PHASE II GEO-ENVIRONMENTAL ASSESSMENT

LAND OFF BECK LANE SKEGBY, MANSFIELD

GRIFFITHS DEVELOPMENTS LTD

JUNE 2025

IVY HOUSE environmental

SUMMARY TABLE: PHASE II GEO-ENVIRONMENTAL ASSESSMENT	
SITE:	Land off Beck Lane, Skegby, Mansfield, Notts.
CLIENT:	Griffiths Developments Ltd
DATE:	June 2025
REFERENCE:	IV.77.23
DEVELOPMENT PROPOSAL:	33No Semi Detached Residential Houses with gardens and landscaping.
HUMAN HEALTH:	Negligible Risk – Subject to post demolition contamination assessment
CONTROLLED WATERS:	
GAS RISK:	No Risk – No made ground and no proximal landfills.
RADON GAS:	Basic Protection Required
CONCRETE SPEC:	A review of the pH and WS Sulphate results concludes that Gen1 concrete is suitable for the proposed development. Design Sulphate Class: DS – 1; ACEC Class: AC – 1
WATER PIPES	Upgraded pipes may be required for plots 25 – 31 – STW to Confirm
COMMENTS:	Client derived Specification.

Authorised:		Richard Sutton MRICS *Director*
Date:	01.07.25	
Version:	1.1	

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APPENDICES

1.0 INTRODUCTION

1.1 PREAMBLE

This Phase II Geo-Environmental Assessment has been produced for Griffiths Developments Ltd to provide a pre-development contamination and geotechnical assessment of the site known as *Land off Beck Lane, Skegby*. The development proposal for the site is for 33No residential houses.

1.2 SITE LOCATION

The site is located approximately 3km west of Mansfield town centre. The National Grid Reference (NGR) for the approximate centre of the site is SK 506 606. The site location, development proposal and site layout are illustrated in Appendix A.

1.3 PROJECT BRIEF

The brief for the Phase II Geo-Environmental Assessment incorporates:

- Implement a Phase 2 Environmental and Geotechnical Assessment.
- Development of the Phase II Conceptual Model.
- To provide recommendations to mitigate against environmental risks.
- Provide geotechnical design for the proposed development.

1.4 DATA REFERENCES

- Environmental Search Data (Supplied by Emapsite Ltd).
- Historical Ordnance Survey (OS) Mapping (Supplied by Emapsite Ltd).
- British Geological Survey Online Geological Mapping.
- *Coal Mining Risk Assessment,* Land at Beck Lane, Sutton in Ashfield. Ref. IV.77.23.L1. Sept. 2023.
- *Phase 1 Environmental Assessment.* Land at Beck Lane, Sutton in Ashfield. Ref.IV.77.23.L1. Sept. 2024.
- *Percolation Testing.* Land at Beck Lane, Sutton in Ashfield. Ref. IV.77.23.Nov. 2024

1.5 LIMITATIONS

This report has been produced in accordance with industry best practice at the time of writing.

Ivy House Environmental Ltd has, in the production of this report, relied upon information provided by third parties. Ivy House Environmental Ltd does not warrant the accuracy of this information and will not be responsible for any opinions which Ivy House Environmental has expressed, or conclusions which it has drawn, in reliance upon information which is subsequently proven to be inaccurate.

All statements and opinions provided in this report have been reported in good faith and are based on the information gained during, and restrictions imposed by, site investigation techniques used at the time. Ivy House Environmental cannot be held responsible for conditions not revealed by the investigation.

This report has been prepared for the sole use of the client and shall not be relied upon or transferred to third parties without the express written consent of Ivy House Environmental. Unauthorised third parties rely upon the information contained within this report at their own risk.

2.0 DESK STUDY AND SITE OBSERVATIONS

2.1 HISTORICAL REVIEW: SITE DEVELOPMENT

The Phase 1 Desk Study reports that the site was originally open arable land which has been occupied by a *Nursery* (plants) from 1957 onwards. Land surrounding the site has been occupied by residential housing as Mansfield & Skegby have increased in size over the years.

Agricultural land to the west of the site as recently been subject to significant residential development.

2.2 DEVELOPMENT PROPOSAL

The development proposal is for the demolition of the existing house and workshop and the construction of 33No residential properties with associated private gardens landscaping and roads.

2.3 SITE DESCRIPTION

The site is located off Beck Lane, Sutton in Ashfield and generally comprises a garden area in the east, several workshop areas and barns within the centre of the site and a paddock in the west.

The garden area in the east forms a grassed area with Leylandii type trees around the perimeter. Workshops and barns of brick construction and asbestos sheeting form the central section of the site with numerous old vehicles parked within this area. A concrete slab is present along the northern boundary. The remaining area comprised rough gravel hardstanding with grassed areas. The area within the western section of the site comprised an overgrown paddock area with bonfire area in the north. Trees and shrubs of varying type and maturity are present around the site boundaries and occasionally across the centre of the site.

Land to the North along Beck Lane is currently under development for residential housing.

Plans showing the site location and development proposal are included within Appendix A.

2.4 ANTICIPATED GEOLOGY

Geological information supplied for the Phase 1 Report illustrates that the site is underlain by Bedrock strata of the *Cadeby Formation* (Dolostone) and the *Lenton Sandstone* Formation. Superficial strata are not present at the site.

2.5 HYDROGEOLOGY & HYDROLOGY

2.5.1 Hydrogeology

The bedrock strata are classified as *Principal Aquifers.* There are two groundwater abstractions located within 2km of the site.

The site is not situated within 500m of a groundwater abstraction or Source Protection Zone (SPZ).

2.5.2 Hydrology

There is a single surface water abstraction within 1750m of the site.

Environment Agency data suggests that the site is not situated within 250m of Zone 2 or Zone 3 floodplain.

2.6 COAL FIELDS

A Coal Mining Report has been undertaken for the site and concludes that:

- The site is not located within a High Development Risk area and no features have been identified on site in relation to historical coal mining legacy at the site. On this basis, it

is considered that no intrusive investigation works are required with respect to the risks associated with the historic mining legacy of the site.

2.7 POTENTIALLY CONTAMINATIVE LAND USES

The site has been occupied by a Nursery business since the 1950's, The site is currently home to a business servicing and repairing vehicles, therefore likely contaminants of concern are:

- Heavy metals, inorganics, asbestos fibres, OCP & OPP's, Petroleum hydrocarbons.

2.8 ASBESTOS

The buildings on site were constructed in the 1950's and, therefore, could include asbestos materials with the fabric of the structure.

An asbestos survey is recommended to inform the demolition works.

2.9 ACCESS

Future access to the site, will be from Omberley Avenue to the South - West.

2.10 RADON GAS ASSESSMENT

Radon data supplied by Emapsite Ltd (Appendix C) confirms that the site is located within an area emitting 5 – 10% Radon. Therefore, basic Radon protection is required for all of the structures built on site.

Figure 3.1: Phase 1 Conceptual Site Model

<table>
<tr><th colspan="4">HUMAN HEALTH</th></tr>
<tr><th>SOURCE</th><th>PATHWAY</th><th>RECEPTOR</th><th>SOLUTION</th></tr>
<tr><td rowspan="4">Potentially contaminated made ground and natural strata from historical site use (nursery & vehicle garage). Potential contaminants of concern include Heavy Metals, PAHs, TPH, SVOC/VOC, OCP, OPP and Asbestos containing materials.

Bonfire Ash Residues

Exposure to Radon Gas</td><td>Dermal contact with potentially contaminated soil dust; ingestion and inhalation of potentially contaminated soil dust.</td><td>Construction Workers</td><td>Basic PPE for all workers (overalls, gloves, dust mask if required) and wash facilities/personal hygiene</td></tr>
<tr><td>Consumption of soil and vegetables grown in potentially contaminated soil</td><td rowspan="2">End Users
(e.g. Residents)</td><td rowspan="3">Phase II Investigation recommended + Post demolition assessment of former workshop footprint.

Basic radon protection required.

Removal of Bonfire Ash

Potentially upgraded water pipes for properties within vicinity of workshop building.</td></tr>
<tr><td>Inhalation of asbestos fibres.</td></tr>
<tr><td>Leaching into water supply pipes</td><td>Water Supply/End Users</td></tr>
<tr><th colspan="4">CONTROLLED WATERS</th></tr>
<tr><td>Potentially contaminated made ground and natural strata from historical site use (nursery & vehicle garage). Potential contaminants of concern include Heavy Metals, PAHs, TPH, OCP, OPP.</td><td>Leaching and vertical migration through the vadose zone to the saturated zone</td><td>Principal Aquifers</td><td>Phase II Investigation recommended.</td></tr>
</table>

3.0 PHASE II FIELDWORK

3.1 INTRODUCTION

The Phase II intrusive investigation was completed on three occasions:

- 4th October 2023 – 12No WS boreholes advanced to refusal at depths of 1.0 – 2.0mbgl 4No Topsoil samples at 0.2mbgl. Screening Suite Analysis.

- 12th October 2023 – 8No Trial trenches excavated across the site.
  5No Screening Suites and 3No OPP and OCP Pesticides @ 0.2 – 0.4mbgl & 0.3mbgl.

- August 2024 – 4No Trial Pits excavated for percolation tests.
- October 2024 – 4No Trial Pits excavated for percolation tests.

  None of the percolation tests successfully discharged the water.

As there was no made ground encountered on site or any proximal landfills, gas or groundwater monitoring installations were not installed on site.

Trial pit logs and window sample logs are contained in Appendix D.

3.2 RATIONALE

The Phase II investigation has been designed to facilitate an assessment of the general ground conditions across the site, contaminant sources, pathways and receptors. The investigation has also been designed in consideration of the current site layout and access restrictions, the development proposal and health and safety issues, the rationale behind the location of each exploratory hole is detailed in table 4.1 below:

Table 4.1: Phase II Rationale

Hole ID	Location	Notes
WS1 – 8	General grid	Screening Suite
TP1, SA1 – SA4	General grid	Soak Tests + Screen, OPP & OCP Analysis.
TT1 – TT6	Trial Trenches	Ground Assessment
WS9 - WS12	Central & Western Area	Ground Assessment

3.3 LABORATORY ANALYSIS & TESTING

Selected soil samples were analysed at specialist environmental and geotechnical laboratories as detailed in the following sections.

3.3.1 Chemical Analysis

A total of 9No samples of Topsoil were sent for analysis at a UKAS/MCERTS accredited laboratory. The scheduled parameters are detailed in table 4.1 above.

3.3.2 Geotechnical Testing

Three samples of *Reddish brown slightly gravelly slightly sandy CLAY* were sent to a UKAS accredited laboratory and subjected to Plasticity Index (PI), Water Soluble Sulphate and pH testing. A copy of the Geotechnical Lab report is contained in Appendix F.

4.0 GROUND CONDITIONS

The intrusive investigation has revealed that Topsoil across the site overlies weathered Solid Strata of the *Lenton Sandstone* Formation, which underlies the majority of the site, and the *Cadeby Formation*, which underlies the south – western corner of the site.

4.1 TOPSOIL

Topsoil, comprising *brown, gravelly SAND* is present across the majority of the site at depths of between 0.30m and 0.50m.

4.2 SOLID STRATA

Sandstone strata were identified as:

- Firm red brown silty CLAY.
- Dense orange yellow gravelly fine to coarse SAND with fine to medium, subangular to subrounded sandstone lithorelics.
- Firm, friable, reddish brown, slightly silty, slightly sandy CLAY.
- Loose to medium dense, orangish brown, slightly silty, slightly gravelly SAND. Gravel is fine to coarse, sub-rounded quartzite.
- Strong, yellowish brown SANDSTONE.

Refusals on Sandstone (Rock) were frequently observed at 1.0mbgl and 2.0mbgl across the site. Firm, red/brown silty CLAY was observed in boreholes in the eastern section of the site.

4.3 FIELD OBSERVATIONS

Table 5.1 illustrates the pertinent geological and contamination observations made during the intrusive investigation.

Table 5.1: Fieldwork Observations

Location	Depth/Strata	Observation
WS1 – 9	1.0 – 2.0mbgl/Weathered Sandstone	Western Section BH's Complete at 1.0 - 2.0mbgl
WS10 - 12	Firm Red Brown CLAY	1 – 1.70mbgl

4.4 GROUNDWATER

Groundwater strikes were not encountered in any of the exploratory holes.

Soakaway testing in a number of trial pits was not successful.

4.5 FIELD TESTS

Standard Penetration Tests (SPT) were undertaken during drilling of all windowless sampler boreholes. An assessment of the borehole logs contained in Appendix D illustrate that 4No boreholes refused on *hard strata (Rock)* at 2.0mbgl and 8No boreholes refused at 1.0mbgl on *hard strata (Rock).*

4.5.1 SOAKAWAY TESTING

Four soakaway tests were undertaken in areas of potential soakaway drainage, with specific aim at the proposed infiltration basin in the northern portion of the site. The locations of the tests (SA01-04), undertaken in trial pits TP01 and TP03, TP04 and TP05, respectively, are shown in Appendix A.

Field Data
During the August visit the following results were recorded:

- SK1 Test – No movement over 4hrs. Pit backfilled.
- SK2 Test – 3 Tests completed. Each run drained in 30mins.
- SK3 Test – Test 1 - 4hrs, 0.1m movement. Pit backfilled.
- SK4 Test – 2 tests completed – 2hrs, 0.5m movement.

Only Pit SK2 produced satisfactory percolation rates. Subsequently, a second visit was planned.

Fieldwork – October 2024
During the October fieldwork, which was carried out during a period of torrential rain, the following percolation rates were recorded:

- SA1 – 180 minutes, 3cm percolation.
- SA2 – 180 minutes, 0.5m percolation.
- SA3 – 180 minutes, 4cm percolation.
- SA4 – 180 minutes, 4cm percolation.

Only pit SA2 produced satisfactory percolation rates, however, only 1 run was completed.

Both percolation assessments illustrated that the site specific strata is not suitable for soakaway drainage; further assessment of ground conditions across the site OR a re-appraisal of the development design parameters is recommended for disposal of surface water.

5.0 CONTAMINATION ASSESSMENT

5.1 HUMAN HEALTH

With regards to the soil risk assessment, Ivy House Environmental observe the following hierarchy:

- Category 4 Screening Levels (C4SLs)
- LQM Suitable 4 Use Levels (S4uls)

Where no C4SLs have been generated Ivy House will use the LQM S4ULs. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on minimal risk' as per previous guidelines and assumptions.

