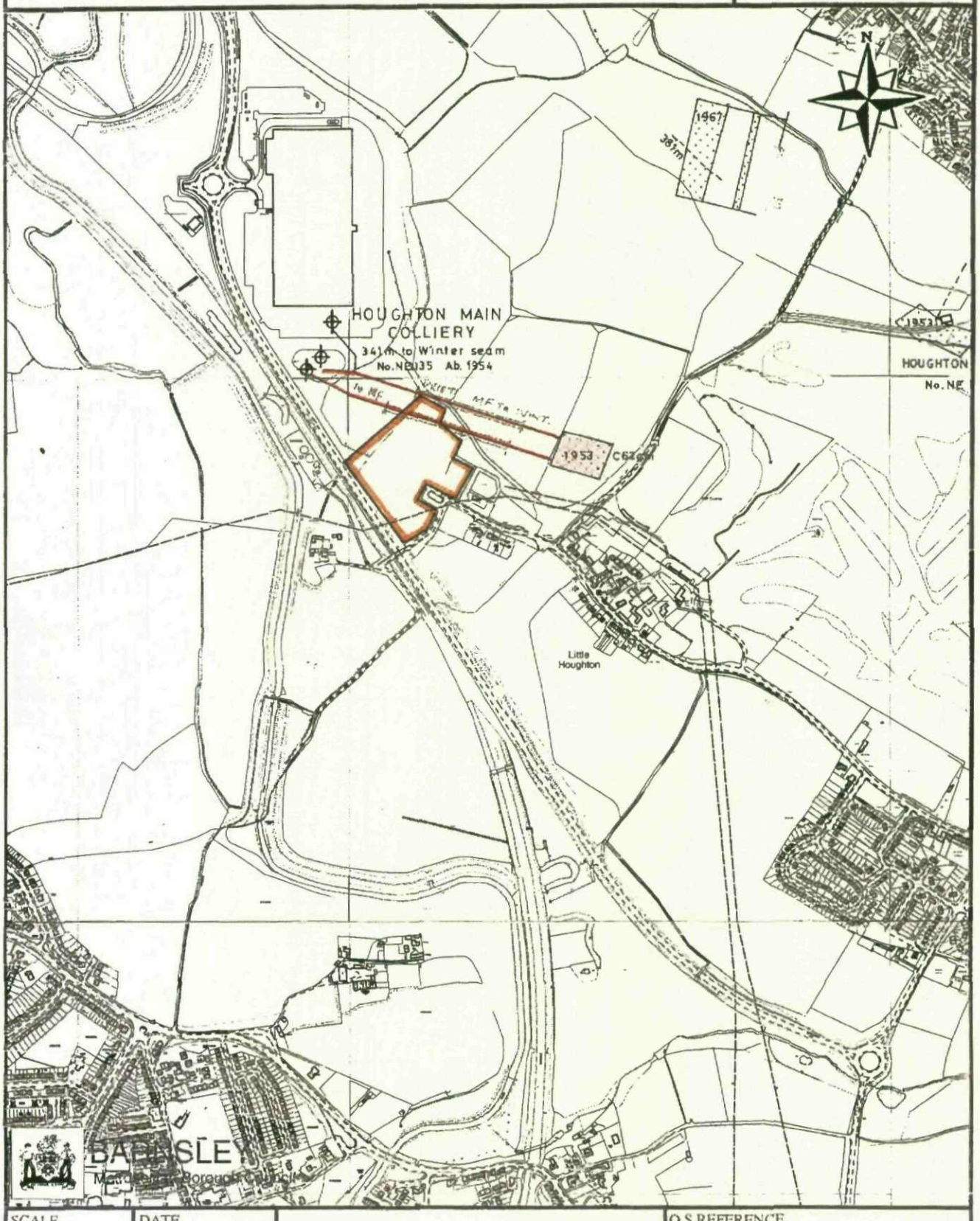
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DRAWING TITLE

LITTLE HOUGHTON
WINTER COAL SEAM WORKINGS

DRAWING NO.

M461 / 6F



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER
SMW			

BMBC Licence Number 100022264 2008

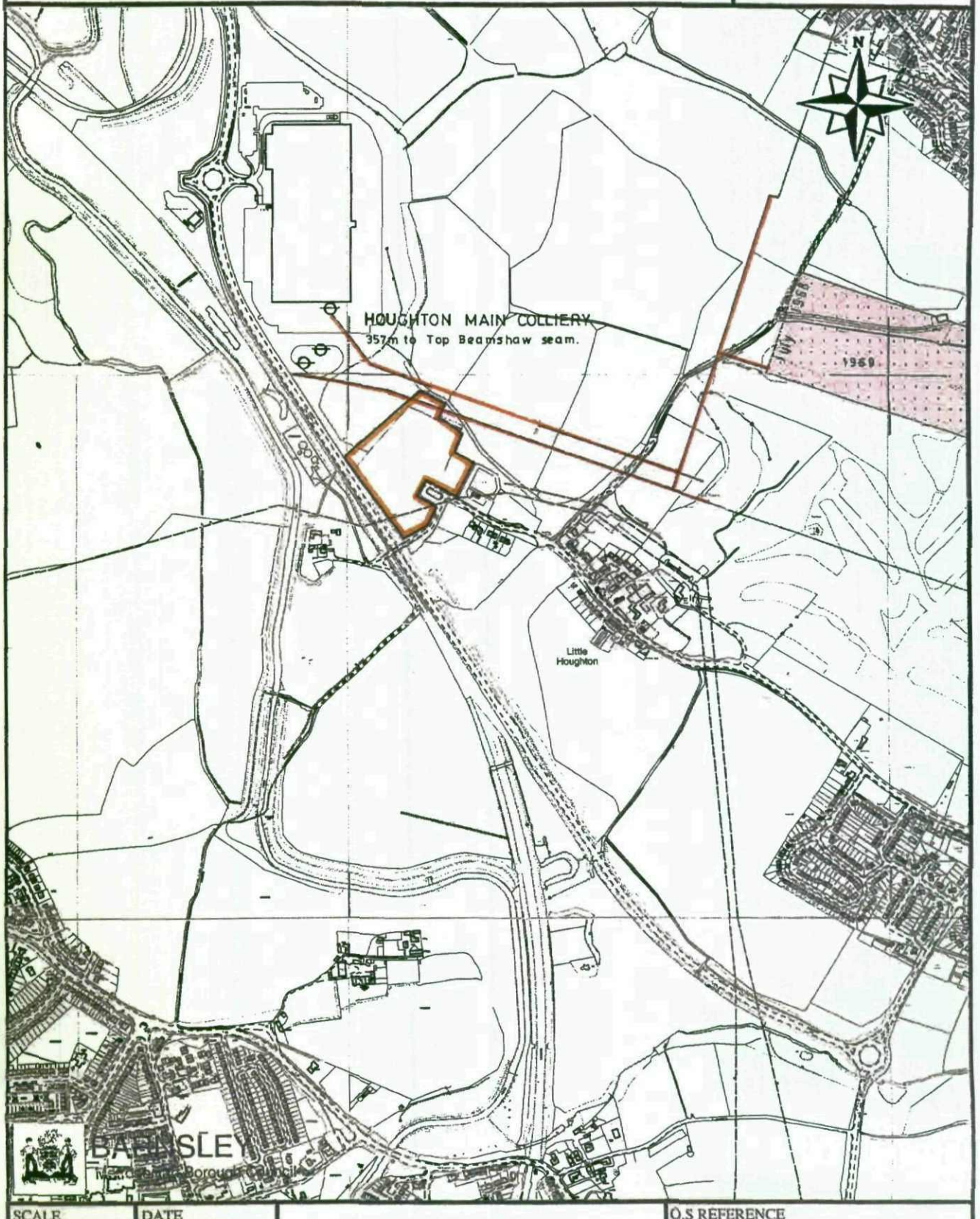
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DRAWING TITLE

