

JPG Limited

Higham Lane Retaining Wall, Dodworth

## Combined Statement of Intent and Preliminary Sources Study Report

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## Document Control Sheet

### Project 2971

#### Higham Lane Retaining Wall, Dodworth

Combined Statement of Intent and Preliminary Sources Study Report

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|      |                                       |            |        |         |          |

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Appendix A: Location Plan, Aerial Photograph, Site Layout Plans, Site Visit Photographs and Groundsure Natural Ground Subsidence Landslides Map

Appendix B: JPG Geoenvironmental Desk Study Report, 2025

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Appendix D: Existing Exploratory Logs

Appendix E: JPG Ground Investigation Scoping Report, 2025

Appendix F: Geotechnical Risk Report

## **1 INTRODUCTION**

Name of Scheme: Higham Lane Retaining Wall, Dodworth

### **1.1 Site Location and Description**

The site is located approximately 3km to the west of Barnsley town centre where Higham Lane intersects and crosses over the M1 motorway. The approximate centre of the site is located at NGR 431460, 406470. A location plan, aerial photograph and proposed layout for the wider site and retaining wall are presented in Appendix A.

The site currently comprises farmland adjoining the M1 motorway and is proposed to be developed industrially. The wider proposals comprise two large industrial buildings with service yards, car park spacing and soft landscaping areas. The retaining wall is required to retain the engineered fill forming the development platform for the northern building, which is referred to as Unit 1, and is proposed to be situated approximately 30m to the south-west of the M1 northbound carriageway.

### **1.2 Objectives**

The objectives of this combined Statement of Intent and Preliminary Sources Study Report are to:

- Determine the Geotechnical Category of the scheme in accordance with CD 622 (Managing Geotechnical Risk)
- Present the findings of the desk study.
- Outline the studies required to investigate the ground and groundwater conditions; a Ground Investigation Scoping Report (GISR) is included within Appendix E.
- Summarise and assess ground-related risks to inform the design of the retaining wall and boundary slope; a Geotechnical Risk Register is included within Appendix F.

### **1.3 Previous Geotechnical Studies**

The following geotechnical studies have previously been undertaken for the wider site and have been consulted as part of this combined Statement of Intent and Preliminary Sources Study Report:

- Wardell Armstrong. Sterling Capitol, Capitol Park, Barnsley. Environmental Appraisal. Doc. Ref. SH11957/0001. Dated September 2017.
- JPG, Sterling Capitol PLC, Higham Lane North, Barnsley. Geoenvironmental Desk Study Report. Doc. Ref. JAM/DS/4173.v1. Dated January 2019.
- JPG, Sterling Capitol PLC, Proposed Industrial Development, Higham Lane North, Barnsley. Coal Mining Risk Assessment and Coal Recovery Report. Doc. Ref. JAM/CMRA/4173.v1. Dated February 2019.
- Hydrock, Scannell Management UK Limited, Higham Lane, Barnsley, Ground Investigation Report. Doc. Ref. 23055-HYD-XX-XX-RP-GE-0003\_S2\_P01. Dated May 2022.
- JPG, Sterling Capitol PLC, Higham Lane North, Barnsley. Ground Investigation Report. Doc. Ref. 4173-JPG-XX-XX-RP-G-0604-S2-P01. Dated September 2023.



- JPG, Commercial Development Projects Ltd., Higham Lane North, Barnsley. Geoenvironmental Desk Study Report. Doc. Ref. 4173-JPG-XX-XX-RP-G-0605-S2-P01. Dated July 2025.

#### **1.4 Geotechnical Category**

The project in its current form falls within Geotechnical Category 2. This is described in Eurocode 7: Geotechnical design - Part 1: General rules as:

“Geotechnical Category 2 should include conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis to ensure that the fundamental requirements are satisfied. Routine procedures for field and laboratory testing and for design and execution may be used for Geotechnical Category 2 designs”.

## 2 SOURCES OF EXISTING INFORMATION, DESK STUDY, SITE RECONNAISSANCE, SITE DESCRIPTION AND REVIEW OF FINDINGS

The findings of this combined Statement of Intent and Preliminary Sources Study Report are based on the sources of existing information that have been summarised in the sections below.

### 2.1 Topographical Maps

Topographical data and reporting from the JPG Desk Study included within Appendix B indicate the site topography to fall gradually to the northwest, with ground levels of approximately 151m AOD at the south of the building footprint falling to approximately 145m AOD at the north of the building footprint. A hill is present in the south of the wider site, the highest point of which is at approximately 163m AOD.

### 2.2 Historical Maps

Historical maps for the wider site were obtained from GroundSure (GS). These have been reviewed in order to establish any former uses of the site and identify any potentially contaminative historical uses or potential geotechnical constraints to the proposed development.

A summary of the relevant map information is presented in the table below and copies of relevant maps are contained within the JPG Desk Study in Appendix B.

**Table 1: Summary of Site Historical Mapping**

| Date(s) & Scale | Feature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1855 1:10,560   | <p><b>The site comprises several parcels of undeveloped fields. Multiple field boundaries are shown trending north to south and east to west. Dodworth Lane cuts across the north-west of the site. A building presumed to be associated with an adjacent farm is shown in the southern corner of the wider site.</b></p> <p>Higham Lane is annotated as Dodworth Lane. The site is located to the north of Dodworth and north of the Sheffield and Lincolnshire railway, which is shown approximately 450m to the south of the wider site. Lane Head farm is shown adjacent to the southern corner of the wider site. Lane Side farm is shown adjacent to the south-western boundary of the wider site. The surrounding land generally comprises fields with areas of woodland. A small pond is shown outside the north-western boundary of the site.</p> |