5.2 HUMAN HEALTH

The majority of the reported concentrations of the contaminants of concern were within their respective GAC or did not exceed their respective *Laboratory Limits of Detection* (LOD).

5.2.1 Pesticide Analysis

Analysis for Organochlorine (OCP) and Organophosphorus (OPP) Pesticides was undertaken for 3No samples of Topsoil. A review of the analysis results contained in Appendix E illustrate that none of the contaminants of concern exceeded their respective LOD.

5.2.2 Ground Gas and Soil Vapours

As made ground was not reported at the site and there are no proximal landfills, gas monitoring was not included in the scope of works for the project.

Basic Radon protection is, however, required for all structures.

5.2.3 Asbestos Contamination

Asbestos fibres were not recorded in any of the soil samples scheduled for analysis.

Potential asbestos containing materials could be present in the fabric of the on – site structures and, therefore, a pre-demolition asbestos survey should be completed to inform the pre – demolition strip out works.

5.3 CONTROLLED WATERS

Groundwater was not encountered during the site investigation.

6.0 PHASE II CONCEPTUAL SITE MODEL

The conceptual model for the site considers the development proposal for residential *with produce use* and the information gathered during the Phase II assessment.

The site's former use as a nursery and current use as a vehicle workshop are considered in respect to potential contaminative sources.

There are no landfill sites within 500m of the site.

There are areas of bonfire ash on site, which are sources of potential contamination. These should be removed and the underlying strata validated to confirm non-contaminated ground.

There is no reported contaminated topsoil across the site. Post demolition, an assessment of soil quality should be implemented across the workshop footprint.

Pathways for the end user of the site include the ingestion of soil and vegetables, direct contact (dermal) with soil and soil dust; ingestion and inhalation of soil dust and exposure to Radon Gas.

Basic Radon protection is required for all properties.

Upgraded water pipes may be required - Subject to utility confirmation.

The primary receptors for the site are construction workers and end users of the site (Residents of completed development). The risk posed to human health receptors is, at this stage, considered Negligible - Moderate, subject to the post demolition contamination assessment around the garage footprint and bonfire ash removal.

For the environment (controlled waters) the primary receptors are the underlying Principal Aquifers.

The majority of the site does not pose a risk to controlled waters.

For the workshop footprint, potential contaminants of concern for the environment include: Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons, SVOC/VOC and BTEX/MTBE.

The primary pathway for controlled waters is the leaching and vertical migration of contaminants through the vadose zone to the saturated zone.

The risk posed to controlled waters (principal aquifers) by contaminated made ground and natural strata relating to the workshop is considered to be low – moderate.

The development of the conceptual model is illustrated on Figure 7.1.

Figure 7.1: Phase II Conceptual Site Model

HUMAN HEALTH – FIELD ASSESSMENT			
SOURCE	**PATHWAY**	**RECEPTOR**	**SOLUTION**
No soil contaminated Soil reported.	Ingestion of soil and vegetables, direct contact (dermal) with soil and soil dust; ingestion and inhalation of soil dust. Exposure to Radon Gas	Construction Workers	Basic PPE for all workers (overalls, gloves, dust mask if required) and wash facilities/personal hygiene
		End Users (Residents)	Post Demolition assessment across workshop footprint. Basic Radon protection measures required.
HUMAN HEALTH - WORKSHOP ASSESSMENT			
Potential contamination within the workshop footprint & Beneath Bonfires – Metals, PAH's, TPH, SVOC, VOC, Asbestos fibres.	Inhalation of soil vapours (VOC). Leaching into water supply pipes	End Users (Residents)	Potential requirement for upgraded water pipes, e.g. aluminium sheathed or steel pipes – Check with utility provider. Removal of contaminated ground.
Asbestos Fibres	Inhalation of fibres	Construction Workers	Assessment of bonfire footprints post removal. Screening and removal of ACMs as part of an appropriate Asbestos Management Plan. Pre demolition removal of ACM.
CONTROLLED WATERS			
Potentially contaminated made ground within workshop footprint, contaminants of concern include Metals, PAH's, TPH, SVOC, VOC.	Leaching and vertical migration through the vadose zone to the saturated zone	Principal Aquifers	Post demolition assessment of Workshop footprint.
Contaminated made ground from historical site use (allotments, timber storage, concrete manufacture,	Leaching and horizontal migration to surface waters		

7.0 RISK MANAGEMENT & REMEDIATION

Previous sections have quantified the risk posed to identified receptors which, in some instances, require remediation to protect or reduce levels of risk.

At this stage, the Phase 2 reports that there are no elevated contaminant concentrations within the soil assessed across the site.

However, a post demolition/Removal contamination assessment is required for the footprint of the existing workshop and the bonfires.

7.1 REMEDIATION TO PROTECT END USERS

Soil quality across the site is good, with no contamination reported.

Upgraded water supply pipes may be required – a copy of this report should be sent to STW.

Basic Radon Protection is required.

7.2 REMEDIATION TO PROTECT CONTROLLED WATERS

At this stage, no remediation is required to protect this receptor.

However, a post demolition assessment is recommended for the workshop buildings and bonfire footprints.

7.3 REMEDIATION TO PROTECT CONSTRUCTION WORKERS

Standard PPE for asbestos contractors is required as per their RAMS.

7.4 REMEDIATION TO PROTECT THIRD PARTIES

No remediation, at this stage, is required to protect this receptor.

7.5 REMEDIATION TO PROTECT CONSTRUCTION MATERIALS

Concrete specifications have been provided.

Upgraded water pipes may be required by STW.

7.6 WASTE MANAGEMENT

Topsoil across the site should be suitable for use at a restoration project – subject to site specific assessment criteria.

8.0 RECOMMENDATIONS

Recommendations for further assessment of the site include:

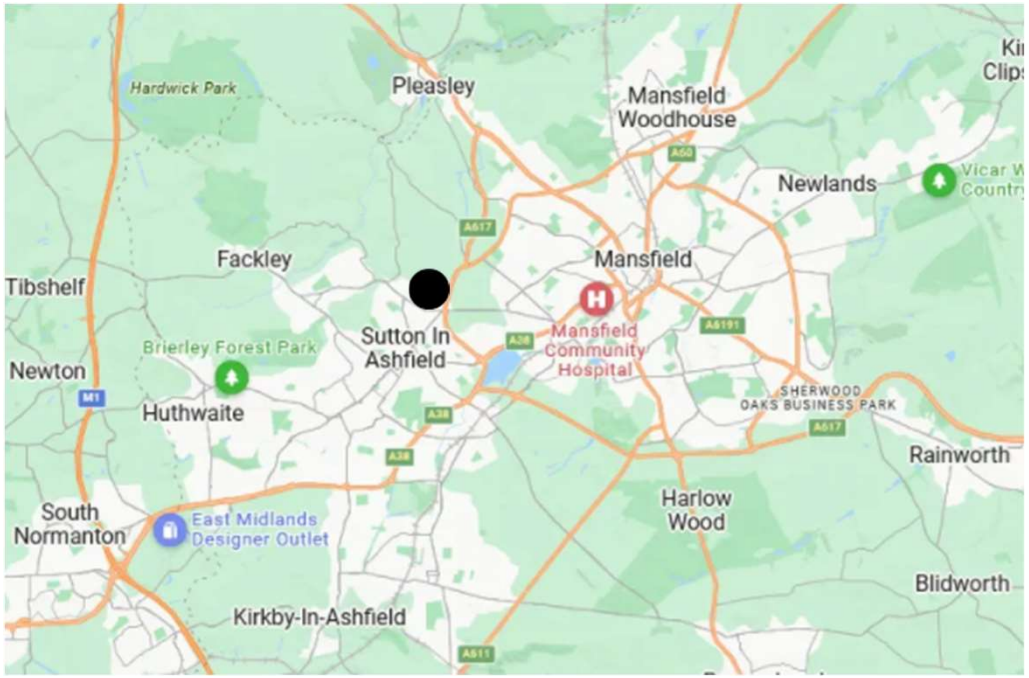
- An asbestos survey should be scheduled for the workshop buildings.
- A post demolition contamination assessment of the workshop footprint is required.
- Post clearance assessment of any bonfire footprints should be implemented.
- Should any signs of organic contamination (solvents/oils/fuels) be evident during construction activities, a qualified environmental specialist should be consulted to assess the risk posed to end users and the environment.
- Consultation with local building control should be entered into to confirm the foundation specification for the development.
- The concrete specification for the development is GEN1.
- Basic Radon protection should be installed as specified and confirmed by a qualified building inspector.

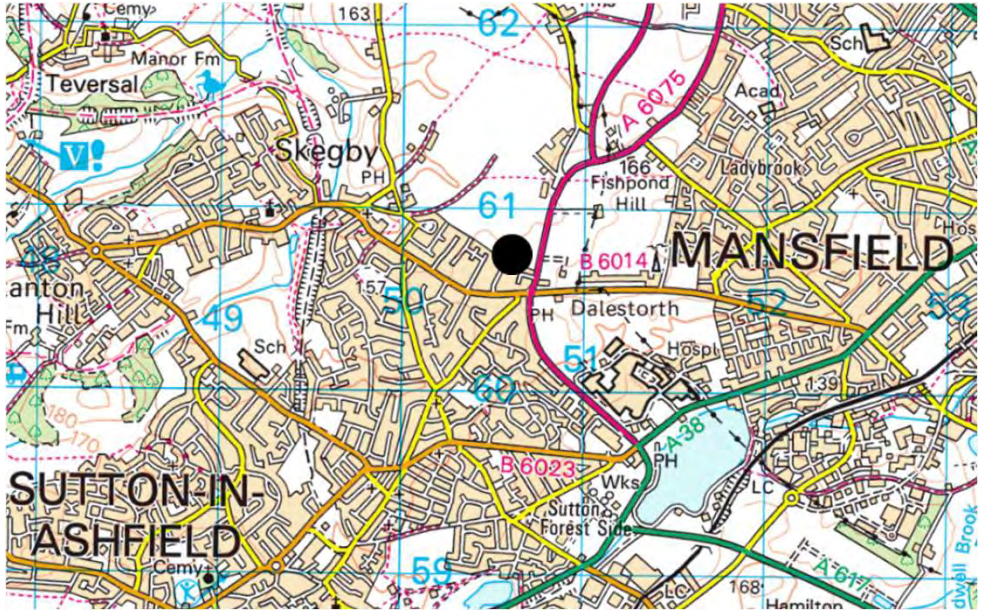
9.0 CONCLUSIONS

The Phase 2 Assessment and the recommendations contained within has illustrated that the proposed residential development, at this stage, does not pose a risk to end users of the site or the environment.

However, a post demolition assessment of the footprint of the workshop is required and the conceptual model for the site may be subject to revision accordingly.

APPENDIX A





KEY:

● Approximate Site Location

DO NOT SCALE

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TITLE: Site Location Plan

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 1

N

KEY:

Site Boundary

DO NOT SCALE

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TITLE: Site Layout

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 2

KEY:

DO NOT SCALE

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TITLE: Development Proposal

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 3

KEY:

Window Sample Borehole Location

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TITLE: Window Sample Location Plan

PROJECT: Land off Beck Lane, Sutton in Ashfield

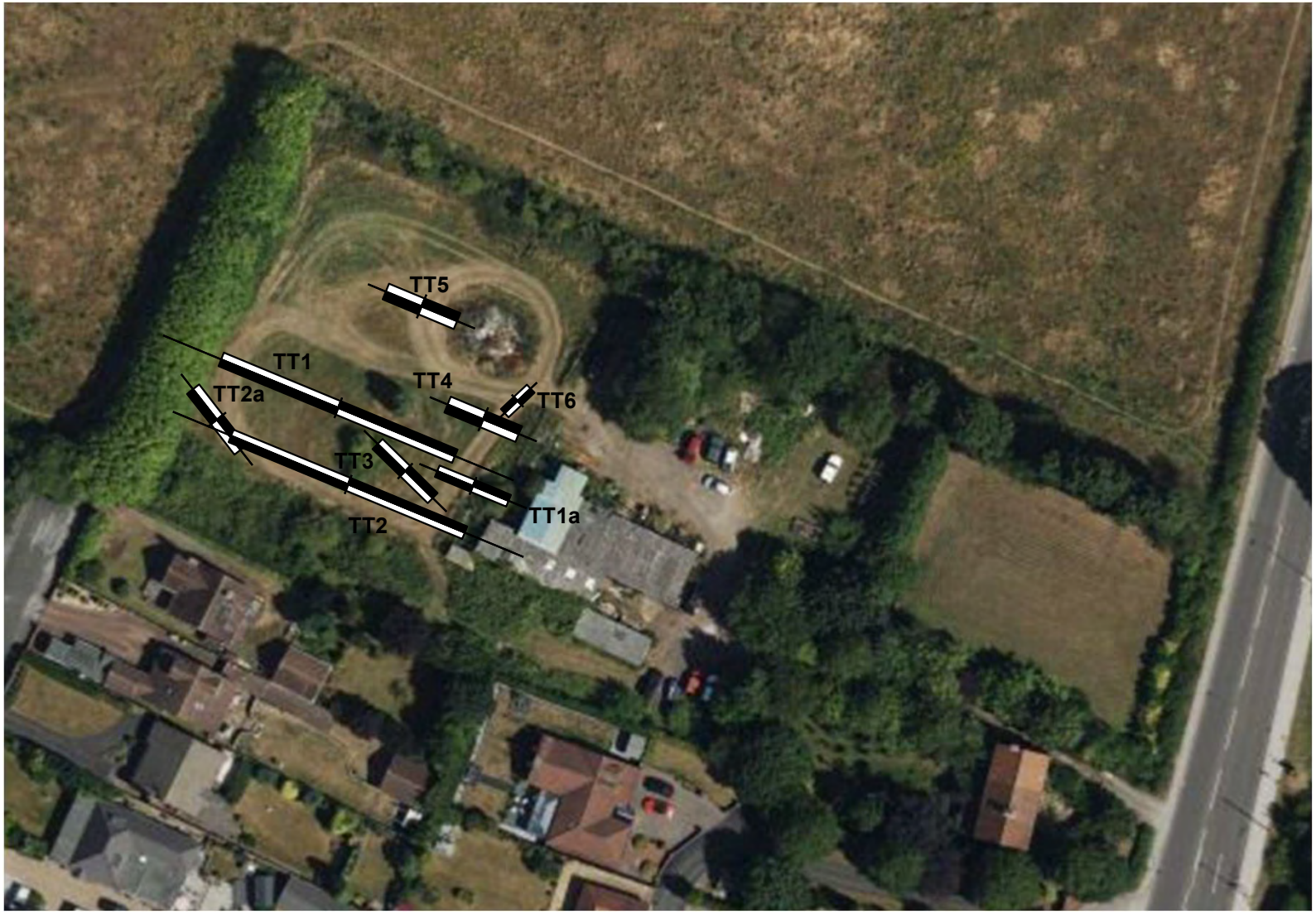
PROJECT No: IV.77.23

DATE: 09/2023

SCALE : NTS

DRAWN : VS

DWG No: Figure 4



KEY:

Trial Trench Location

DO NOT SCALE

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TITLE: Trial Trench Location Plan

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 5

KEY:

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TITLE: Site Photographs

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 6

KEY:

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TITLE: Site Photographs

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 7

APPENDIX B

COAL MINING RISK ASSESSMENT

LAND OFF BECK LANE, SUTTON IN ASHFIELD, NOTTINGHAMSHIRE

GRIFFITHS SERVICES AND DEVELOPMENTS LTD & NOTTINGHAM COMMUNITY HOUSING LTD

SEPTEMBER 2023

IVY HOUSE environmental

COAL MINING RISK ASSESSMENT
Land off Beck Lane, Sutton in Ashfield

Ref: IV.77.23 – V1

September 2023

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1. BACKGROUND

Introduction
This desk-based Coal Mining Risk Assessment (CMRA) relates to a site known as Land off Beck Lane, Sutton in Ashfield, Nottinghamshire. It is understood the site is to be developed with 35 residential properties with associated private gardens and roadways.