LITTLE HOUGHTON
TOP BEAMSHAW COAL SEAM WORKINGS

DRAWING NO.

M461 / 6G



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER
SMW			

BMBC Licence Number 100022264 2008

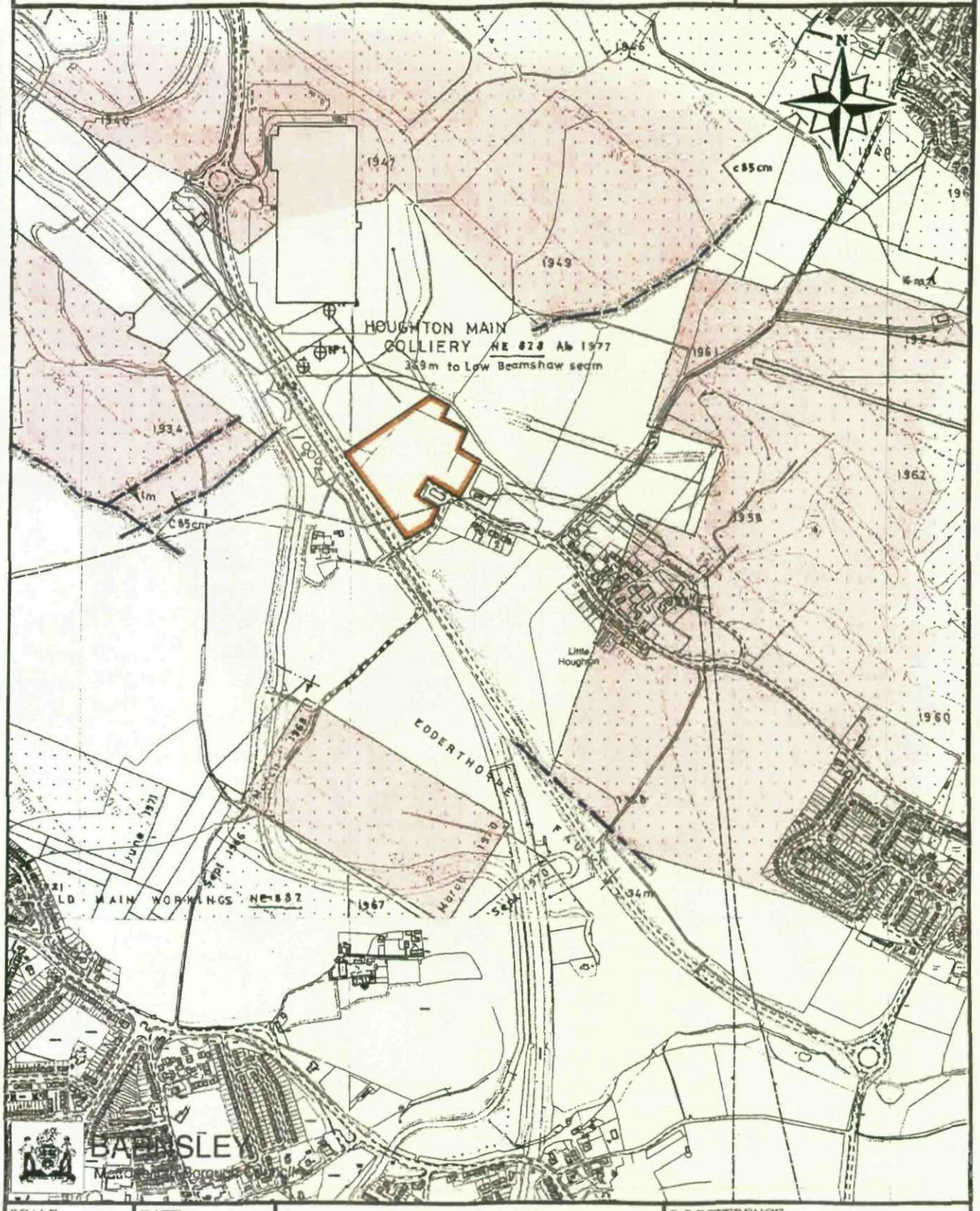
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DRAWING TITLE

LITTLE HOUGHTON
LOW BEAMSHAW COAL SEAM WORKINGS

DRAWING NO.

M461 / 6H



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	**SOUTH YORKSHIRE MINING**	SE 40 NW
DRAWN BY	CHECKED BY	**ADVISORY SERVICE**	PRINCIPAL MINING ENGINEER
SMW			