| Date(s) & Scale                      | Feature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1890 – 1891 1:10,560<br>1893 1:2,500 | <p><b>A farm track is shown to extend along the western boundary.</b></p> <p>A pump is shown at Lane Head farm, approximately 15m to the south of the wider site.</p> <p>A small pond is shown outside the north-western most part of the site, beyond which there is some potentially infilled ground.</p> <p>Higham Colliery is shown approximately 500m to the north-west of the site. Church Lane Colliery (Old Silkstone Collieries on later plans) with associated reservoirs, coke ovens (labelled on later plans) and spoil heaps, is shown approximately 550m to the south-west of the site.</p> |
| 1904 1:10,560<br>1906 1:2,500        | <p><b>No significant changes to the site.</b></p> <p>Higham Colliery is now labelled as disused. Church Lane Colliery is now referred as Old Silkstone Collieries.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1929 1:10,560                        | <p><b>No significant changes to the site.</b></p> <p>Reservoirs and spoil heaps associated with Higham Colliery are shown approximately 500m to the north-west of the site. Higham Pumping Station is shown approximately 700m north-west of the site. The coke ovens and large reservoir at Old Silkstone Colliery are no longer presented on the plans. However, the spoil heaps (assumed to be colliery waste) have increased in size to approximately 400m to the south-west of the site. The pump at Lane Head farm is no longer shown on the plans.</p>                                             |
| 1938 1:10,560                        | <p><b>No significant changes to the site or the surrounding area.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1948 1:10,560                        | <p><b>No significant changes to the site or the surrounding area.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1956 1:10,560                        | <p><b>No significant changes to the site.</b></p> <p>The spoil heap (slag heap on later plans – assumed to be colliery spoil) associated with Old Silkstone Colliery has continued to increase in size, it is now shown approximately 200m to the south-west of the site.</p>                                                                                                                                                                                                                                                                                                                             |

| Date(s) & Scale                          | Feature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1966 1:10,560</p> <p>1961 1:2,500</p> | <p><b>The building in the southern corner associated with Lane Head farm is no longer shown and a track is shown in this location. A building associated with Lane Side Farm is shown to the north of the farm, with the north-eastern corner of the building possibly extending into the site.</b></p> <p>The spoil heap at Old Silkstone Colliery (now referred to as a Mine) is shown as a slag heap (presumed colliery spoil) and is approximately 150m to the south of the wider site. A long linear feature (referred to as a conveyor on later plans) is shown approximately 400m to the west of the site connecting Old Silkstone Colliery and a 'mine' shown in the area of the disused Higham Colliery. Large opencast workings are shown approximately 400m to the north of the site. Smaller opencast workings are shown approximately 750m to the northeast of the site (adjacent to Pogmoor). A second Lane Head (shown as a farm) is located approximately 200m to the south of the site. The ponds on the western boundary and north-western corner are no longer shown on the plans</p> |
| <p>1973 1:10,000</p> <p>1970 1:2,500</p> | <p><b>There is now only one field boundary shown on site, trending east to west. A small building (presumed dwelling) is shown in the southern corner of the wider site, adjacent to Lane Head (now also labelled as a farm). The raised section (embankment) of Higham Lane is shown along the western boundary of the site.</b></p> <p>The M1 motorway (shown as a cutting) bounds the north-eastern boundary of the site. The slag heap (presumed colliery spoil) associated with the south-western mine (Old Silkstone Colliery) is approximately 50m to the south-west of the site. The opencast workings are no longer shown on the plans. Part of the Sheffield and Lincolnshire Railway is shown to be dismantled, approximately 400m to the south-east of the site.</p>                                                                                                                                                                                                                                                                                                                         |
| <p>1982 1:10,000 &amp; 1:2,500</p>       | <p><b>No significant changes to the site.</b></p> <p>Both Lane Head Farms are shown as one large farm. The southern part of the former slag heap (presumed colliery spoil) appears to have been landscaped. The conveyor only extends to the start of the slag heap, approximately 400m to the north-west of the site. A disused tip assumed to be associated with Higham Colliery is shown approximately 500m north-west, with the associated 'mine' no longer shown on the plans.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Date(s) & Scale               | Feature                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1993 1:10,000<br>1991 1:2,500 | <p><b>The building associated with Lane Side Farm which extended into the site no longer appears on the plans.</b></p> <p>The slag heap to the west is now referred to as disused workings. The south-western mine (Old Silkstone Colliery) is no longer shown on the plans, with Fall Bank Industrial Estate being developed in that area, approximately 750m to the south west of the site.</p> |
| 2002 1:10,000                 | <p><b>No significant changes to the site.</b></p> <p>Dodworth Business Park has been built over the former Old Silkstone Colliery, between approximately 500m and 750m to the south-west of the site.</p>                                                                                                                                                                                         |
| 2014 1:10,000                 | <p><b>No significant changes to the site.</b></p> <p>Several small units are shown immediately to the east of the site.</p>                                                                                                                                                                                                                                                                       |
| 2025 1:10,000                 | <p><b>Buildings in the south of the site no longer shown.</b></p> <p>Further development of Capitol Park to the east.</p>                                                                                                                                                                                                                                                                         |

In summary, the site of the northern building and retaining wall has remained farmland with the M1 motorway having been constructed immediately to the north-east in 1970.

The wider site comprised two small ponds that were located on the western/north-western boundary, which were later infilled. Two separate buildings associated with Lane Head (referred to as Lane Head Farm on later maps) were shown in the south from 1850 to 1961 and from 1970 to 2014. A circular structure assumed to be a pond was shown partially on site from 1850 to 1890. A building associated with Lane Side Farm was shown to possibly encroach onto the site from 1961 to 1991.

The surrounding area has also generally remained farmland. The land to the south-west was used as a spoil heap associated with the Old Silkstone Colliery and Higham Colliery. Old Silkstone Colliery (originally known as Church Lane Colliery) was active until approximately 1993 and was later redeveloped as Dodworth Business Park by 2002. Higham Lane colliery, located to the northwest, was active until approximately 1982.

### 2.3 British Geological Survey (BGS)

The geology of the site is shown on the British Geological Survey (BGS) Sheet 87 Barnsley (solid and drift geology) at 1:50,000 scales.

A large area of worked ground, associated with the M1 motorway, is indicated along the north-eastern boundary of the site. Further made ground and infilled ground associated with historical spoil heaps and historical opencast coal sites are indicated approximately 30m to the south-west and 70m to the north-east of the site respectively.

No superficial deposits are recorded on the site.