The CMRA has been prepared to provide information on the following:

- present a desk-based review of all available information on the coal mining issues that are relevant to the application site;
- use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact of issues;
- set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development;
- demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of National Planning Policy Framework with regard to development on unstable land.

Site Location and Description
The site comprises several buildings within the centre of the site and surrounding by garden/paddock areas. Trees and shrubs form the site boundaries. The site is bound to the north and west by agricultural fields and residential properties to the south. Beck Lane bounds the site to the east.

The site location plan, current site layout and development proposal are shown in **Appendix A**.

The site is located approximately 2km north-east of Sutton in Ashfield town centre. The National Grid Reference (NGR) for the approximate centre of the site is SK 506 607. The site appears to rise gently from the north west to south east.

The site is understood to have been undeveloped until the 1950's when a nursery was developed within the centre of the site.

2. SOURCES OF INFORMATION USED TO INFORM THIS REPORT

Information from the following sources has been used to undertake this CMRA.

- Coal Authority Interactive Mapping Website;
- Coal Authority Consultants Coal Mining Report, Ref: 51003377799001, dated: 13th September 2023 – **Appendix B**;
- BGS 1:50,000 scale Sheet Chesterfield (112);
- BGS Digital Geological Mapping;
- CIRIA "SP32 Construction over Abandoned Mine Workings" (2002);
- CIRIA "C758D Abandoned Mine Workings Manual" (2019).

3. FACTUAL INFORMATION

Geological Context
BGS 1:50,000 Scale Sheet Chesterfield (112) and Digital On-Line Mapping
The BGS geological maps for this area show that superficial deposits are generally not present on site however Till is shown to the immediate east. Solid strata are shown to belong to the Lenton Sandstone Formation with solid strata of the Cadeby Formation to the west.

No coal seams or coal mining are identified within close proximity to the site. In addition, no geological features are recorded within close proximity of the site.

No relevant borehole records are recorded within close proximity to the site.

The geological map is shown in the figures in **Appendix A.**

Coal Authority Interactive Mapping Web Site
Reference to the Coal Authority (CA) Interactive Mapping Web Site shows:

- the site is not indicated to be within an area designated as being of High Development Risk;
- there are no recorded abandoned mine entries within or within the vicinity of the site;
- there are no coal outcrops recorded within close proximity of the site;
- the site is not located within an area where probable shallow coal mine workings are present within close proximity of the site;
- no surface workings (the site is not located within an area where past or current) of shallow coal mine workings are present within close proximity of the site.

A plan showing the above information from the CA Interactive Mapping Website map is included in the figures in Appendix A.

Coal Authority Consultants Coal Mining Report
The CA report (**Appendix B**) findings are detailed below:

Past Underground Coal Mining – The CA report confirms that the site is located in a region where there are records of past workings in the Top Hard, Dunsil, Deep Soft, Deep Hard, First Piper and Tupton coal seams. The shallowest is recorded at a depth of 177mbgl with an extraction thickness of 1.8m thick, and last worked from the Teversal in 1940. The dipping rate of the seam worked is recorded to be 5.4^{o} in a north-easternly direction.

Probable Unrecorded Shallow Workings - The report states that the site is not recorded to be in an area where Probable Unrecorded Shallow Workings are present beneath the site.

Spine Roadways at Shallow Depth – No spine roadways are recorded at shallow depth.

Mine Entries – None recorded within 100 metres of the enquiry boundary.

Outcrops – The report confirms there are no outcrops recorded beneath the site.

Geological Faults, Fissures and Breaklines – No faults, fissures or breaklines are recorded within influencing distance of the site.

Opencast Extraction – No opencast mines are recorded within 500m of the site.

Subsidence – The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property;

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine Gas – No mine gas is recorded within 500m of the site boundary.

Withdrawal of Support Notices - The property is in an area where a notice to withdraw support was been given in 1982.

4. INTERPRETATION

Based on all of the above information, the following interpretations have been formed:

- the site is not located within a High Development Risk Area in terms of coal;
- no features in relation to historic coal mining legacy are recorded on site or within close proximity to the site;
- the site is not at risk from opencast mining;
- the property is in an area where a notice to withdraw support was given in 1982.

5. RISK ASSESSMENT

The table below summarises the potential risks associated with mining legacy for the proposed site, identified from the sources identified above.

Coal Mining Issue	Yes	No	Risk Assessment
Underground mining (recorded at shallow depths)		No	Negligible
Underground mining (unrecorded probable at shallow depths)		No	Negligible
Recorded Mine entries (shafts and adits)		No	Negligible
Unrecorded Mine entries (shafts and adits)		No	Negligible
Mining geology (faults and fissures)		No	Negligible
Coal mine gas emissions		No	Negligible
Recorded mining subsidence hazard		No	Negligible
Surface mining (opencast workings)		No	Negligible

5. CONCLUSION

The site is not located within a High Development Risk area and no features have been identified on site in relation to historical coal mining legacy at the site. On this basis, it is considered that no intrusive investigation works are required with respect to the risks associated with the historic mining legacy of the site.

RELEVANT APPENDICES

Appendix A: Site Plans

Appendix B: Coal Authority Consultants Coal Mining Report

Written by:		Victoria Sutton BSc (Hons) *Engineering Manager*
Authorised:		David Johnson BSc MSc (Eng) *Technical Director*
Date:	14th September 2023	
Version:	1.0	

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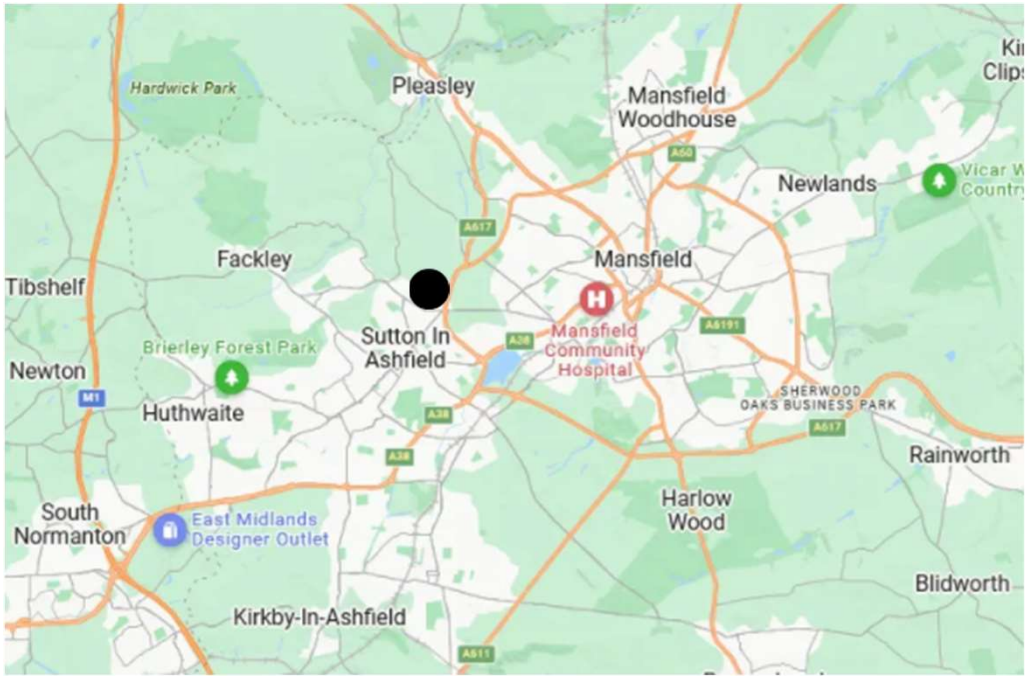
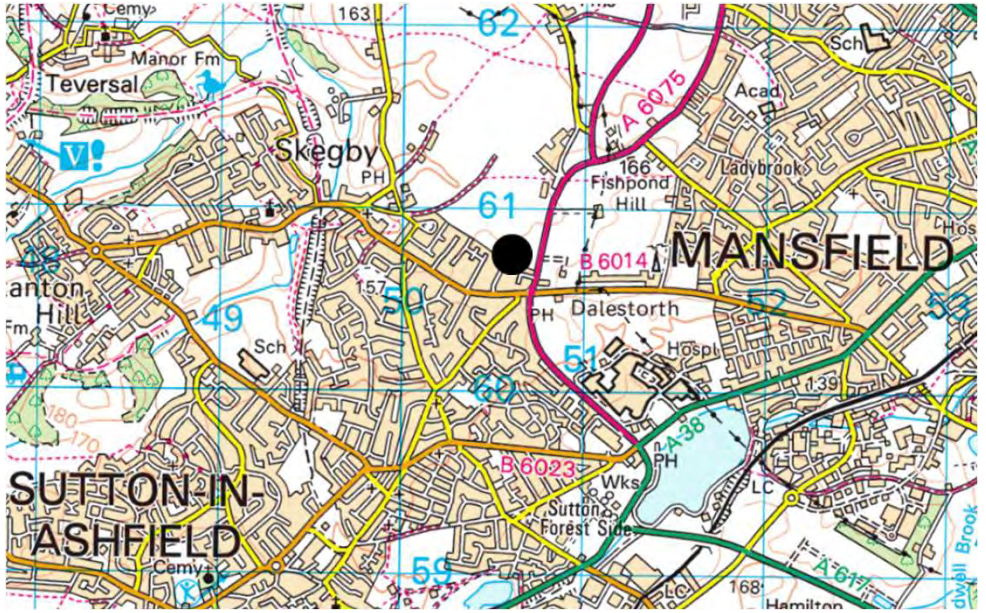
APPENDIX A





KEY:

● Approximate Site Location

DO NOT SCALE

IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhouseenv.co.uk • www.ivyhouseenv.co.uk • 01332 661 987

TITLE: Site Location Plan

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 1

N

KEY:

Site Boundary

DO NOT SCALE

IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE: Site Layout

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No: IV.77.23

DATE: 09/2023

SCALE : NTS

DRAWN : VS

DWG No: Figure 2

KEY:

DO NOT SCALE

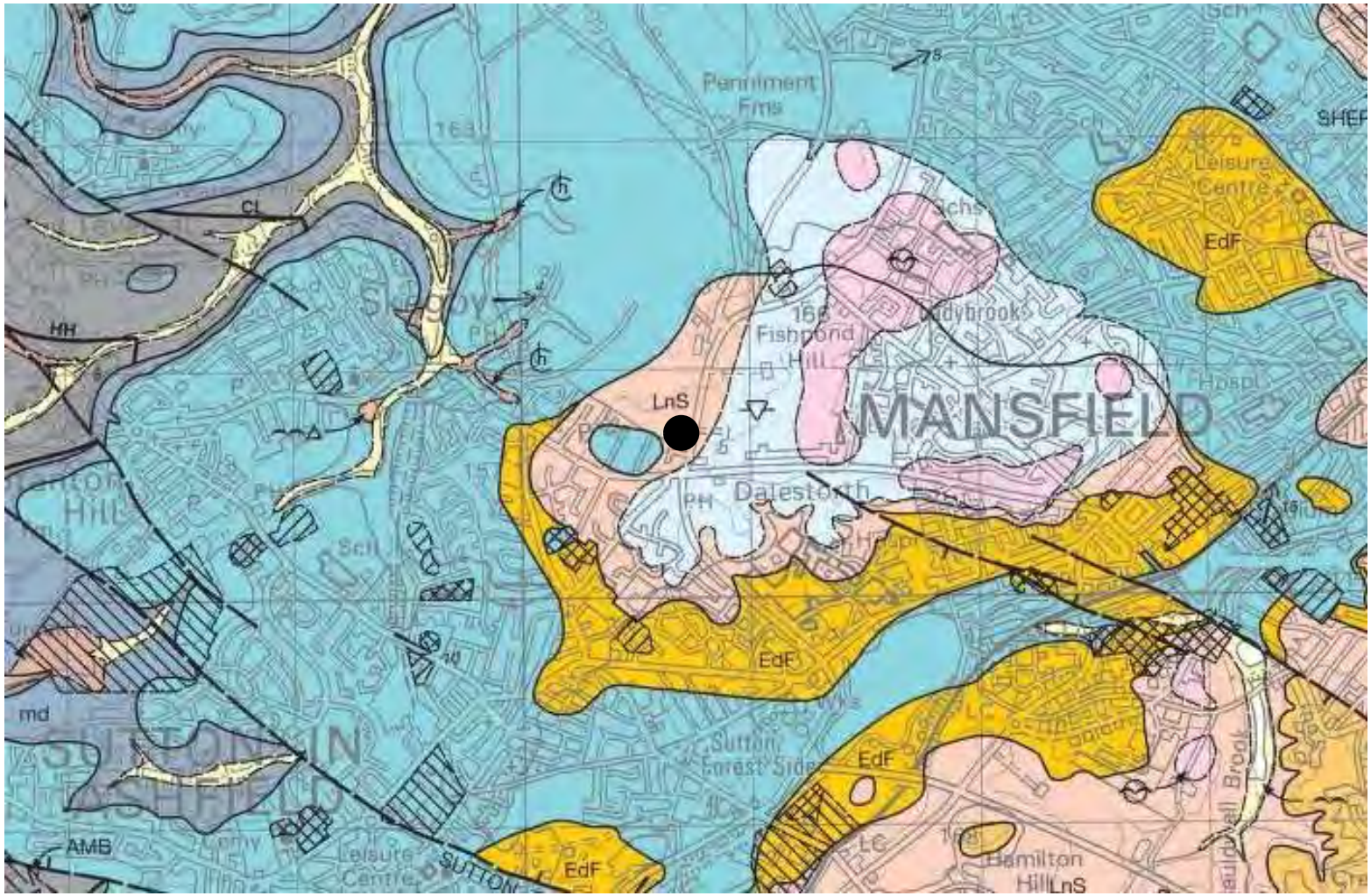
IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE: Development Proposal