BMBC Licence Number 100022264 2008

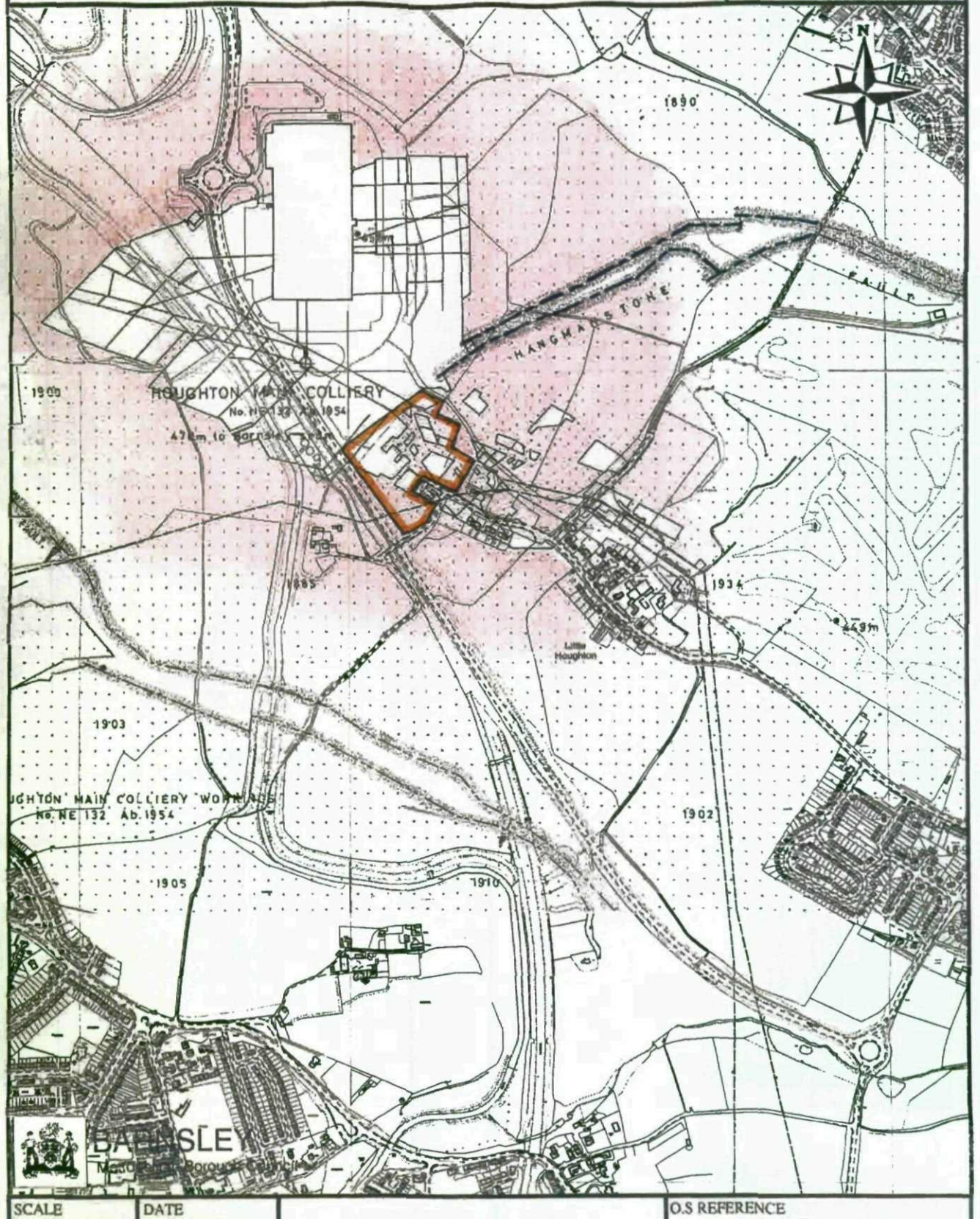
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DRAWING TITLE

LITTLE HOUGHTON
BARNSLEY COAL SEAM WORKINGS

DRAWING NO.

M461 / 6I



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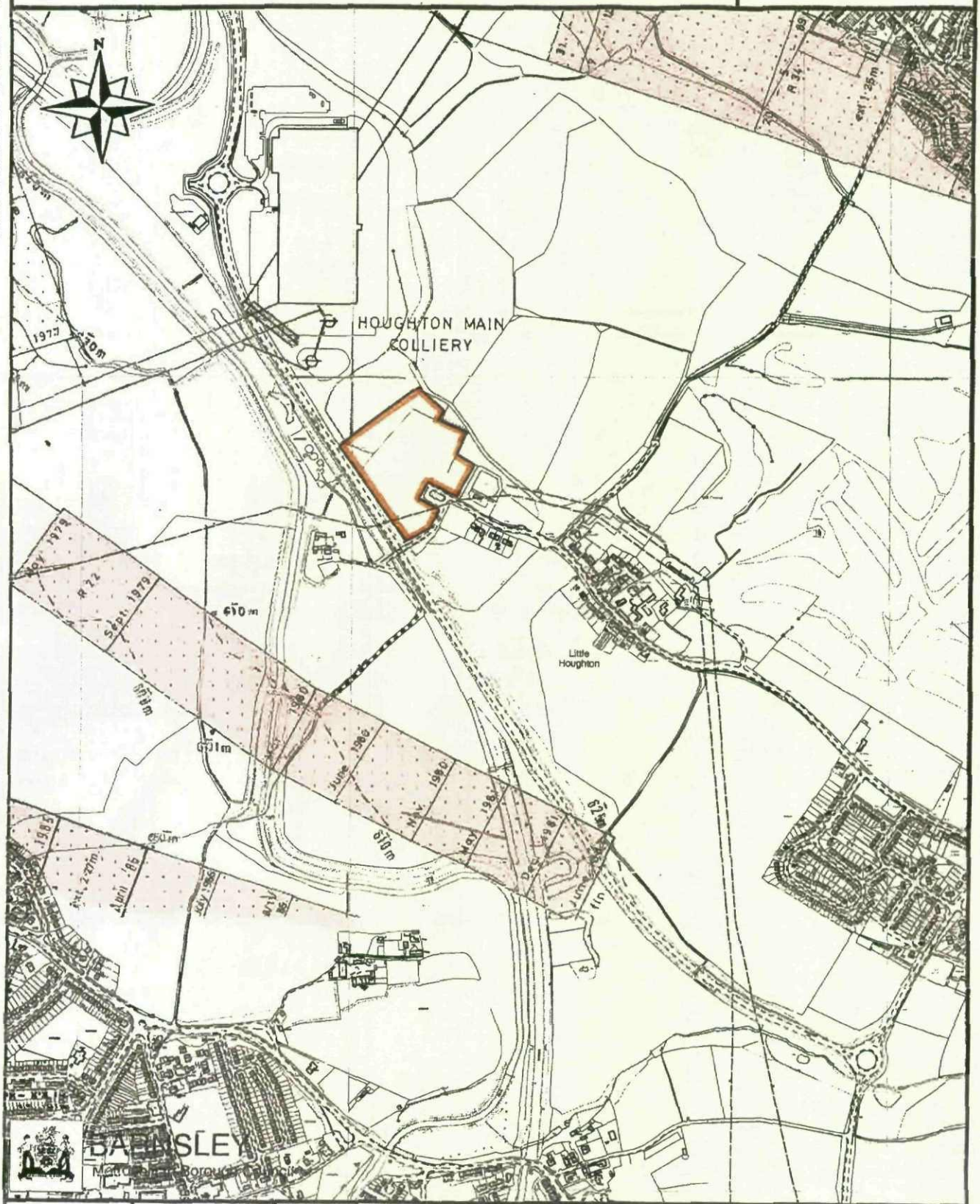
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1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER
SMW			

DRAWING TITLE

LITTLE HOUGHTON
FENTON COAL SEAM WORKINGS

DRAWING NO.