The bedrock geology comprises the Pennine Middle Coal Measures (PMCM) Formation consisting of undifferentiated mudstone, siltstone, sandstone and coal seams. The overall dip of the solid geology is shown as 5 degrees to the north-east. The hill in the south of the wider site corresponds to a sandstone unit shown to outcrop on the geological maps in this part of the site.

No faults are recorded on the site.

Historical borehole records have been obtained from the BGS GeoIndex Onshore website. A summary of 2 No. borehole records, which are closest to the site, is provided below. Copies of the borehole logs are presented in Appendix D.

#### **M1 Aston-Leeds Motorway R 239, 42m northeast of the site.**

Borehole Reference: SE30NW424

Depth: 2.44m bgl

NGR: 431583 406617

**Table 2: Summary of Historical Borehole Record SE30NW424**

| Depth (m bgl)               | Geology                                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Surface to 2.44m bgl</b> |                                                                                                                       |
| 0 – 0.30                    | TOPSOIL.                                                                                                              |
| 0.30 – 2.13                 | Very soft becoming soft (weathered) mottled grey brown silty MUDSTONE with siltstone and carbonaceous mudstone bands. |
| 2.13 – 2.44                 | Moderately hard grey ironstained silty MUDSTONE.                                                                      |

#### **M1 Aston-Leeds Motorway R 240, 33m northeast of the site.**

Borehole Reference: SE30NW425

Depth: 2.44m bgl

NGR: 431495 406547

**Table 3: Summary of Historical Borehole Record SE30NW245**

| Depth (m bgl)               | Geology                                           |
|-----------------------------|---------------------------------------------------|
| <b>Surface to 2.44m bgl</b> |                                                   |
| 0 – 0.30                    | Dark grey clayey silty TOPSOIL and roots.         |
| 0.30 – 1.83                 | Stiff grey brown mottled silty CLAY.              |
| 1.83 – 2.44                 | Soft (weathered) grey ironstained silty MUDSTONE. |

The following coal seams outcrop on or close to the site and are anticipated to be present at shallow depth below the site (youngest to oldest):

- Top Haigh Moor Coal.
- Low Haigh Moor Coal.

Based on the generalised vertical section included on the 1:10,000 scale geological map, the Top Haigh Moor coal seam has a recorded thickness of 0.69m to 1.19m and is separated from the Low Haigh Moor coal seam by approximately 10m; this latter coal seam has a recorded thickness of between 0.42m and 1.02m and is indicated to be present as two distinct leafs.

The coal mining legacy is summarised in Section 2.5 below.

## 2.4 Aerial Photography

Aerial photography for the wider site was obtained from GroundSure (GS) and is presented within the JPG Desk Study included in Appendix B. This confirms the site of the northern building and retaining wall to currently comprise farmland with the M1 motorway to the north-east.

## 2.5 Coal Authority

An updated Con29M Coal Mining Report, which details key coal mining risks, has been obtained from the Mining Remediation Authority and is included within the JPG Desk Study in Appendix B. Prior to this, a Coal Mining Risk Assessment, which was based on earlier coal mining reports, was produced by JPG and is included in Appendix C.

A ground investigation was subsequently undertaken by Hydrock (refer to Section 2.6), which was targeted to investigate the coal seams within the PMCM Formation.

A summary of the key information, quoted in italics, from the Coal Mining Report and Consultants Coal Mining Report, with substantiation from the Hydrock ground investigation where applicable, is presented below:

- *The property is in a surface area that could be affected by underground mining in 6 seams of coal at 90m to 290m depth, and last worked in 1966. Any movement in the ground due to coal mining activity should have stopped.*

The recorded underground coal workings are not considered to pose a risk to the surface stability of the site based on their depth and respective thicknesses.

- *In addition, the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered, particularly prior to any site works or future development activity, as ground movement could still be a risk.*

It is considered that the above comment relates to the presence of the Top Haigh Moor and Low Haigh Moor coal seams at shallow depth below the site. The Hydrock ground investigation indicated these shallow coal seams to be intact. The next named coal seam below the Low Haigh Moor is the Lidget. Based on the coal seam separation, the Lidget coal seam is not considered to pose a risk to the surface stability of the site.

The Coal Authority Interactive Map indicates:

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

However, the presence of unrecorded mine entries (shafts or adits as well as bell pits) cannot be discounted.

- *The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.*
- *The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.*

However, a historical opencast site (known as the Hunters Cottage) is indicated immediately to the north-east of the north-eastern corner of the wider site, beyond the

M1 motorway. Abandonment plans indicate that the Swallow Wood and Top Haigh Moor coal seams were extracted by opencast methods. Based on the mapping data, it is unlikely that this infilled opencast area, including any associated highwalls, encroaches close to the northern building and retaining wall. The Hydrock ground investigation did not encounter evidence of this and the proposed site-specific ground investigation for the retaining wall will further confirm the absence of infilled opencast areas and highwalls.

- *The Coal Authority has no record of a mine gas emission requiring action.*

Although there is a risk to the wider site from ground gas due to infilled ground, the Hydrock ground investigation did not encounter evidence of this and the proposed site-specific ground investigation for the retaining wall will confirm the absence of ground gas emission.

## 2.6 Existing Ground Investigations

A ground investigation for the site was undertaken by Hydrock between March and April 2022. 3 No. rotary open holes were undertaken on the footprint of the northern building. This ground investigation is reported in more detail in Section 4.

A ground investigation was also undertaken by JPG in 2023 along Higham Lane just outside the boundary of the wider site. Selected data from this ground investigation will also be referenced as required.

## 2.7 National Highways' Geotechnical & Drainage Management Service (GDMS)

A review of National Highways' Geotechnical & Drainage Management System (GDMS) has shown a number of existing reports that cover the wider site, although these do not provide any significant additional information. Details of these reports are provided below. Note that the 'Northbound Cutting' referred to below is approximately 800m to the south of the site at M1 Junction 37.