PROJECT: Land off Beck Lane, Sutton in Ashfield

PROJECT No:	DATE:
IV.77.23	09/2023

SCALE :	DRAWN :	DWG No:
NTS	VS	Figure 3



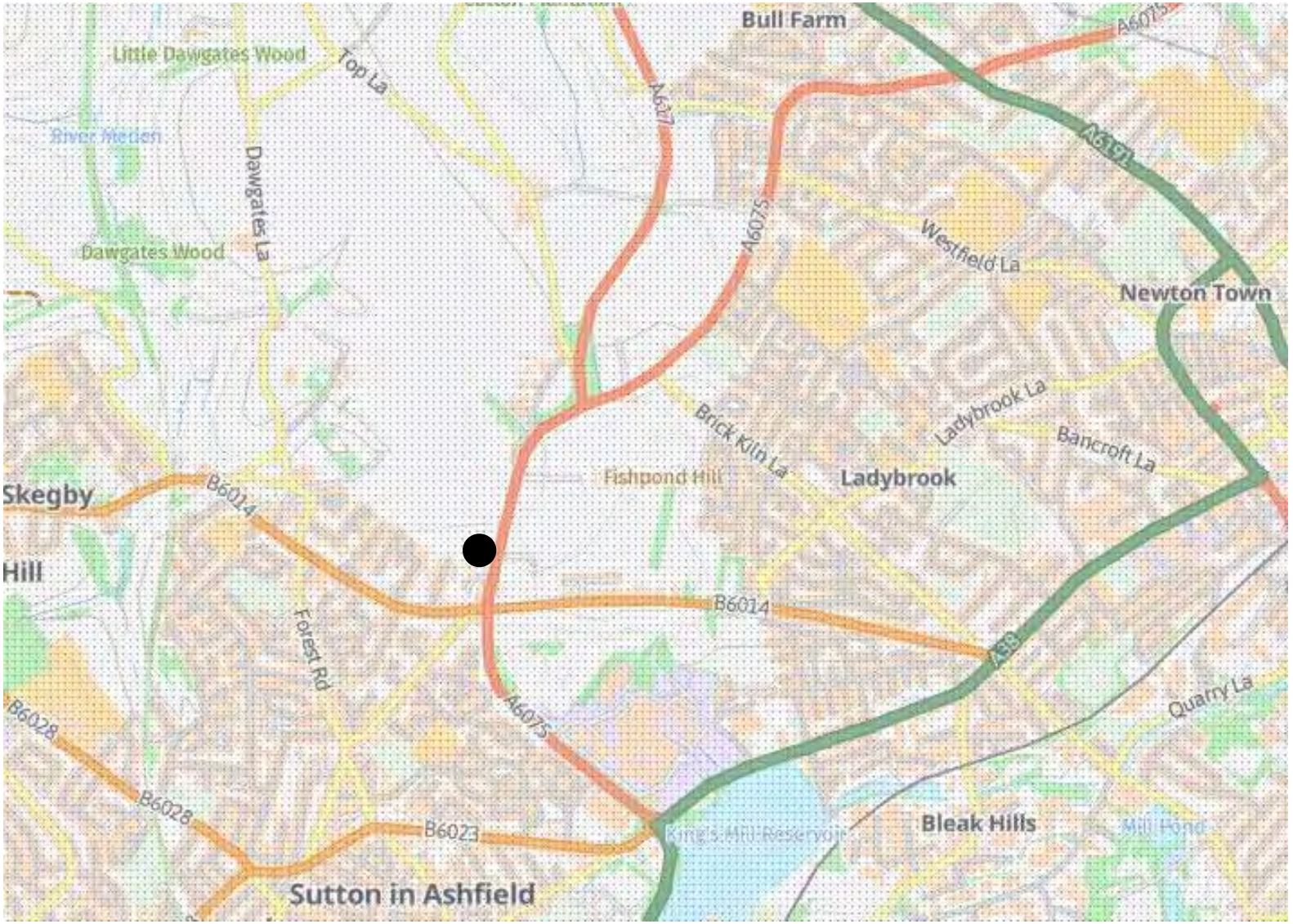
KEY:

● Approximate Site Location

DO NOT SCALE

IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE:	Geology Chesterfield (112) Map
PROJECT:	Land off Beck Lane, Sutton in Ashfield
PROJECT No:	IV.77.23
DATE:	09/2023
SCALE :	NTS
DRAWN :	VS
DWG No:	Figure 4



KEY:

● Approximate Site Location

DO NOT SCALE

IVY HOUSE environmental
Scotland Farm, Ockbrook, Derby, DE72 3RX
rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE:	CA Interactive Map
PROJECT:	Land off Beck Lane, Sutton in Ashfield
PROJECT No:	IV.77.23
DATE:	09/2023
SCALE :	NTS
DRAWN :	VS
DWG No:	Figure 5

APPENDIX B

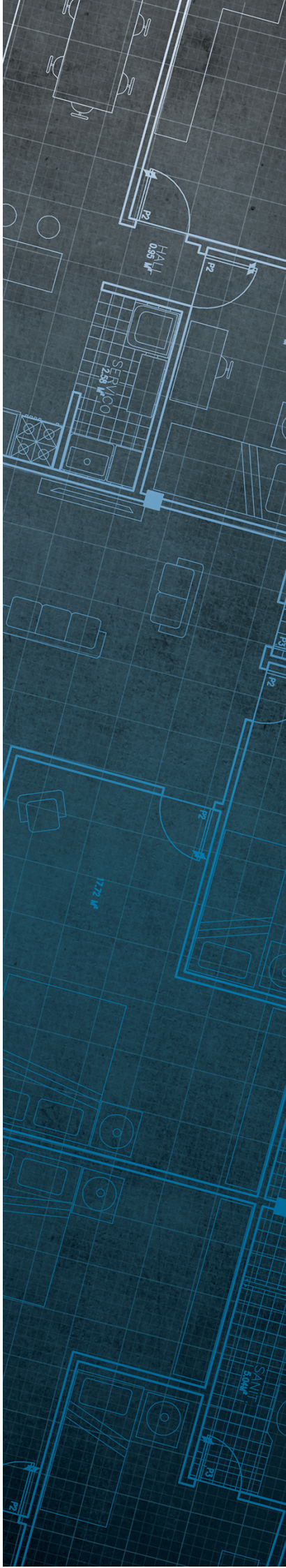
The Coal Authority

Consultants

Coal Mining Report

Land West Of
Beck Lane
Sutton In Ashfield
Nottinghamshire
NG17 3AH

Date of enquiry:	**13 September 2023**
Date enquiry received:	**13 September 2023**
Issue date:	**13 September 2023**
Our reference:	**51003377799001**
Your reference:	**IV.77.23**



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

Ivy House Environmental Ltd

Enquiry address

Land West Of
Beck Lane
Sutton In Ashfield
Nottinghamshire
NG17 3AH

Approximate position of property

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

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

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
TEVERSAL	TOP HARD	Coal	5RJE	177	North-East	5.4	North-East	180	1940
TEVERSAL	TOP HARD	Coal	5RME	183	North-West	5.5	South	180	1935
TEVERSAL	DUNSIL	Coal	5RLF	198	North	4.9	North-East	90	1957
TEVERSAL	DUNSIL	Coal	5RMF	206	North-West	2.9	North	90	1952
SHERWOOD	DEEP SOFT	Coal	5RCG	363	North-East	5.7	North-East	130	1970
SUTTON	DEEP HARD	Coal	5RFF	384	North-West	0.9	North-East	100	1947
SUTTON	FIRST PIPER	Coal	30	393	Beneath Property	2.6	North-East	120	1982
SUTTON	FIRST PIPER	Coal	32	397	North-East	5.2	North-East	120	1987
SUTTON	FIRST PIPER	Coal	5RDG	400	South-West	7.8	South	100	1979
SUTTON	FIRST PIPER	Coal	20	416	South-East	12.5	South	120	1980
SUTTON	TUPTON	Coal	5RJF	440	South-West	12.1	South	110	1940
SUTTON	TUPTON	Coal	5RIF	442	Beneath Property	4.0	North-East	120	1962

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

EM977	14992	EM607
EM1376	EM1120	EM158
EM588	EM1157	EM1377

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence
The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

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

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

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

Withdrawal of support notices
The property is in an area where a notice to withdraw support was given in 1982.

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

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

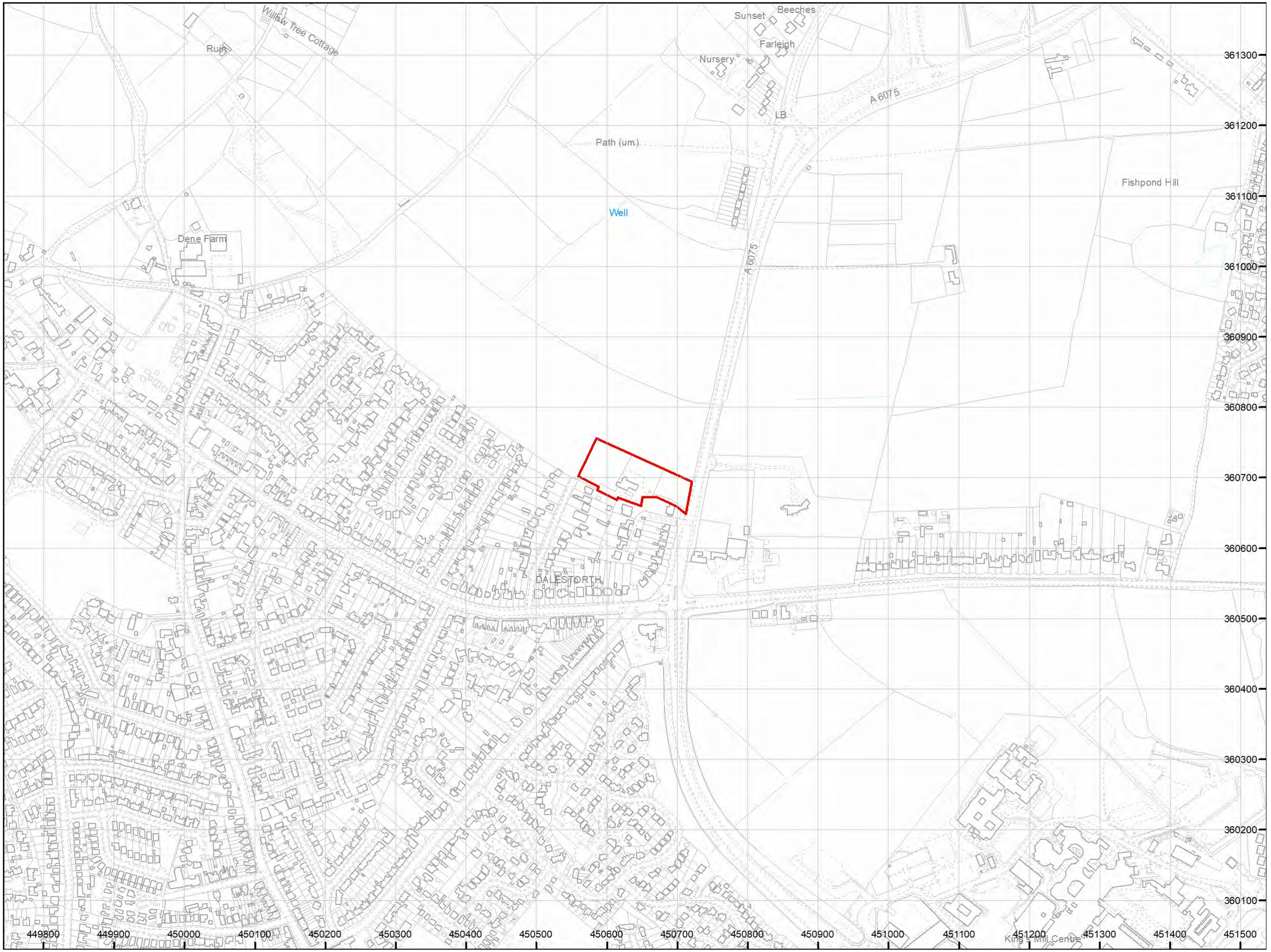
The Coal Authority

Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown



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www.groundstability.com

APPENDIX C

PHASE I ENVIRONMENTAL ASSESSMENT

LAND AT BECK LANE, SUTTON IN ASHFIELD, NOTTS.

GRIFFITHS DEVELOPMENTS LTD

SEPTEMBER 2024

IVY HOUSE environmental

SUMMARY TABLE: PHASE I GEO-ENVIRONMENTAL ASSESSMENT	
SITE:	Land at Beck Lane, Sutton in Ashfield, Notts
CLIENT:	Griffiths Developments Ltd
DATE:	September 2024
REFERENCE:	IV.77.24
DEVELOPMENT PROPOSAL:	Residential Housing
HUMAN HEALTH:	Phase II recommended. Post Demo Survey Recommended
CONTROLLED WATERS:	Principal Aquifer – Negligible Risk
GAS RISK:	Negligible Risk
RADON GAS:	Basic radon protection required.
COMMENTS:	Phase II recommended.
FOUNDATIONS:	Traditional Strip Foundations across the majority of the site.
FLOOR SLABS:	Beam & Block across majority of the site.
SOAKAWAYS:	Site potentially suitable for Soakaway drainage.
COMMENTS:	Confirmation subject to further site investigation.

Authorised:		Richard Sutton MRICS *Director*
Date:	Sept 2024	
Version:	1.0	

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CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 PREAMBLE

This Phase I Environmental Assessment has been produced for Griffiths Developments Ltd to provide a pre-development contamination and geotechnical assessment of the site known as *Former Britannia Works, Melton Road, Thurmaston, Leicester*. The development proposal is unknown at this stage however it is considered that it will be a commercial development either office, retail or industrial.