M461 / 6J



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
DRAWN BY: SMW	CHECKED BY	ADVISORY SERVICE	PRINCIPAL MINING ENGINEER

BMBC Licence Number 100022264 2008

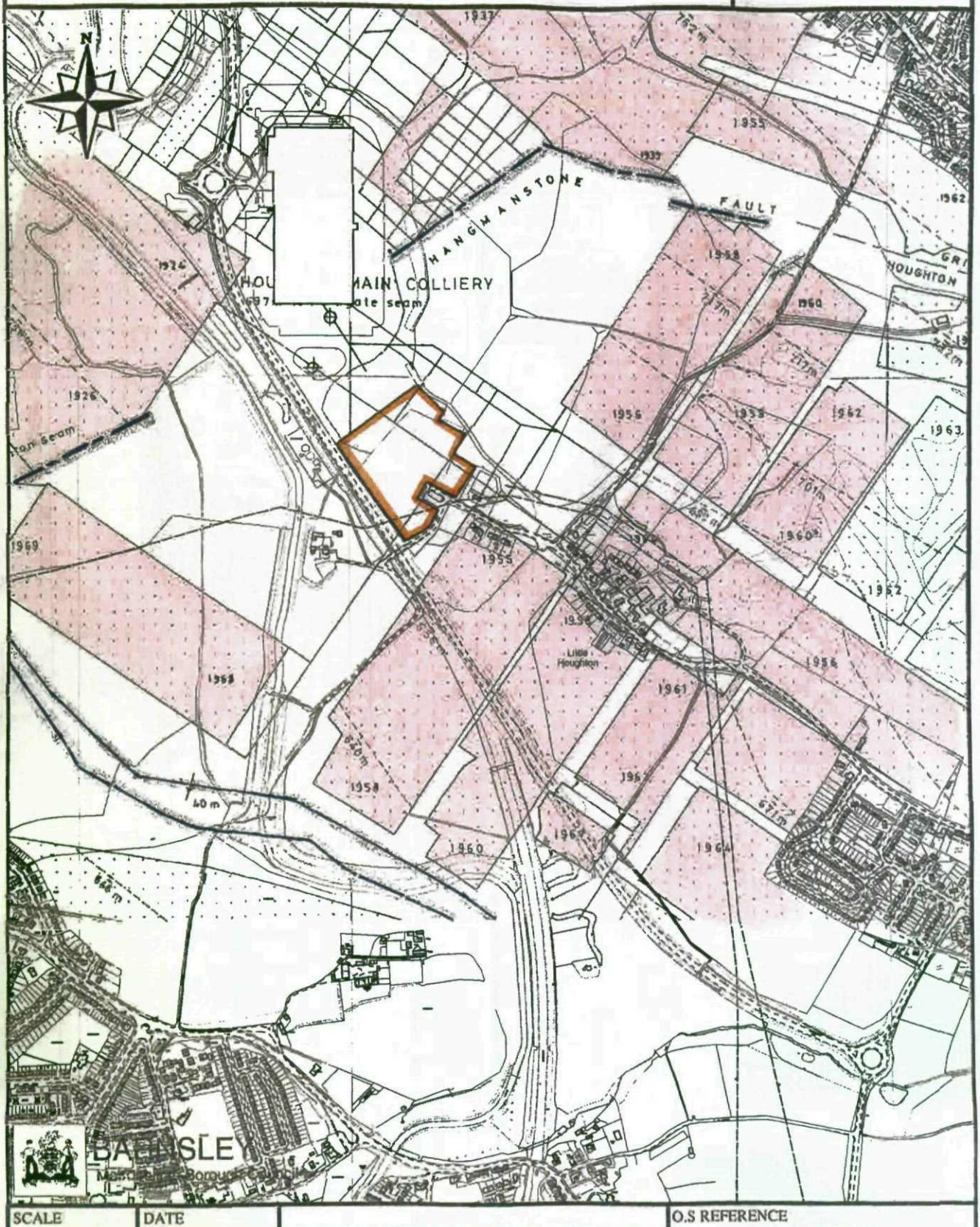
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DRAWING TITLE

LITTLE HOUGHTON
PARKGATE COAL SEAM WORKINGS

DRAWING NO.

M461 / 6K



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING	SE 40 NW
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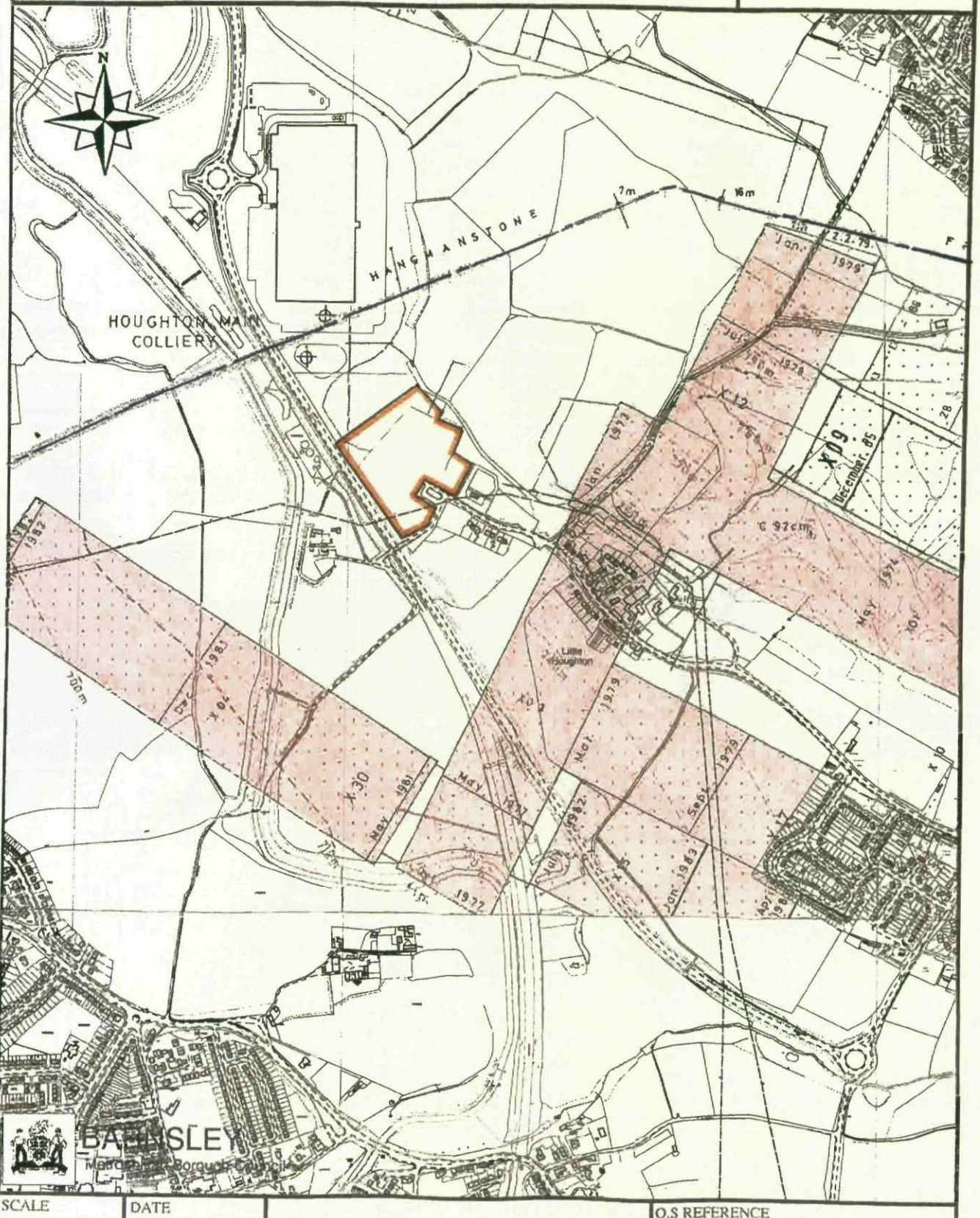
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DRAWING TITLE