**Table 4: Summary of Existing GDMS Reports Relating to the Site**

| GDMS ID | Scheme                                                                             | Report Title                                                     | Publication Date |
|---------|------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------|
| 4054    | M1 Ashton-Sheffield-Leeds Motorway                                                 | Conditions of Contract/Specification/Bills of Quantities/Key Map | November 1961    |
| 20515   | M1 Widening Junctions 37 to 39                                                     | Preliminary Sources Desk Study                                   | April 2006       |
| 20590   | M1 Improvements Junctions 37 to 39                                                 | Ground Investigation                                             | May 2006         |
| 20994   | M1 Improvements Junctions 37 to 39                                                 | Preliminary Ground Investigation Annex A                         | November 2006    |
| 25010   | M1 Motorway, Junction 37, Northbound Cutting Slope                                 | Preliminary Sources Study Report                                 | September 2008   |
| 25511   | M1 Motorway, Junction 37, North Bound Cutting Slope, Unique ID: 12_M1_42407_276923 | Statement of Intent                                              | September 2010   |



| GDMS ID | Scheme                                                                                    | Report Title                         | Publication Date |
|---------|-------------------------------------------------------------------------------------------|--------------------------------------|------------------|
| 25513   | M1 Motorway, Junction 37, North Bound Cutting Slope, Unique Defect ID: 12_M1_42407_276924 | Statement of Intent                  | September 2010   |
| 25792   | M1 Motorway Junction 37, North Bound Cutting Slope,                                       | Preliminary Sources Study Report     | September 2010   |
| 25978   | M1 Motorway, Junction 37, North Bound Cutting Slope                                       | Unique Defect ID: 12_M1_42407_276923 | September 2008   |

The Natural Ground Subsidence - Landslides Map from Groundsure, which is included in Appendix A, indicated potential slope instability to the north-west of the northern building close to the bridge abutment. The highway cutting this would potentially correspond to is designated as Asset ID 36896 within GDMS. Apart from a fractured clay drainage pipe at the base of the slope, which appears to have been repaired based on the principal inspection notes, no other defects are recorded for this cutting.

The GDMS database provides geometry information for the cutting, which is summarised below. The cutting is noted to be 904m long with the northern section only corresponding to the location of the proposed retaining wall.

**Table 5: Summary of GDMS Geometric Information Relating to the Adjacent Highway Cutting**

| GDMS ID | Type         | Chainage (m) | Length (m) | Angle (°) | Height (m) | Description  |
|---------|--------------|--------------|------------|-----------|------------|--------------|
| 100719  | Start        | 0            | 30         | 20        | 10.26      |              |
| 170651  | Intermediate | 100          | 41         | 18        | 12.67      | Bench slope. |
| 152164  | Intermediate | 508          | 32.6       | 20        | 11.15      | Bench slope. |
| 3261    | Intermediate | 636          | 13         | 18        | 4.02       | Geometry.    |
| 221943  | Intermediate | 722          | 8          | 16        | 2.21       | Geometry.    |
| 197306  | End          | 904          | 12         | 26        | 5.26       |              |

Based on the observations from the northern section only, specifically Ch. 636, 722 and 904, the cutting was observed to vary between 2.21m and 5.26m in height with a slope angle varying between 16° to 26°.

### **3 SITE RECONNAISSANCE**

A site inspection was carried out by a JPG engineer on 9 January 2019. Details of the site access from a farm track off Higham Lane were noted along with observations of a bungalow, an overhead telecoms line and a wooden fence running parallel to the M1 motorway.

A further site inspection was undertaken on 29<sup>th</sup> July 2025 as part of this combined Statement of Intent and Preliminary Sources Study Report. The site was accessed from Higham Lane. The wider site was perceived to comprise two parcels of land with the site of the retaining wall situated in the northern, lower-lying field beyond the residential buildings associated with Lane Side Farm.

The proposed location of the wall was noted as being close to the highway fence line. The fence itself was in good condition although the field and vegetation were overgrown. Although the highway was not accessed, a walkway with stairs descending along the cutting to the motorway was noted in the north and a motorway communications installation was observed slightly to the south. In both cases, the width of the level area/platform between the fence line and the crest of cutting was assessed to be 2 - 5m approximately.

Photographs from the recent site visit are included in Appendix A.

## 4 GROUND CONDITIONS

The ground conditions at the site will be investigated through a site-specific ground investigation proposed for the northern building and retaining wall. This will be undertaken as part of the main ground investigation for the wider site. Details and justification for the proposed ground investigation are included in the Ground Investigation Scoping Report (GISR) in Appendix E.

At this stage, an initial assessment of the ground conditions is provided, which includes descriptions of the soils and rock identified at the site and an outline of their engineering properties. The assessment has been based on the 2022 Hydrock ground investigation, historical BGS records and any relevant data from the JPG investigation along Higham Lane.

### 4.1 Existing Ground Investigation Data

A preliminary ground investigation was undertaken for the wider site by Hydrock in March to April 2022 on behalf of Scannell Management UK Limited, which consisted of 8 No. rotary open-hole boreholes to a maximum depth of 30m and 12 No. trial pits to maximum depth of 3.5m.

From the overall data, 3 No. rotary open-hole boreholes were undertaken on the footprint of the northern building. These are illustrated in grey on Drawing 4173-JPG-ZZ-ZZ-DR-G-1104 in the GISR. In addition, 2 No. historical boreholes have been identified along the M1 motorway adjacent to the location of the proposed retaining wall. The initial assessment of the ground conditions in this report is based on these exploratory holes.

All the exploratory holes recorded Topsoil over Pennine Middle Coal Measures (PMCM) Formation, with up to 1.83m of the upper PMCM Formation having weathered to a clay.

Data from the relevant boreholes are summarised below.