1.2 SITE LOCATION

The site is located approximately 3km West of Mansfield Town Centre. The site location, development proposal and site layout are illustrated in Appendix A.

1.3 PROJECT BRIEF

The brief for the Phase I Environmental Assessment incorporates:

- A review and assessment of the site history, with reference to potentially contaminative uses.
- A review of regulatory authority and environmental data relating to the site and its environs.
- A site inspection.
- An appraisal of potential environmental risks.
- Development of a Phase I Conceptual Model.
- Provide a strategy for, and to implement, a Phase II Environmental and Geotechnical Assessment.

1.4 DATA REFERENCES

- Environmental Search Data (Supplied by Emapsite Ltd).
- Historical Ordnance Survey (OS) Mapping (Supplied by Emapsite Ltd).
- British Geological Survey Online Geological Mapping.
- BRE (2015), BR211: Radon: Guidance on protective measures for new buildings.
- BSI (2013), BS 8576:2013 Guidance on investigations for Ground Gas - Permanent Gases and Volatile Organic Compounds (VOCs).
- BSI (2020), BS 5930:2015+A1 2020 Code of practice for ground investigations.
- BSI (2015), BS 8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- CIRIA (2007), C665 Assessing risks posed by hazardous ground gases to buildings.
- CIRIA (2014), C735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases.
- NHBC (2007), Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present.
- PHE-BGS (2011), Joint Indicative Atlas of Radon in Great Britain.

1.5 LIMITATIONS

This report has been produced in accordance with industry best practice at the time of writing.

Ivy House Environmental Ltd has, in the production of this report, relied upon information provided by third parties. Ivy House Environmental Ltd does not warrant the accuracy of this information and will not be responsible for any opinions which Ivy House Environmental has expressed, or conclusions which it has drawn, in reliance upon information which is subsequently proven to be inaccurate.

All statements and opinions provided in this report have been reported in good faith and are based on the information gained during, and restrictions imposed by, site investigation techniques used at the time. Ivy House Environmental cannot be held responsible for conditions not revealed by the investigation.

This report has been prepared for the sole use of the client and shall not be relied upon or transferred to third parties without the express written consent of Ivy House Environmental. Unauthorised third parties rely upon the information contained within this report at their own risk.

2.0 DESK STUDY AND SITE OBSERVATIONS

2.1 HISTORICAL REVIEW: SITE DEVELOPMENT

A review of the historical maps contained in Appendix B illustrates the following:

DATE	ON – SITE	OFF - SITE
1877 – 1880	Site occupies an arable field;	*Dalestorth House* is located approximately 72m to the south-east. A number of 'Oak' Trees are illustrated on the highway. *Skegby Rd* 120m to the south.
1902 - 1903	No change.	Housing illustrated 200m to South - West.
1917 - 18		
1950		No23 Illustrated to SW
1957 – 58	*Nursery* on site	
1966 – 67	No significant change.	No significant Change
1993	*Additional Structure on site.*	
2001 – 2024	No significant change.	

2.1.1 SUMMARY

The site was originally open arable land which has been occupied by a *Nursery* (plants) from 1957 onwards. Land surrounding the site has been occupied by residential housing as Mansfield & Skegby have increased in size.

2.2 DEVELOPMENT PROPOSAL

The site extends to approximately 0.85 hectare.

The development proposal is for the construction of 34No residential houses with associated landscaping, garages and driveways.

2.3 SITE DESCRIPTION

The site is located off Beck Lane, across from the Dalestorth/Mansfield Rd/Skegby Lane cross roads. No 23 Beck Lane shares an entrance with the site

The site is mainly overgrown grass cover, with a large lawns to the front and rear and a large brick built building in a central/left position, currently used as a garage for vehicle repairs and servicing, there are a number of vehicles parked around the site and two large green waste spoil heaps to the rear of the site.

The boundary is formed by mature conifers.

Land to the South along Beck Lane is currently under development for residential housing.

2.4 GEOLOGY

Geological information supplied by Emapsite Ltd illustrates that the site is underlain by Bedrock strata of the Cadeby Formation (Dolostone) and the L*enton Sandstone* Formation. Superficial strata are not present at the site.

2.5 HYDROGEOLOGY & HYDROLOGY

2.5.1 Hydrogeology

The bedrock strata are classified as *Principal Aquifers.* There are two groundwater abstractions located within 2km of the site.

The site is not situated within 500m of a groundwater abstraction or Source Protection Zone (SPZ).

2.5.2 Hydrology

There is a single surface water abstraction within 1750m of the site.

Environment Agency data suggests that the site is not situated within 250m Zone 2 or Zone 3 floodplain.

2.6 COAL FIELDS

A Coal Mining Report has been undertaken for the site and is enclosed in Appendix D.

2.7 MINERAL RESOURCES

There are no significant mineral workings within 250m of the site.

2.8 POTENTIALLY CONTAMINATIVE LAND USES

The site has been occupied by a Nursery business since the 1950's, The site is currently home to a business servicing and repairing vehicles, therefore likely contaminants of concern are:

- Heavy metals, inorganics, asbestos fibres, OCP & OPP's, Petroleum hydrocarbons.

2.9 ASBESTOS

The buildings on site were constructed in the 1950's and, therefore, could include asbestos materials with the fabric of the structure.

An asbestos survey is recommended to inform the demolition works.

2.10 ACCESS

Access to the site, will be from Beck Way to the east.

2.11 RADON GAS ASSESSMENT

Radon data supplied by Emapsite Ltd (Appendix C) confirms that the site is located within an area emitting 5 – 10% Radon. Therefore, basic Radon protection is required for all of the structures built on site.

Building control should be contacted to confirm this and to validate the membrane installation.

2.12 ENVIRONMENTAL DATA ASSESSMENT

Environmental search data supplied by Emapsite Ltd (Appendix C) is summarised in Table 3.1 below:

		Summary of Findings (Number)			
Env Data	**On Site**	**0 – 50m**	**50 – 250m**	**250 – 500m**	**500 – 2000m**
Geology	Principal Aquifers				
Historical Land Use		3		2	
Historical Tanks	0				
Historical Garages				4	
Historical Industrial Land Use		3		5	
Historical Landfill Sites	0				
Waste Exemptions	0				
Recent Ind Land Use			3		
Current Petrol Station	0				
Licensed Pollutant Release	0				
GW Abs					2
SW Abs					1
SW Features					
Flood Zone 2	0	0			
Flood Zone 3		0			
Surface Ground Workings	0				
Coal Mining Risk					

3.0 PHASE I CONCEPTUAL MODEL

3.1 SOURCE-PATHWAY-RECEPTOR

The conceptual model for the site considers the potential to develop the property with residential housing (*Residential with Produce)* and the preceding information.

The site's former uses as an agricultural field, plant nursery and the current garage use are considered in light of the development proposal.

There are no landfills within 250m of the site.

Potential contaminants of concern for the end user include Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons, OCP, OPP and Asbestos Fibres.

Basic Radon protection will be required for all residential units.

Pathways for the end user of the site include direct contact (dermal) with potentially contaminated soil dust; ingestion and inhalation of potentially contaminated soil dust; ingestion of potentially contaminated soils and ingestion of food grown in potentially contaminated soil; inhalation of potential asbestos fibres and exposure to radon gas.

The primary receptors for the site are construction workers and end users of the site (Construction workers and residents)

For the controlled waters environment the primary receptors are the underlying Principal A Aquifers.

Potential contaminants of concern for the environment include Heavy Metals, Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons, OCP & OPP.

The primary pathway for controlled waters is the leaching and vertical migration of potential contaminants through the vadose zone to the saturated zone.

The development of the conceptual model is illustrated on Figure 3.1.

Figure 3.1: Conceptual Site Model

<table>
<tr><th colspan="4">HUMAN HEALTH</th></tr>
<tr><th>SOURCE</th><th>PATHWAY</th><th>RECEPTOR</th><th>SOLUTION</th></tr>
<tr><td rowspan="4">Potentially contaminated made ground and natural strata from historical site use (nursery & vehicle garage). Potential contaminants of concern include Heavy Metals, PAHs, TPH, SVOC/VOC and Asbestos containing materials.

Exposure to Radon Gas</td><td>Dermal contact with potentially contaminated soil dust; ingestion and inhalation of potentially contaminated soil dust.</td><td>Construction Workers</td><td>Basic PPE for all workers (overalls, gloves, dust mask if required) and wash facilities/personal hygiene</td></tr>
<tr><td>Consumption of soil and vegetables grown in potentially contaminated soil</td><td rowspan="2">End Users
(e.g. Residents)</td><td rowspan="3">Phase II Investigation recommended.

Basic radon protection required.

Upgraded water pipes.</td></tr>
<tr><td>Inhalation of asbestos fibres.</td></tr>
<tr><td>Leaching into water supply pipes</td><td>Water Supply/End Users</td></tr>
<tr><th colspan="4">CONTROLLED WATERS</th></tr>
<tr><td>Potentially contaminated made ground and natural strata from historical site use (nursery & vehicle garage). Potential contaminants of concern include Heavy Metals, PAHs, TPH, OCP, OPP.</td><td>Leaching and vertical migration through the vadose zone to the saturated zone</td><td>Principal Aquifer</td><td>Phase II Investigation recommended.</td></tr>
</table>

4.0 RECOMMENDATIONS

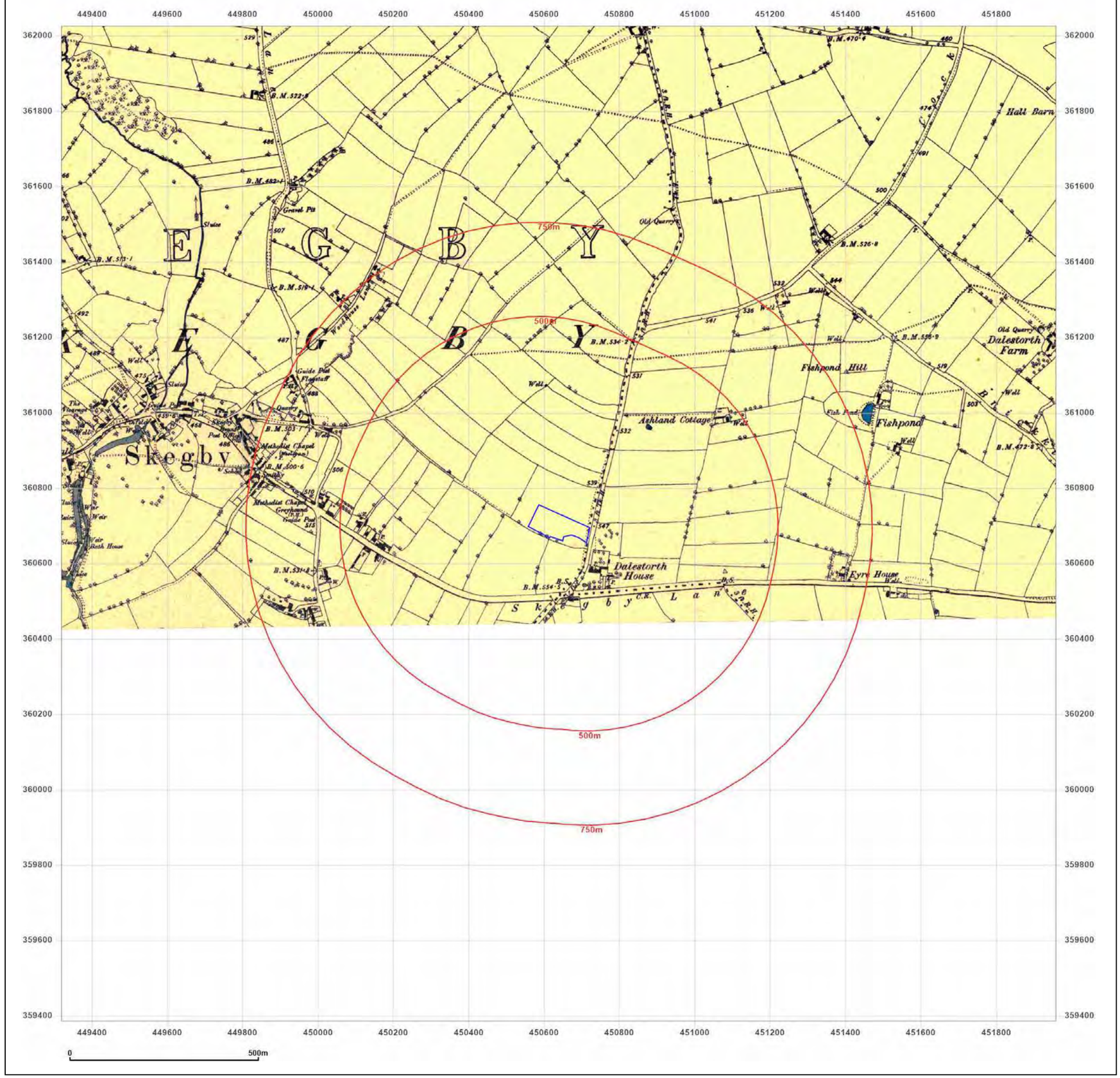
Recommendations for further assessment of the site include:

- An asbestos survey and controlled removal of all asbestos and asbestos containing material is required prior to demolition of the existing structure;
- Basic Radon Protection is required for all units.
- A post demolition ground assessment should be implemented to assess whether any signs of organic contamination (solvents/oils/fuels) are evident during construction activities, a qualified environmental specialist should be consulted to assess the risk posed to end users and the environment.

5.0 CONCLUSIONS

The Phase I Assessment and the recommendations contained within have illustrated that the proposed residential end use poses a risk to end users of the site and the controlled waters environment.

However, if the recommendations of this report are carried out to mitigate or assess and remove all hazards presented in the conceptual model, the site can be made suitable for the proposed end use.