LITTLE HOUGHTON
SILKSTONE COAL SEAM WORKINGS

DRAWING NO.

M461 / 6L



SCALE	DATE		O.S REFERENCE
1 / 10,000	6 / 3 / 08	SOUTH YORKSHIRE MINING ADVISORY SERVICE	SE 40 NW
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BMBC Licence Number 100022264 2008

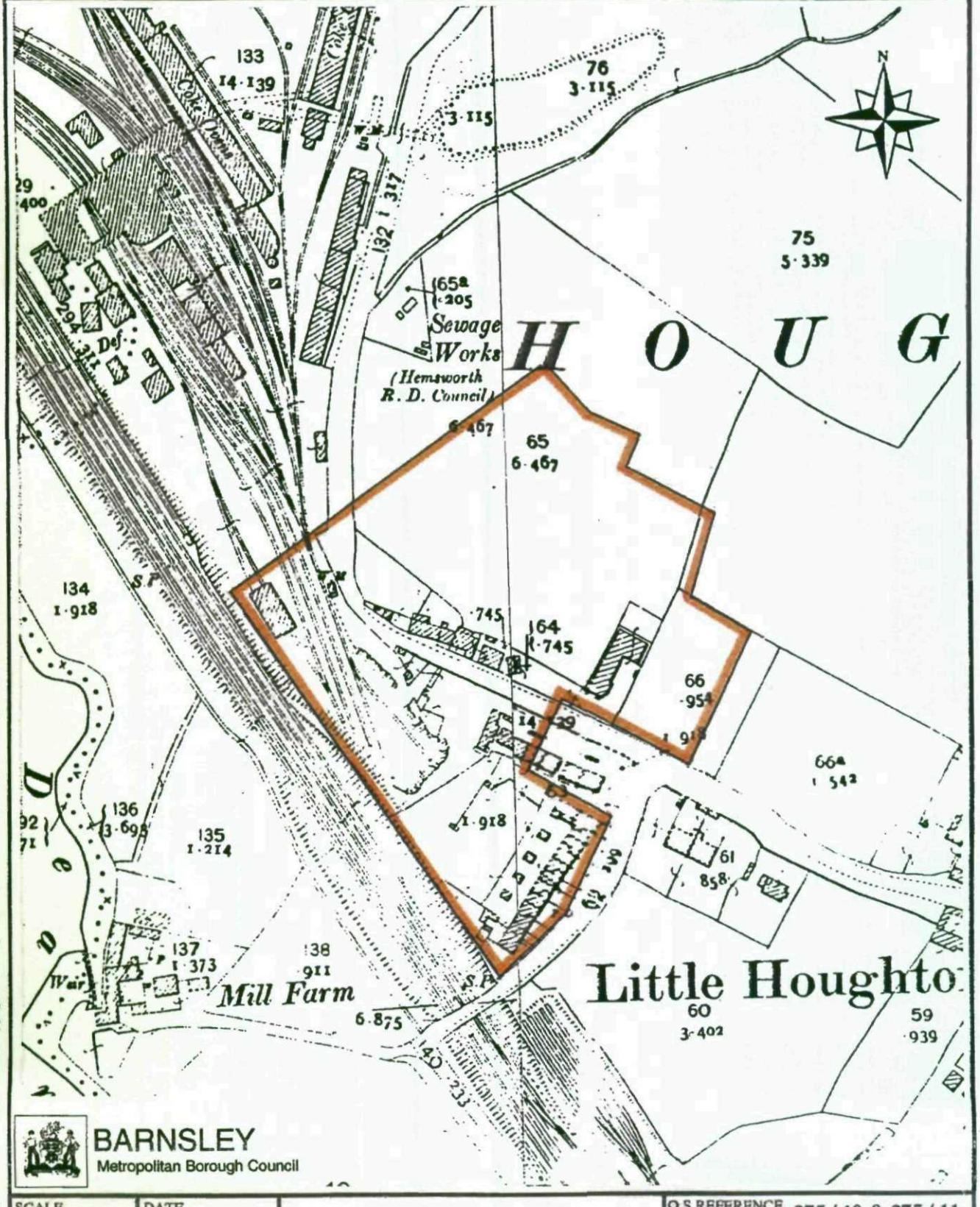
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DRAWING TITLE

LITTLE HOUGHTON
1906 ORDNANCE MAP (COUNTY SERIES)

DRAWING NO.

M461 / 6N



BARNSLEY
Metropolitan Borough Council

SCALE	DATE		O.S REFERENCE
1 / 2500	6 / 3 / 08	SOUTH YORKSHIRE MINING	275 / 10 & 275 / 11 1906 EDITION
DRAWN BY: SMW	CHECKED BY	ADVISORY SERVICE	P. JAMES BSc (Hons) PRINCIPAL MINING ENGINEER