**Table 6: Summary of Existing Relevant Boreholes**

| Hole      | Ground Level (mOD) | Layer thickness (m) & Elevation at the base of the layer in brackets (mOD) |                  |                         |
|-----------|--------------------|----------------------------------------------------------------------------|------------------|-------------------------|
|           |                    | Made Ground                                                                | Weathered PMCM   | PMCM                    |
| SE30NW424 | 146.76             | 0.30<br>(146.46)                                                           | 1.83<br>(144.63) | 0.31 NP<br>< 144.32 NP  |
| SE30NW425 | 145.46             | 0.30<br>(145.16)                                                           | 1.53<br>(143.63) | 0.61 NP<br>< 143.02 NP  |
| RO104     | 147.71             | 0.40<br>(147.31)                                                           | 1.60<br>(145.71) | 28.00 NP<br>< 117.71 NP |
| RO201     | 144.48             | 0.40<br>(144.08)                                                           | 0.60<br>(143.48) | 9.00 NP<br>< 134.48 NP  |
| RO202     | 145.80             | 0.30<br>(145.5)                                                            | 0.70<br>(144.80) | 9.00 NP<br>< 135.80 NP  |

The descriptions and engineering properties of the strata are provided in more detail below.

## **4.2 Geotechnical Properties**

### **4.2.1 Topsoil**

Topsoil is encountered in all exploratory holes with thicknesses varying between 0.30m and 0.40m. It is present from ground level across the site, and it is described as silty and clayey in SE30NW425 only (descriptions are not provided in other boreholes).

No in-situ or laboratory testing has been undertaken in the topsoil.

### **4.2.2 Weathered PMCM**

Weathered PMCM is encountered in all exploratory holes with thicknesses varying between 0.60m and 1.83m. It underlies the topsoil in all cases. Its description varies between a soft to stiff yellow clay (also described as grey clay in SE30NW424 and SE30NW425).

No SPT testing has been undertaken in the Weathered PMCM from the footprint of the northern building, but SPT results from the nearest borehole from the JPG ground investigation along Higham Lane (WS111) range from 12 to 35 with an average of 22 indicating a firm to stiff clay.

#### Plasticity Index

No plasticity testing has been undertaken in the Weathered PMCM from the footprint of the northern building, but Atterberg testing results from the wider site (as reported in the Hydrock GIR) range from 19 to 25 with an average of 22 indicating an intermediate plasticity.

#### Undrained Shear Strength

No direct undrained shear strength testing was undertaken in the Weathered PMCM from the footprint of the northern building.

According to Stroud & Butler (1975), the SPT N values can be correlated to the undrained shear strength by the formula  $c_u = f_1 \times N$ , where  $f_1$  is a factor depending on the plasticity index of the clay. SPT N values within the Weathered PMCM from the nearest borehole from the JPG ground investigation along Higham Lane (WS111) vary between 12 and 35 with an average of 22. For a plasticity index of 22%,  $f_1=4.5$  which corresponds to a  $c_u$  varying between 54kPa and 158kPa with an average of 99kPa indicating a medium to high strength clay.

### **4.2.3 PMCM Formation**

The PMCM Formation is encountered in all exploratory holes with thicknesses varying between 0.31m (not proven) and 28.00m (not proven). It underlies the Topsoil and weathered PMCM in all cases. It is described as a 'moderately hard' grey MUDSTONE or SILTSTONE.

No SPT testing has been undertaken in the PMCM Formation from the footprint of the northern building, but one SPT refusal result (160mm penetration) was obtained from the nearest borehole from the JPG ground investigation along Higham Lane (WS111) indicating a very weak rock.

### Unconfined Compressive Strength (UCS)

No UCS or Point Load Tests were undertaken in the PMCM Formation from the footprint of the northern building or the wider site.

## **4.3 Groundwater**

Groundwater was not encountered during the drilling of the exploratory holes from the footprint of the northern building or the wider site, although the Hydrock GIR contradicts the relevant log by stating groundwater was encountered at 15.00mbgl (132.71m OD). The Hydrock GIR also states that groundwater monitoring within RO104 recorded groundwater at 10.25 – 11.41mbgl (137.46 – 136.30mOD).

It should be noted that groundwater monitoring results from the wider site did indicate shallower groundwater, with a minimum depth of 0.72mbgl (147.19mOD) recorded, which may be perched groundwater. This elevation would also need to be correlated with the varying site topography.

## **5 PRELIMINARY ENGINEERING ASSESSMENT**

Drawing 4173-JPG-ZZ-ZZ-DR-G-1120, which is included within Appendix A, presents preliminary plan and sections of the proposed northern building and retaining wall. The drawing also gives an indication of the slope profile and distance to the M1 motorway boundary, and the thickness of fill required to achieve the proposed development platform behind the wall.

Based on the findings of this desk study, the ground conditions at the site are likely to comprise a thin layer of topsoil underlain by weathered and competent PMCM Formation bedrock comprising mudstone, siltstone and sandstone. The maximum thickness of the weathered PMCM layer is likely to be approximately 2m.

The unweathered PMCM is likely to provide a competent founding stratum for the foundations of gravity walls, which can typically accommodate retained heights of up to 3m.

For the maximum retained height indicated of approximately 5.3m, alternative structural forms may be required. A detailed options study report will be undertaken based on the findings of the ground investigation to confirm the preferred solution.

A detailed slope stability assessment will be required for the global stability of the retaining wall. Although a gravity retaining wall or reinforced earth structure is likely to be adequate, additional measures may be required to ensure stability, including the potential to adopt piled foundations.

## **6 COMPARISON OF PROJECT OPTIONS AND RISKS**

Further to Section 5, a Geotechnical Risk Register is included in Appendix F.

## **7 DRAWINGS AND PHOTOGRAPHS**

### **7.1 List of Drawings and Documents accompanying the Submission**

Appendix A: Location Plan, Aerial Photograph, Site Layout Plans, Site Visit Photographs and Groundsure Natural Ground Subsidence Landslides Map

Appendix B: JPG Geoenvironmental Desk Study Report, 2025

- 4173-JPG-XX-XX-RP-G-0605-S2-P01 - JPG, Geoenvironmental Desk Study Report, Higham Lane North, Dodworth, Barnsley, July 2025.

Appendix C: JPG Coal Mining Risk Assessment and Coal Recovery Report, 2019

- JAM/CMRA/4173 - JPG, Coal Mining Risk Assessment And Coal Recovery Report, Proposed Industrial Development, Higham Lane North, Dodworth, Barnsley, February 2019.