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Report Ref: EMS-972919_1234213
Grid Ref: 450638, 360705

Map Name: County Series

Map date: **1877**

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Printed at: 1:10,560

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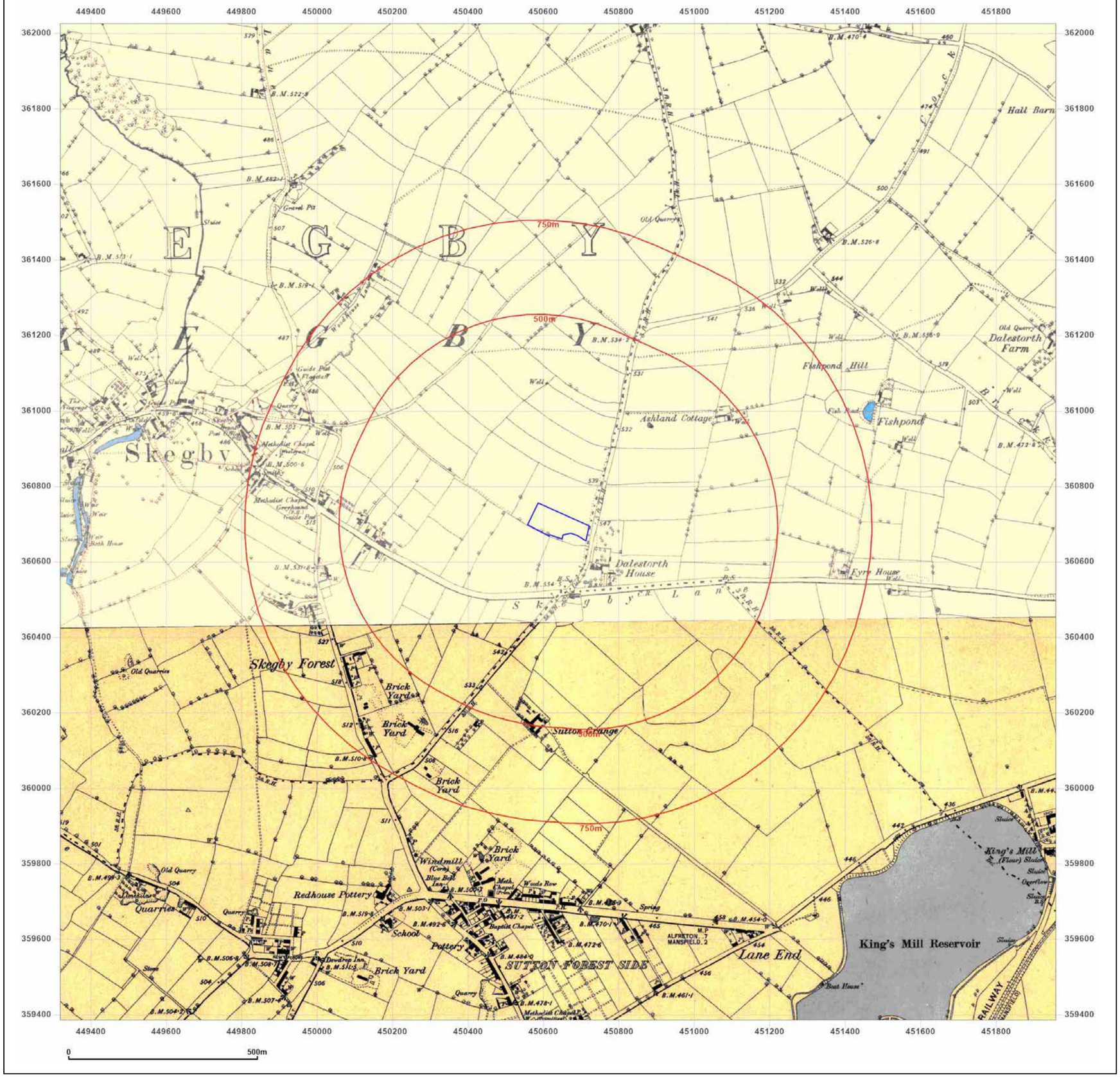

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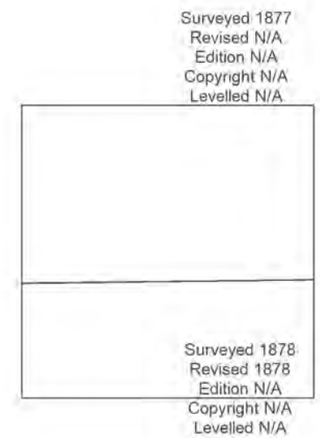

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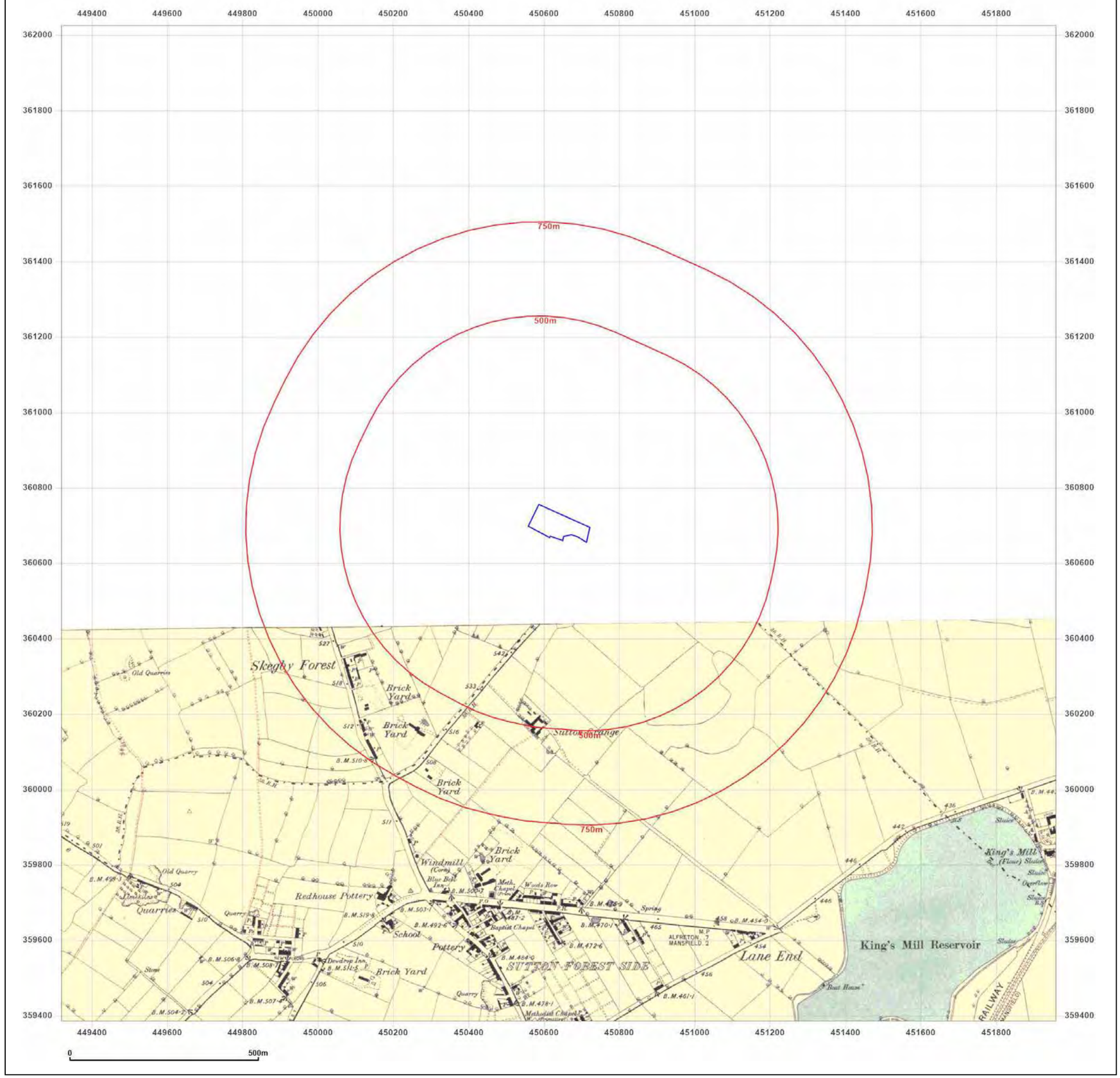

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Map Name: County Series

Map date: **1886**

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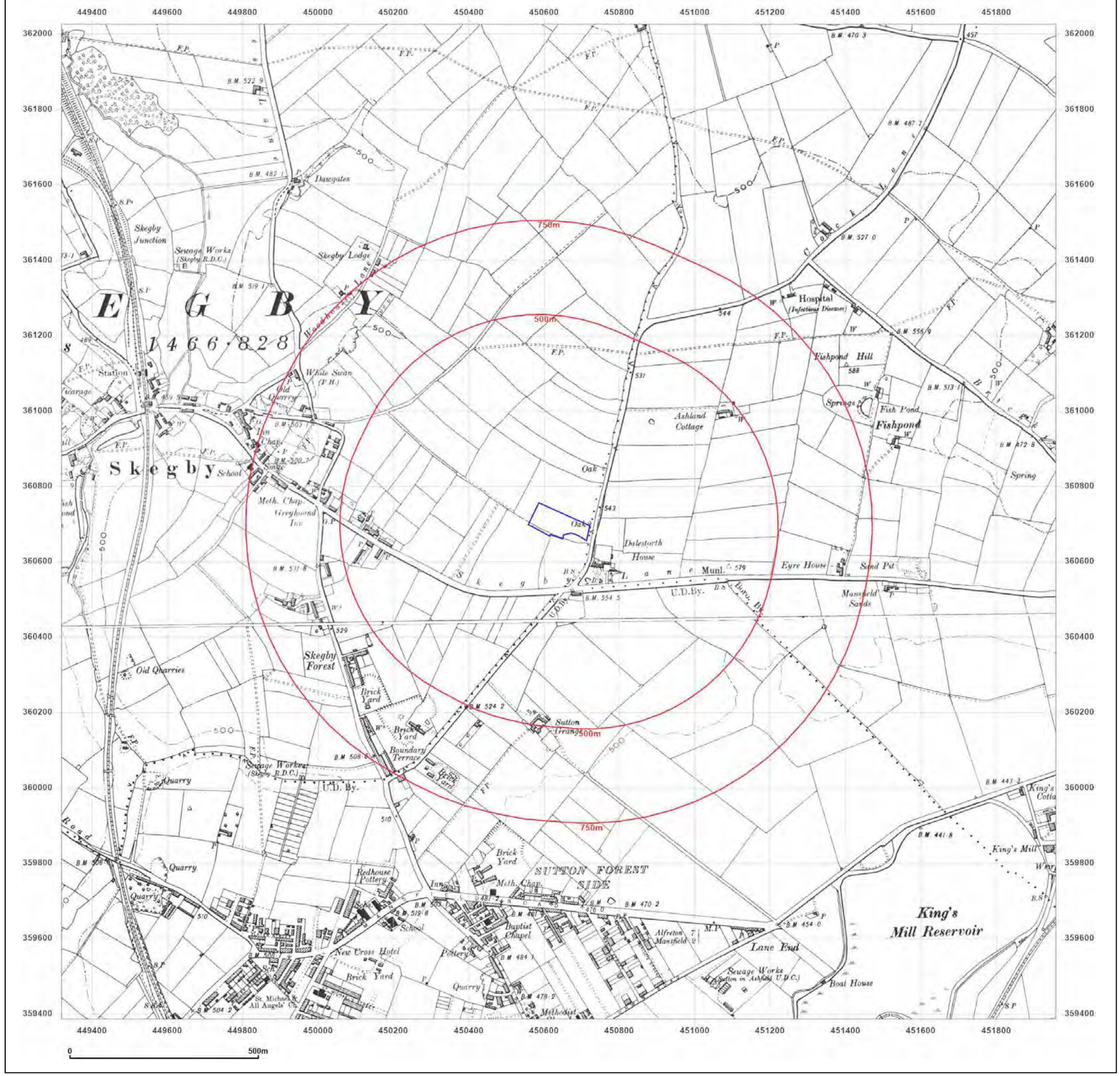

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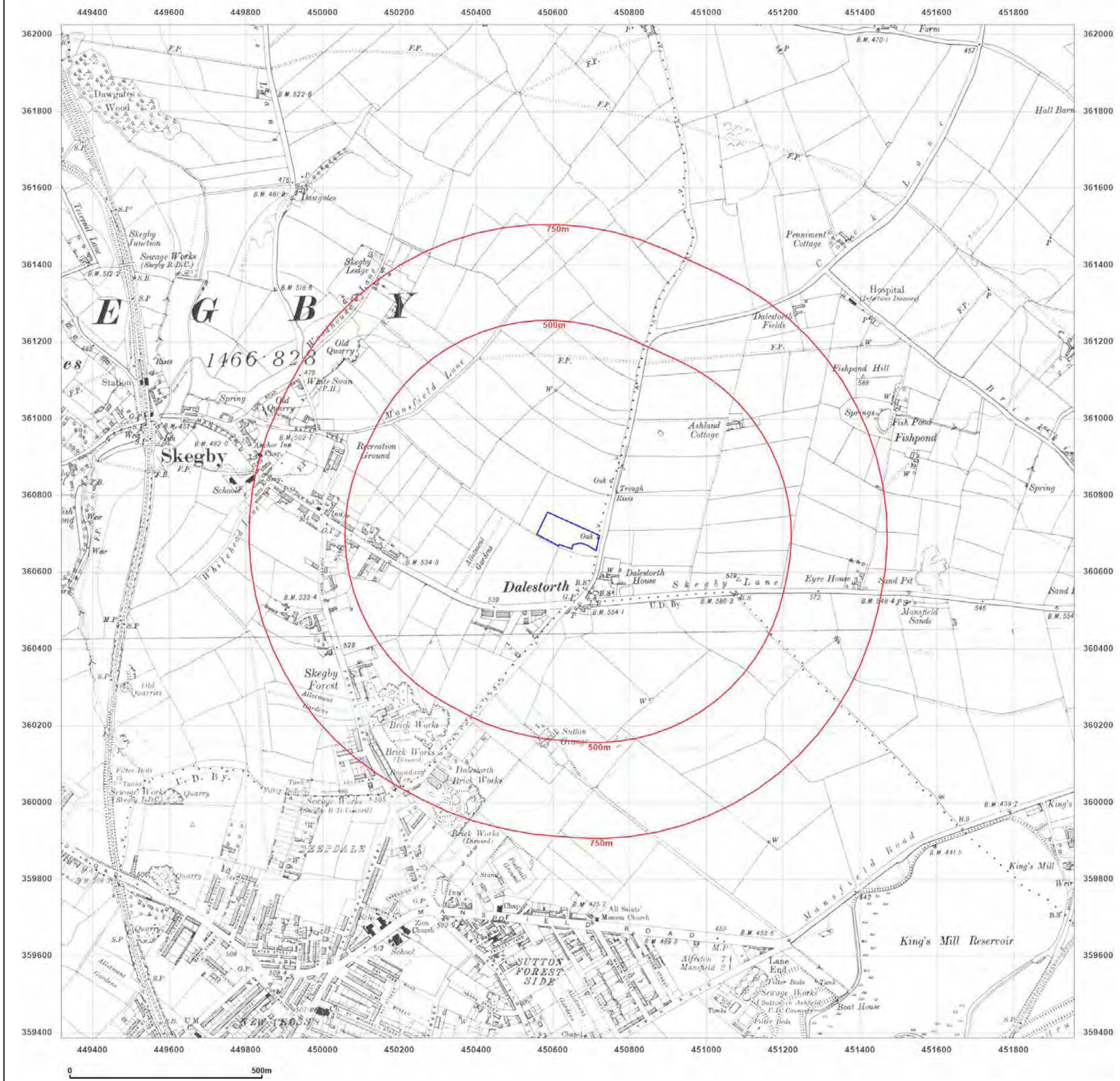