BMBC Licence Number 100022264 2008

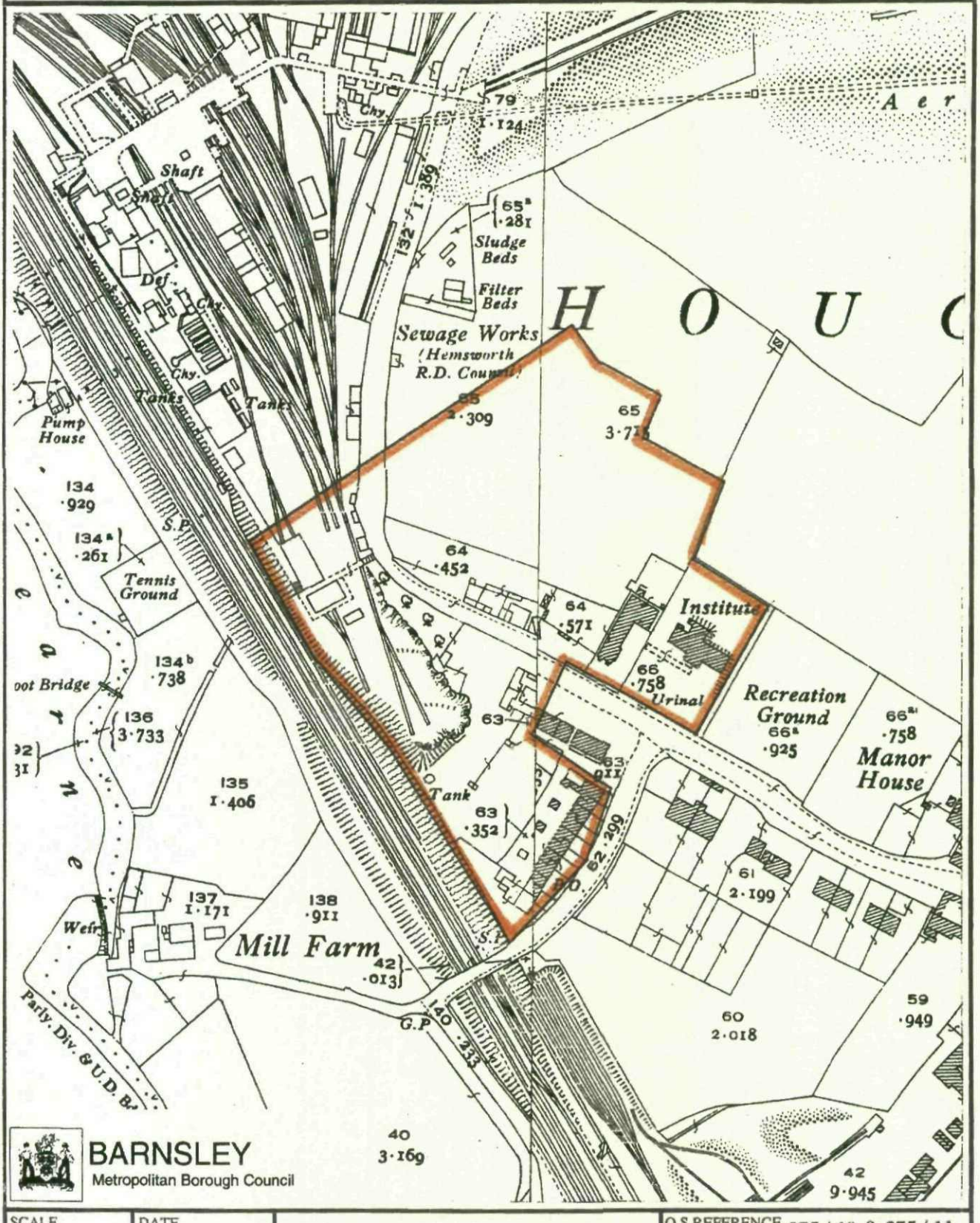
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DRAWING TITLE

LITTLE HOUGHTON
1931 ORDNANCE MAP

DRAWING NO.

M461 / 60



SCALE	DATE		O.S REFERENCE
1 / 2500	6 / 3 / 08	**SOUTH YORKSHIRE MINING ADVISORY SERVICE**	275 / 10 & 275 / 11 1931 EDITION
DRAWN BY: SMW	CHECKED BY		P. JAMES BSc (Hons) PRINCIPAL MINING ENGINEER

BMBC Licence Number 100022264 2008

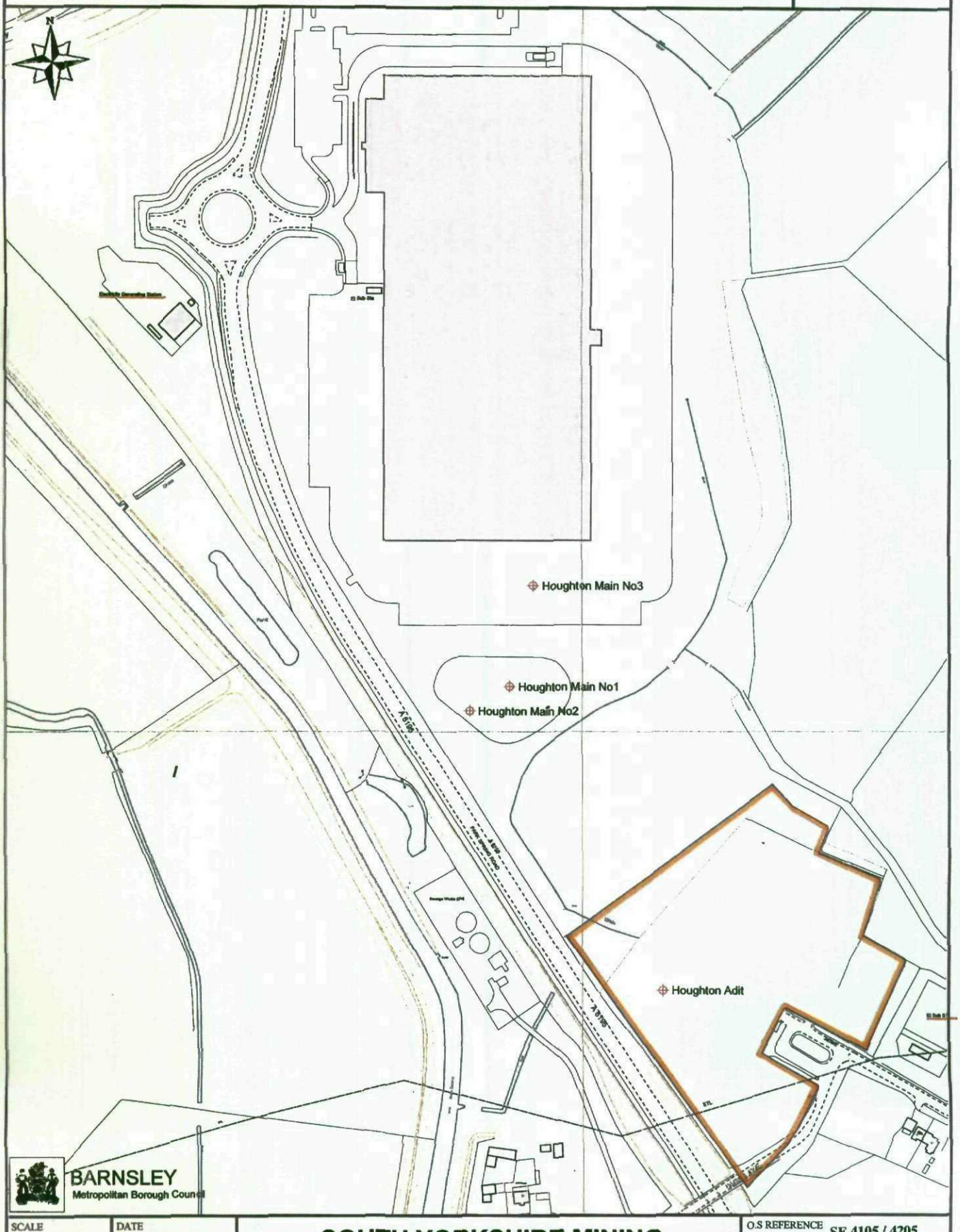
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DRAWING TITLE

LITTLE HOUGHTON SHAFT LOCATIONS

DRAWING NO.