Appendix D: Existing Exploratory Logs

Appendix E: JPG Ground Investigation Scoping Report, 2025

- 4173-JPG-XX-XX-RP-G-0608-S2-P01- JPG, Rationale and Scoping For Ground Investigation, Higham Lane North, Dodworth, Barnsley, July 2025.

Appendix F: Geotechnical Risk Report



### **Appendix A**

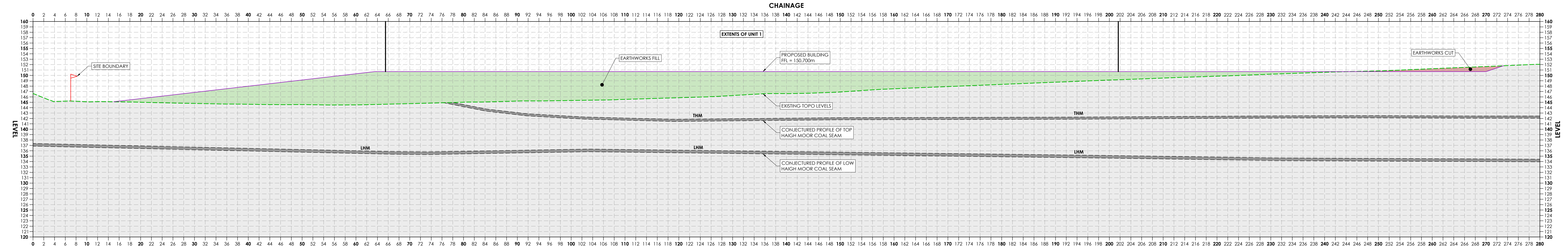
Location Plan and Site Layout Location Plans, Aerial Photograph, Site Layout Plan, Site Visit Photographs and Groundsure Natural Ground Subsidence Landslides Map