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Map Name: County Series

Map date: **1914**

Scale: 1:10,560

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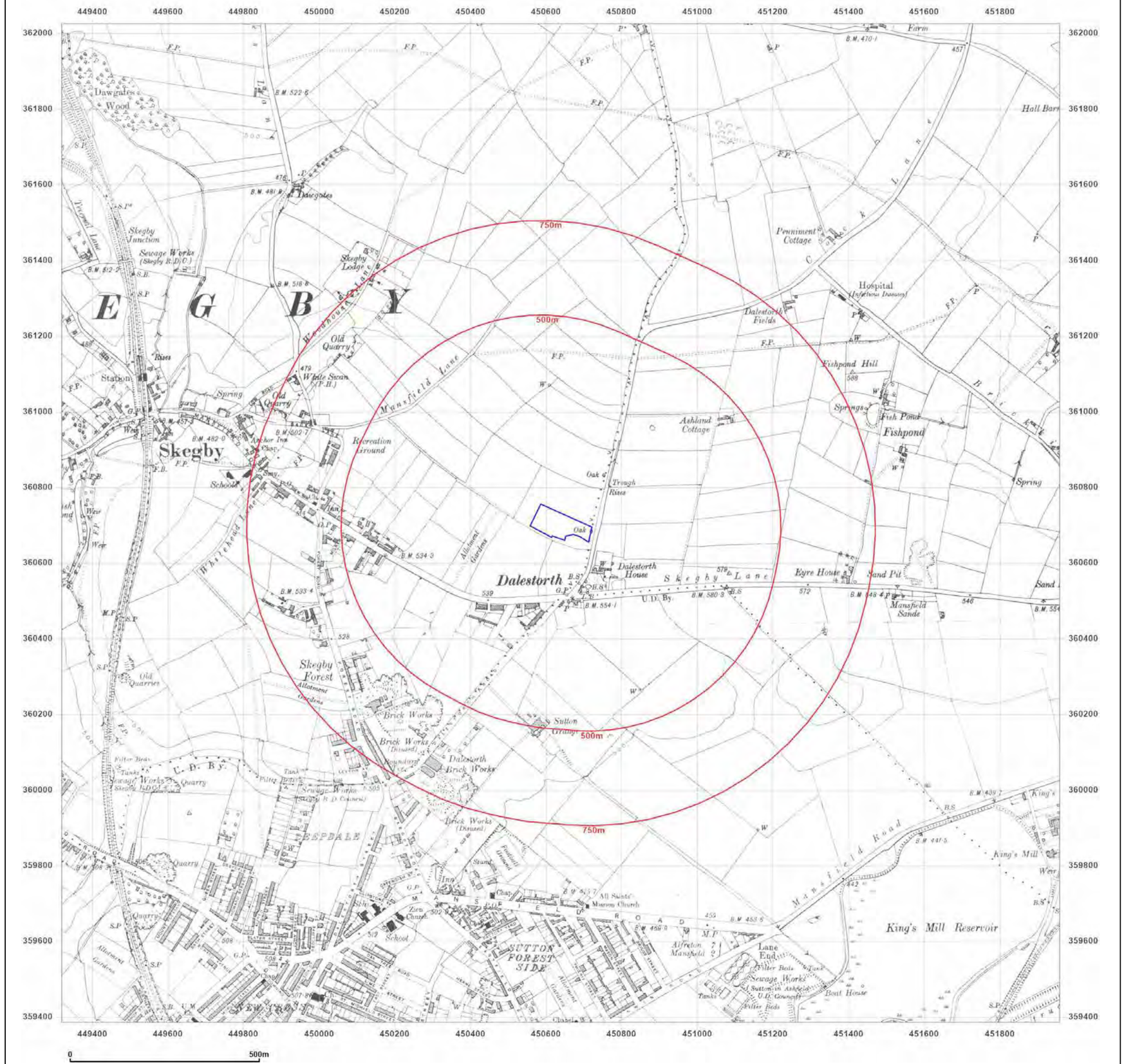

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Map Name: County Series

Map date: **1921**

Scale: 1:10,560

Printed at: 1:10,560

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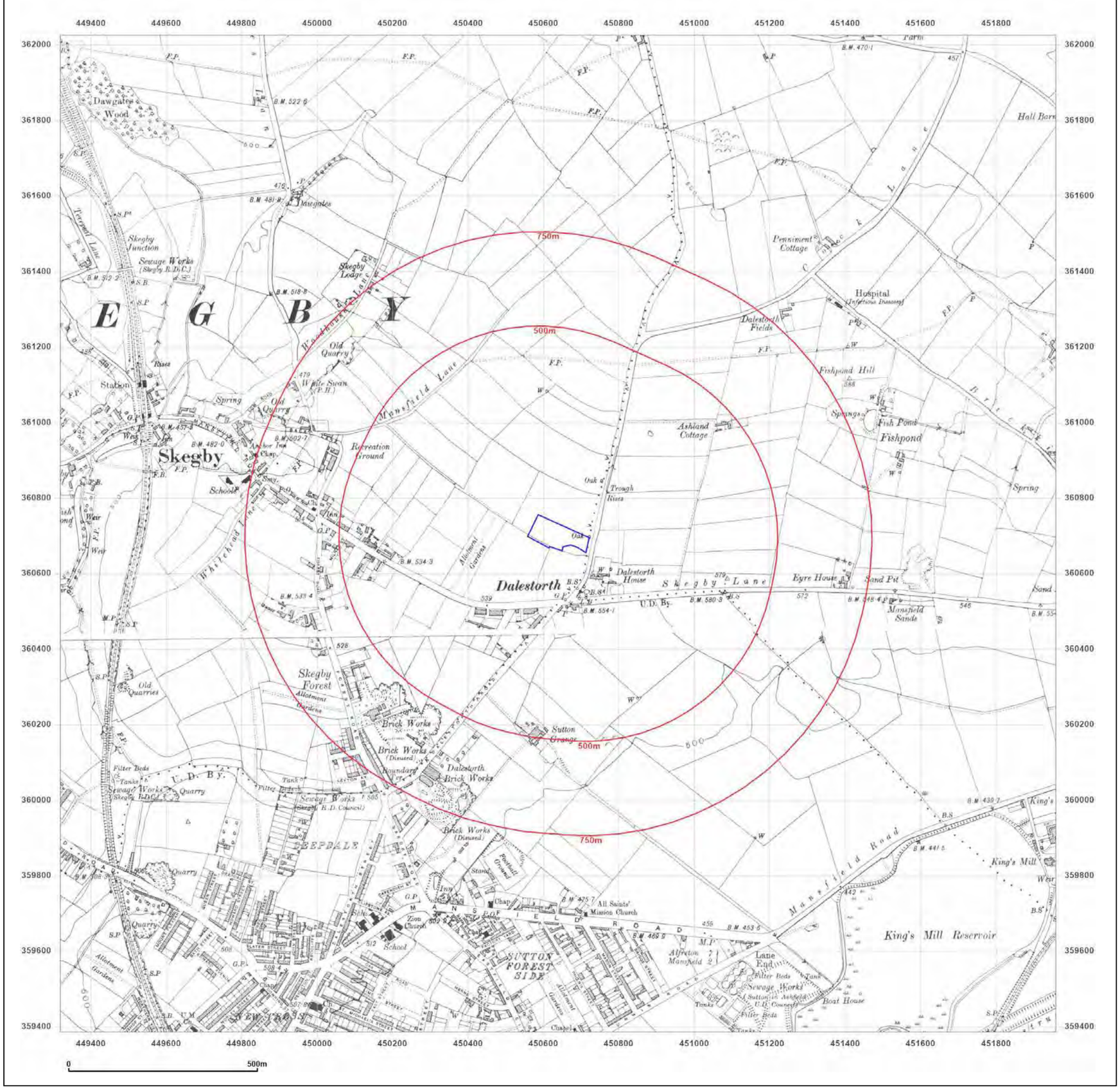

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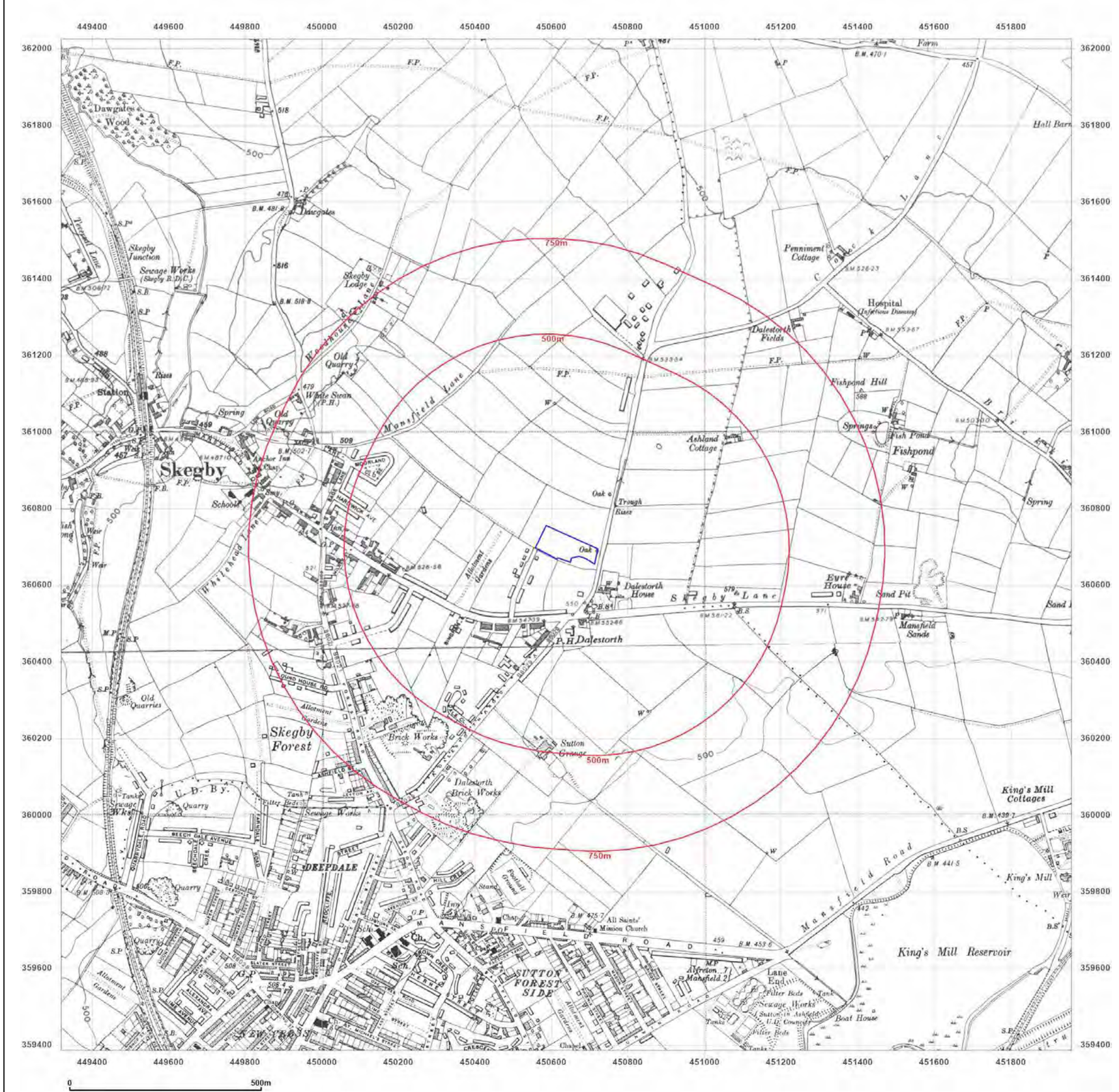

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Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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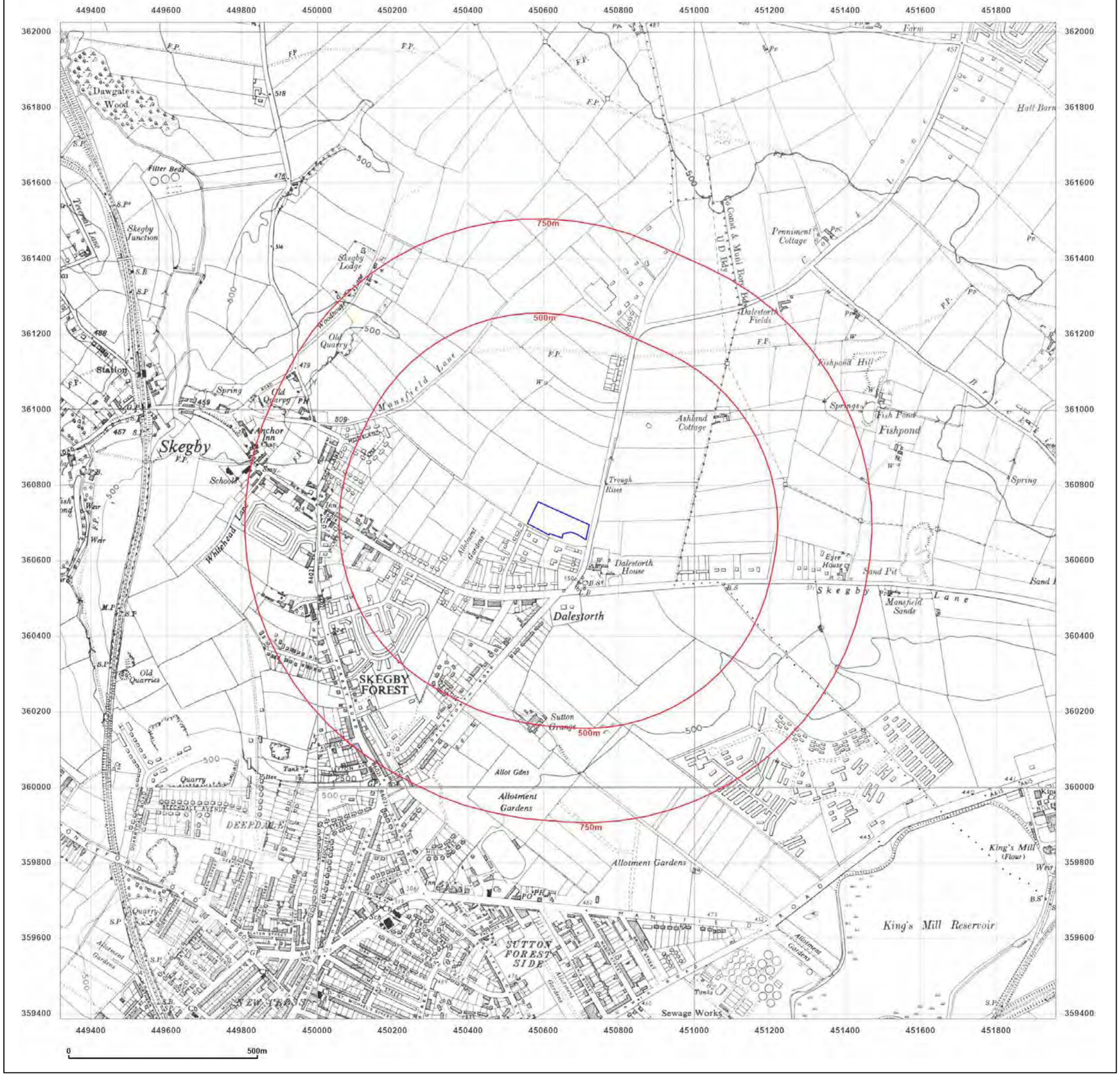