M461 / 6M



BARNSLEY
Metropolitan Borough Council

SCALE	DATE	SOUTH YORKSHIRE MINING ADVISORY SERVICE	O.S REFERENCE
1 / 2500	6 / 3 / 08		SE 4105 / 4205 SE 4105 / 4206
DRAWN BY	CHECKED BY		PRINCIPAL MINING ENGINEER
SMW			

BMBC Licence Number 100022264 2006

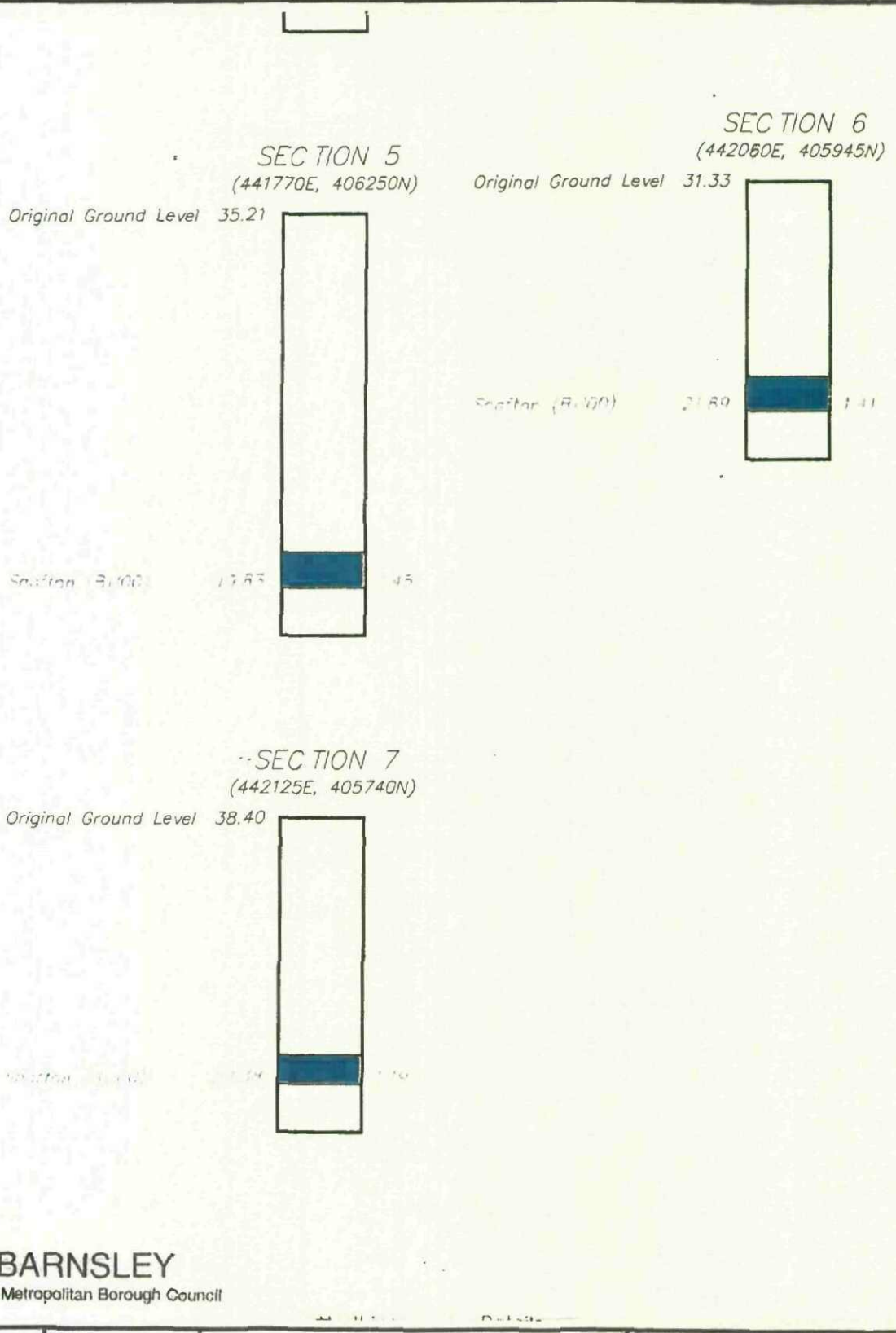
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DRAWING TITLE

LITTLE HOUGHTON SECTIONS

DRAWING NO.

M461 / 6P



BARNSLEY
Metropolitan Borough Council

SCALE	DATE		O.S REFERENCE
——	6 / 3 / 08	SOUTH YORKSHIRE MINING ADVISORY SERVICE	——
DRAWN BY: SMW	CHECKED BY:		P. JAMES BSc (Hons) PRINCIPAL MINING ENGINEER

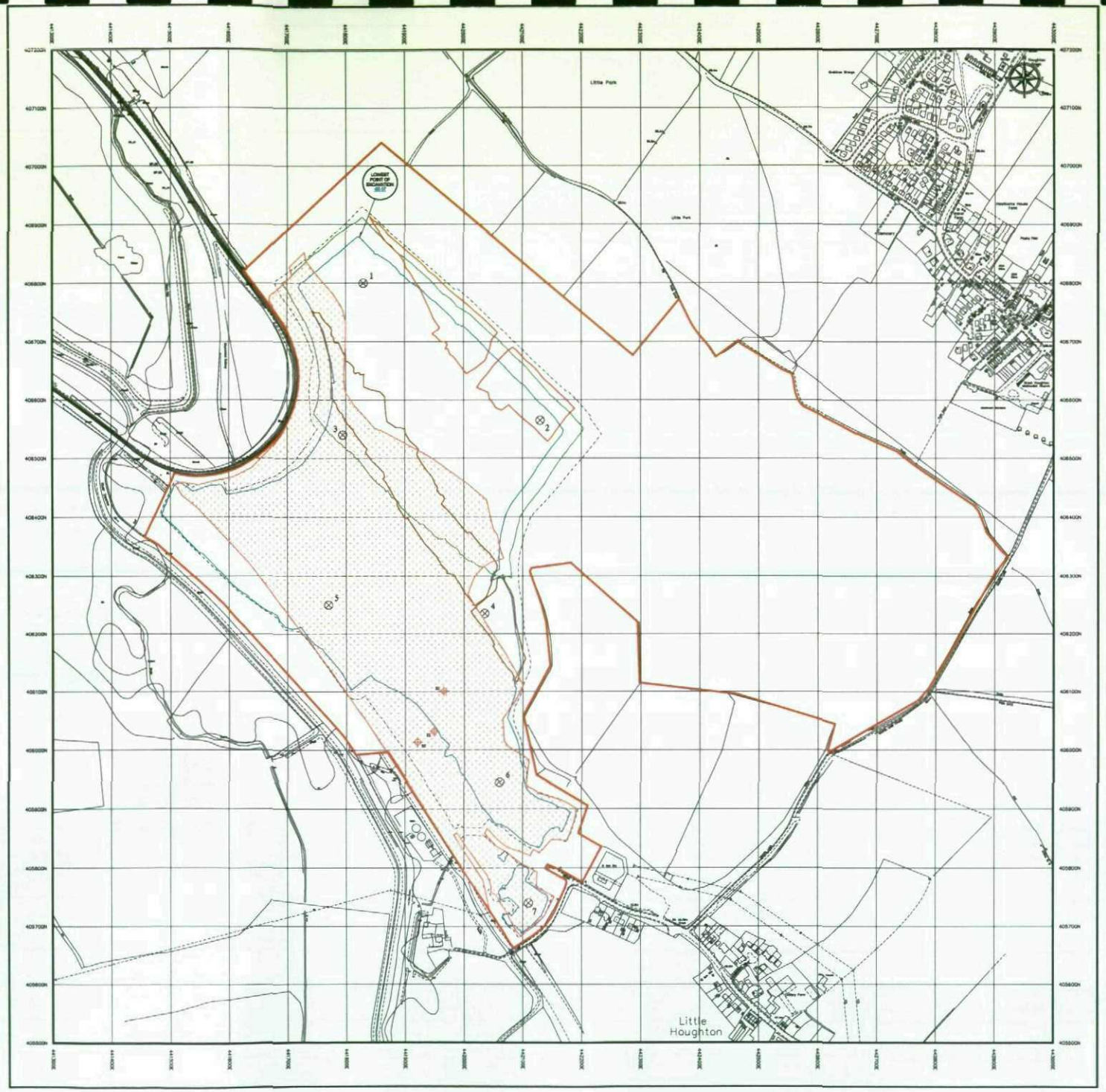
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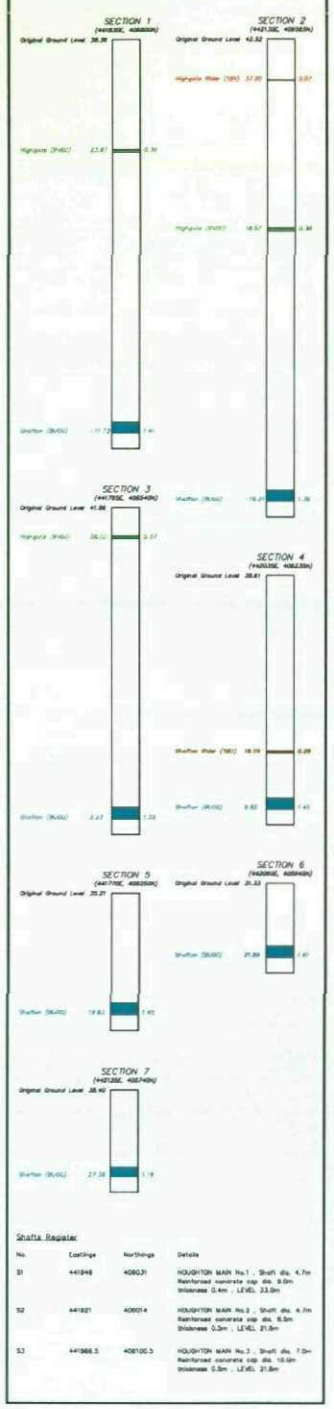
APPENDIX G

UK COAL COMPLETION PLAN DRAWING NO. 48/CP/1.

creative minds



Vertical Sections - Scale 1/250



Shafts Register

No.	Eastings	Northings	Details
S1	441848	408031	HOUGHTON MAIN No.1 . Shaft dia. 4.7m Reinforced concrete cap dia. 8.0m thickness 0.4m . LEVEL 23.0m
S2	441921	408014	HOUGHTON MAIN No.2 . Shaft dia. 4.7m Reinforced concrete cap dia. 8.0m thickness 0.3m . LEVEL 21.6m
S3	441966.5	408100.5	HOUGHTON MAIN No.3 . Shaft dia. 7.0m Reinforced concrete cap dia. 10.0m thickness 0.3m . LEVEL 21.6m

Legend

- SITE BOUNDARY
- PERIMETER OF BATTER
- POSITION OF VERTICAL SECTION
- POSITION OF SHAFT (See Shaft Register for Details)
- AREA OF COMPACTION

AREA OF SEAM WORKED (WITH SEAM CODE) IN GEOLOGICAL DESCENDING ORDER

HIGHGATE RIDER	18V
HIGHGATE	8VOO
SHAFTON RIDER	18U
SHAFTON	8UOO

NOTES

LAND TYPE AND USAGE

BEFORE OPERATIONS *DERELICTION/AGRICULTURE*

AFTER RESTORATION *INDUSTRIAL DEVELOPMENT/WOODLAND/IMPROVED AGRICULTURE LAND/GRASSLAND/HEATH/PASTURE*

DETAILS OF OVERBURDEN *COAL MEASURES*

DETAILS OF BACKFILL *COMPACTED IN AREA SHOWN*

NATURE OF COAL

OPERATIONAL DATES

AUTHORISED

COALING COMMENCED *April 1997*

COALING COMPLETED *July 2000*

PLANS ISSUED

UK COAL MINING LTD

HARWORTH PARK BLYTH ROAD HARWORTH

DONCASTER S.YORKS DN11 8DB

SITE NAME

HOUGHTON MAIN

TITLE

COMPLETION PLAN

COUNTY SOUTH YORKSHIRE	DISTRICT BARNSLEY METROPOLITAN BOROUGH	CIVIL PARISH LITTLE HOUGHTON, GREAT HOUGHTON
LOCATION 4Km EAST of BARNSLEY		
O.S. SHEETS 1/2500	Prefix 66	Based upon the Ordinance Survey 1:2500 Land Line maps with the permission of the controller of H.M.Stationery Office CROWN COPYRIGHT RESERVED Licence No.AL 100020314
		Drawn by M.R.H. Date
4107 4207		Checked by Date
4108 4208		Scale 1/2500 Sheet 1 of 2
4109 4209		Drawing No. 46/CP/1 Contract Drawing No.