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Map Name: Provisional

Map date: **1955**

Scale: 1:10,560

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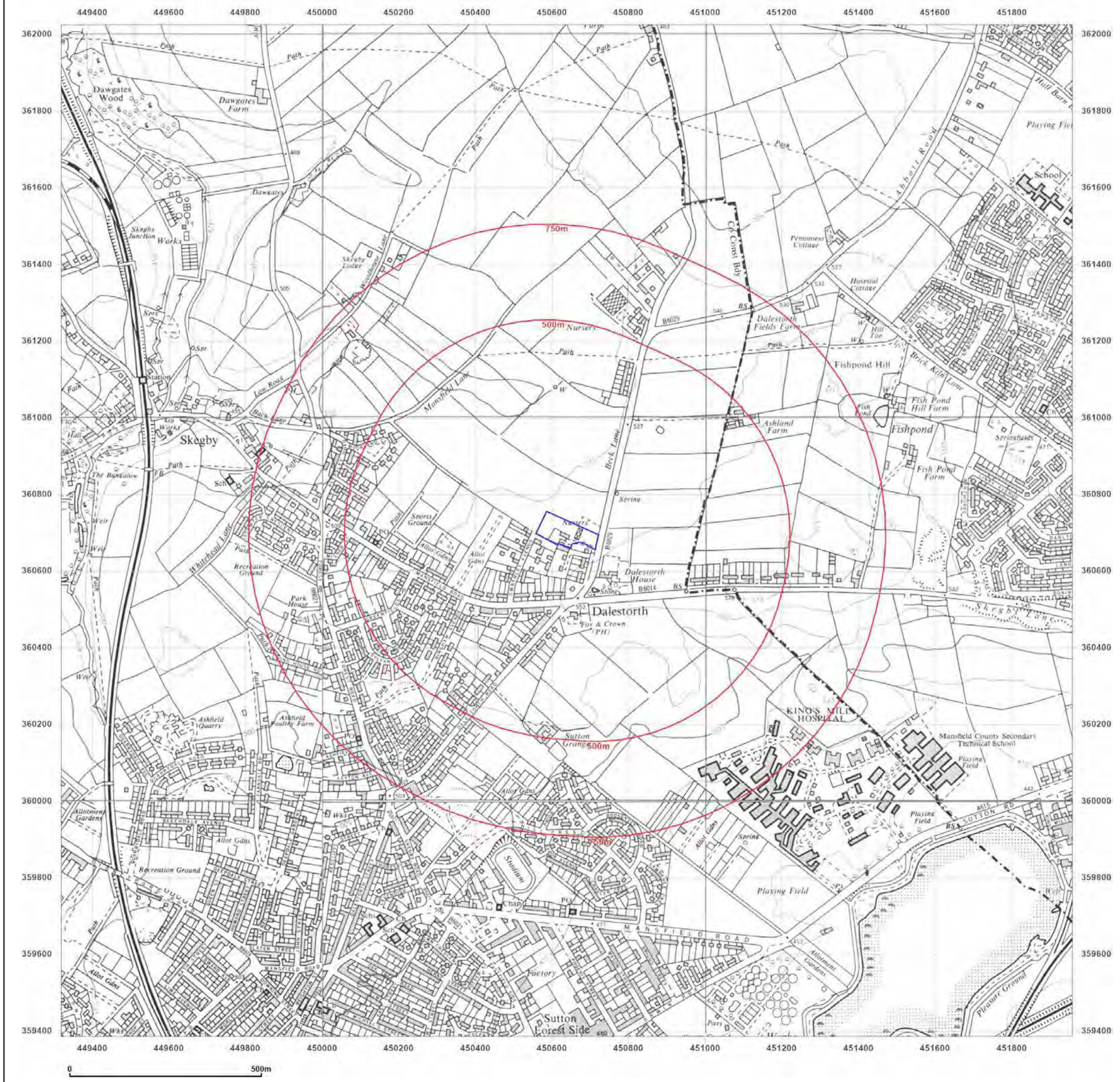

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Map Name: Provisional
Map date: **1966-1967**
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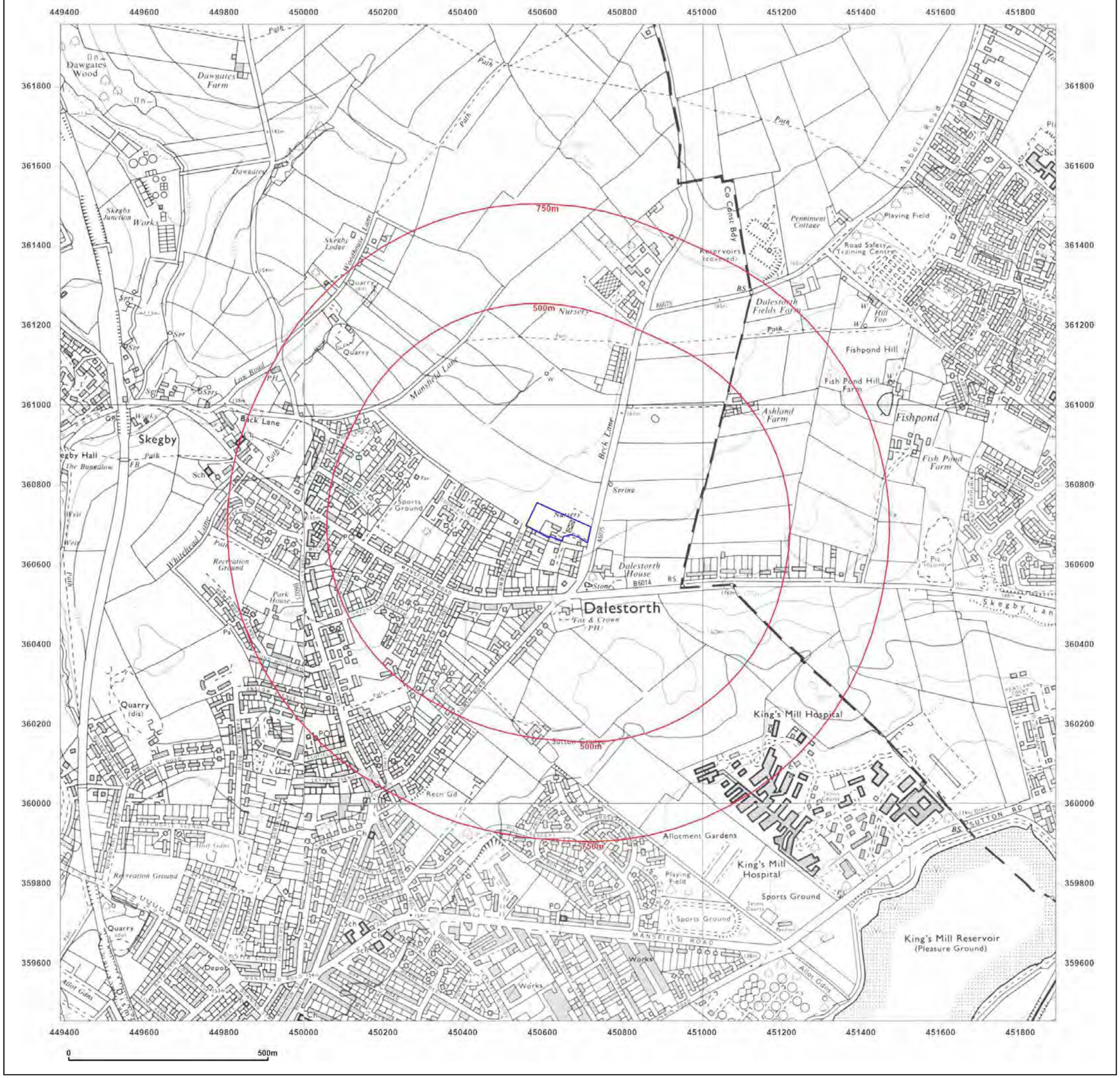

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Grid Ref: 450638, 360705

Map Name: National Grid

Map date: **1971-1975**

Scale: 1:10,000

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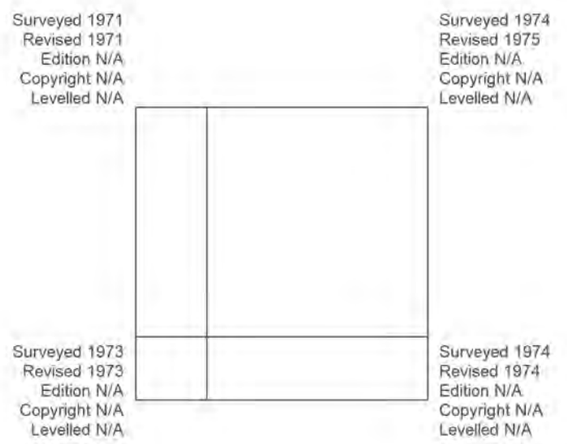

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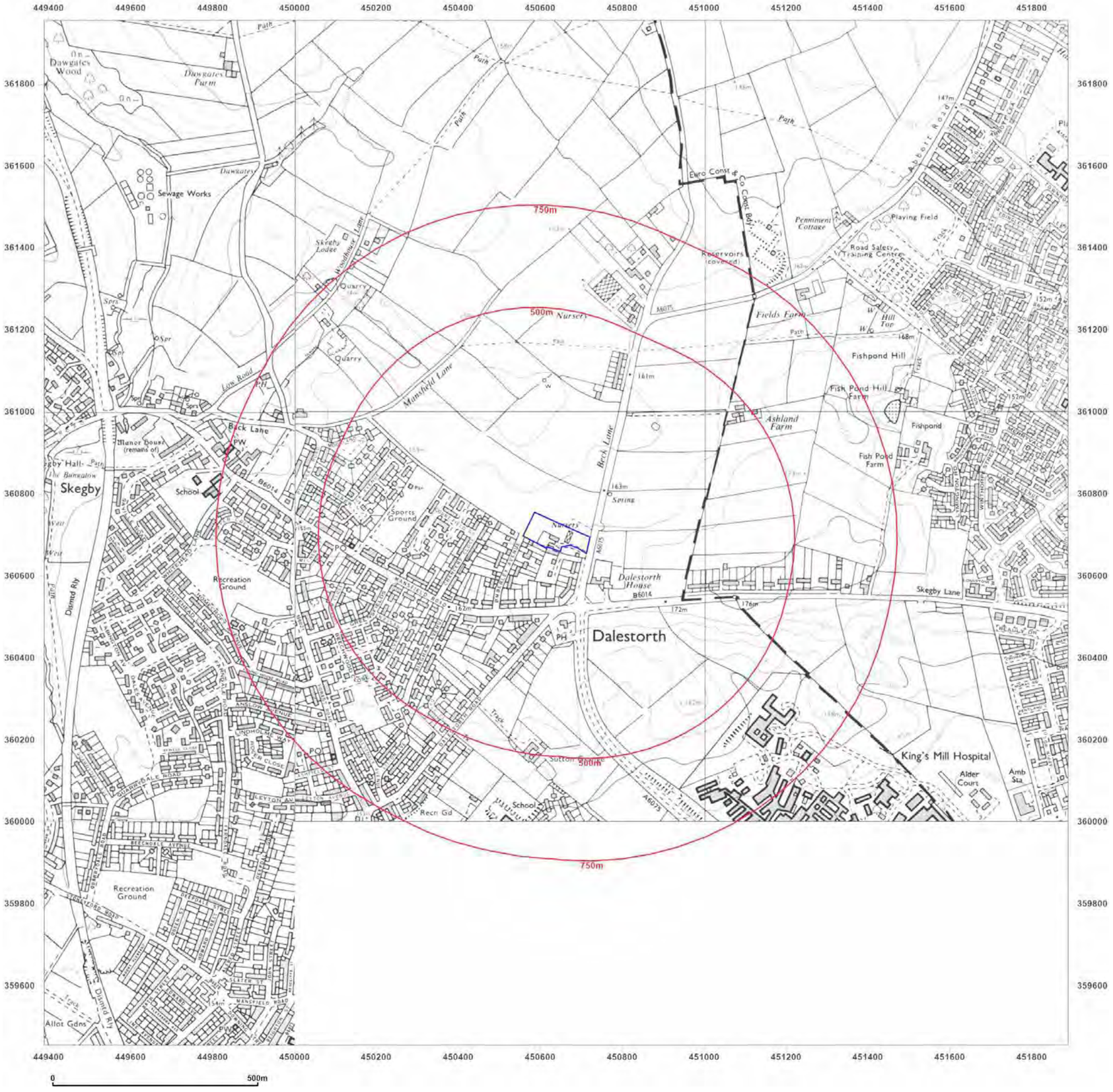

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Grid Ref: 450638, 360705

Map Name: National Grid

Map date: **1985-1989**

Scale: 1:10,000

Printed at: 1:10,000

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