**Site Location Plan**

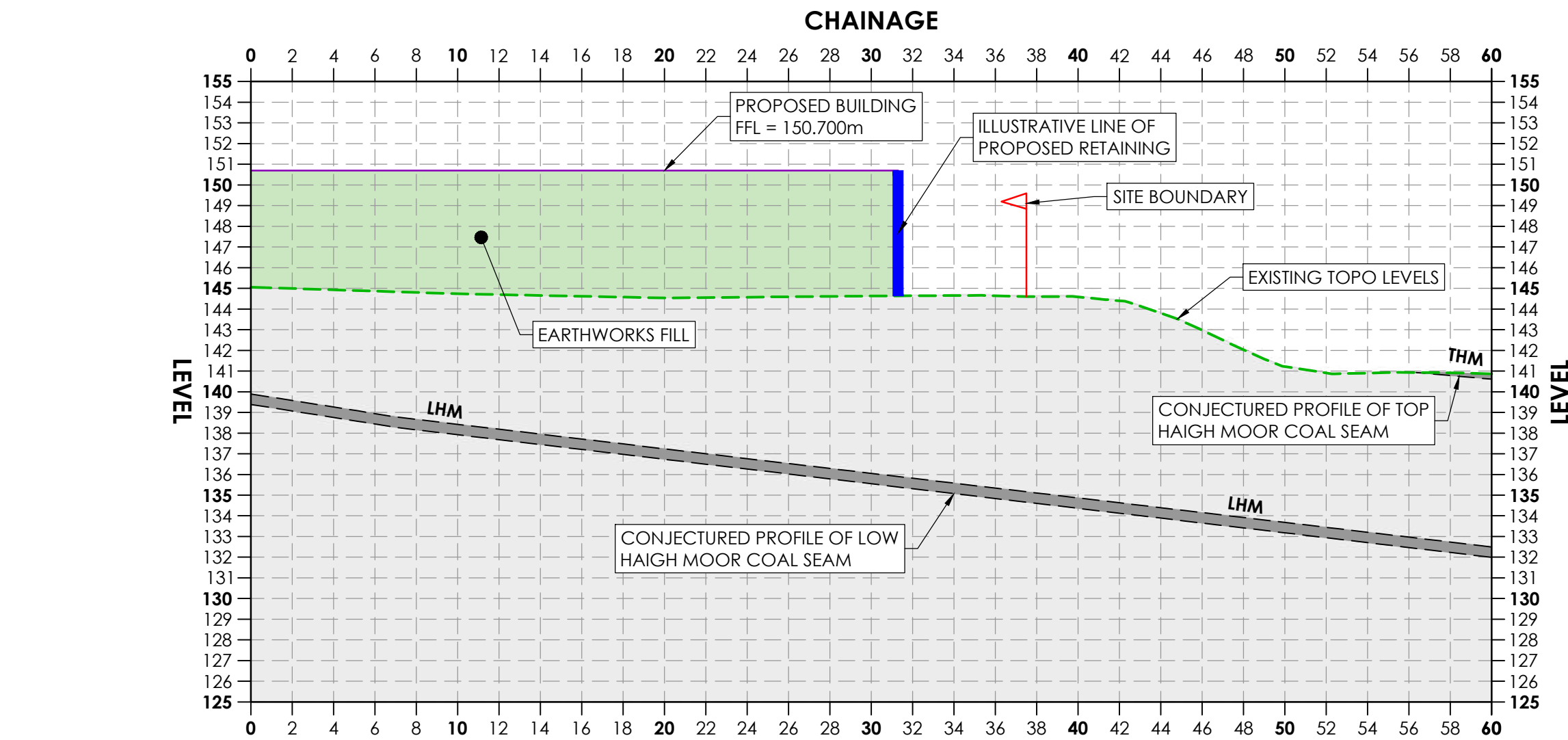






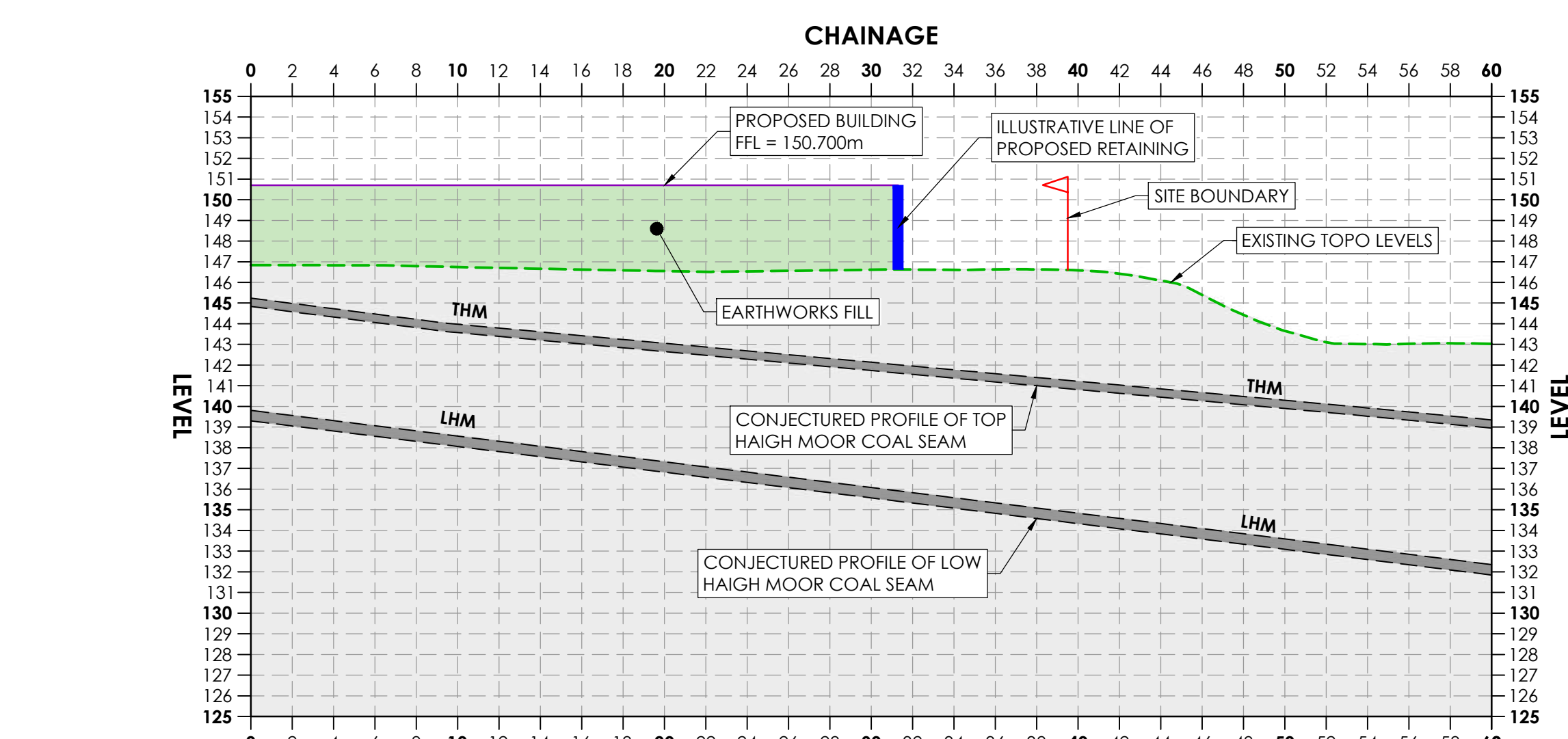
CHAINAGE

**SECTION 1 PROFILE**  
SCALE 1:250



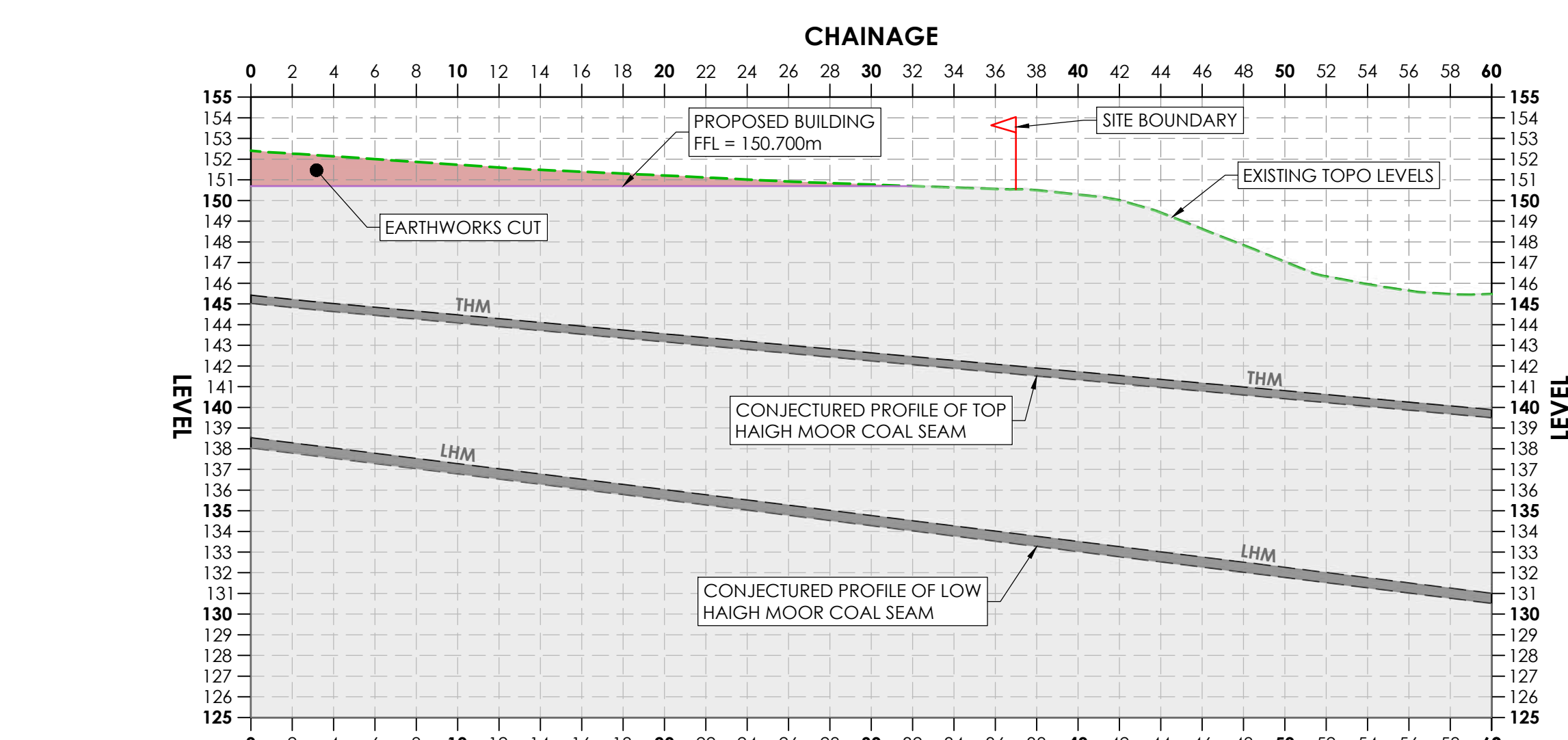
CHAINAGE

**SECTION 2 PROFILE**  
SCALE 1:250



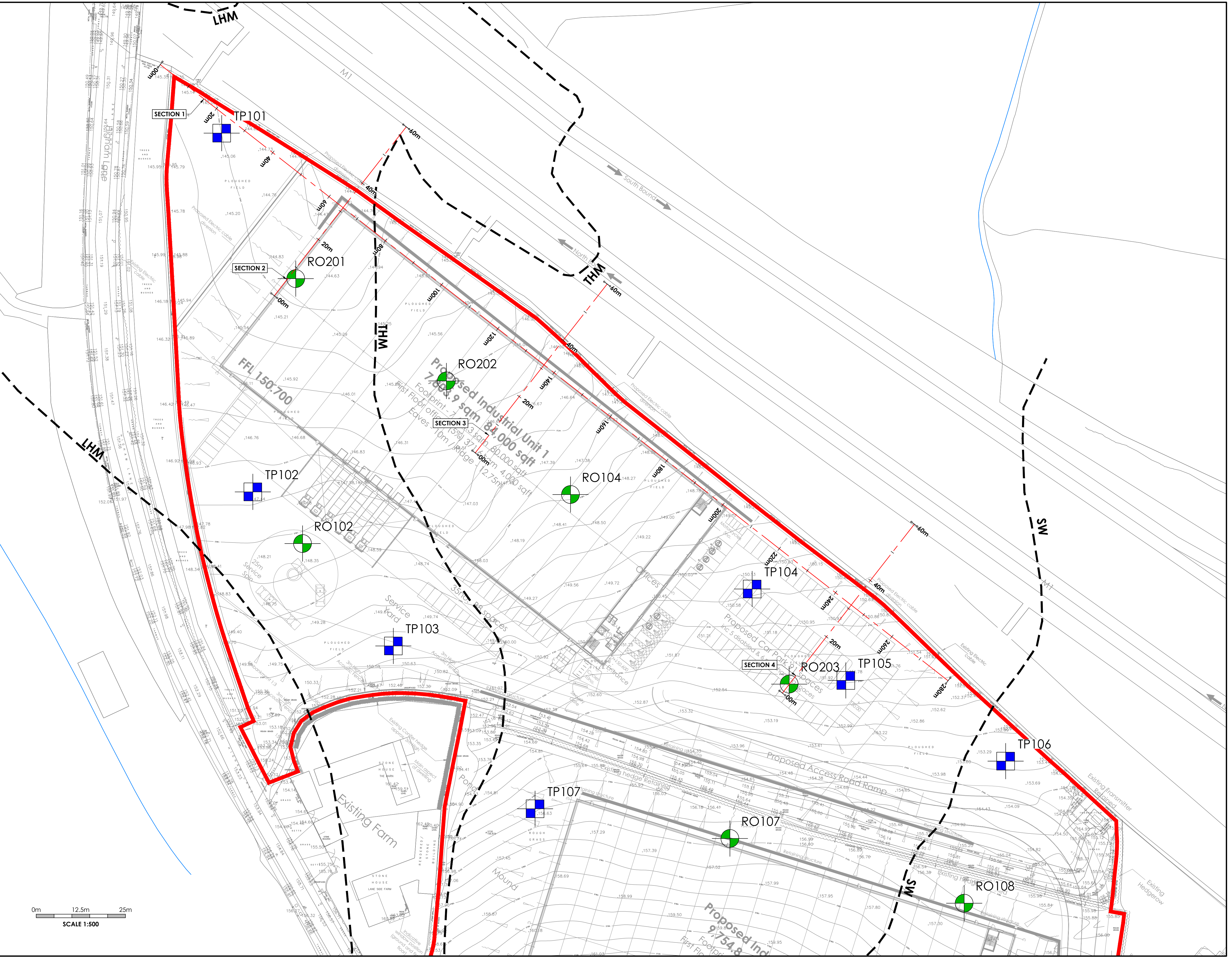
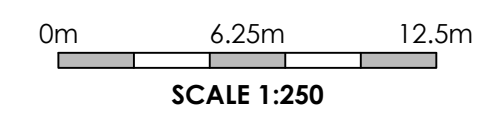
CHAINAGE

**SECTION 3 PROFILE**  
SCALE 1:250



CHAINAGE

**SECTION 4 PROFILE**  
SCALE 1:250



**GENERAL NOTES**

1. ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

**LEGEND**

- DENOTES SITE BOUNDARY
- DENOTES PROPOSED FINISHED LEVELS
- DENOTES EXISTING TOPO LEVELS
- DENOTES COAL SEAM OUTCROP

**HYDROCK SITE INVESTIGATION**  
2022

- TP TRIAL PIT
- RO ROTARY OPEN HOLE BOREHOLE

|                                                                          |             |          |     |     |
|--------------------------------------------------------------------------|-------------|----------|-----|-----|
| P01                                                                      | FIRST ISSUE | 25/07/25 | EJR | UGJ |
| REV                                                                      | DESCRIPTION | DATE     | CHK | BY  |
| Project<br>HICHAM LANE<br>BARNLEY                                        |             |          |     |     |
| Drawing Title<br>UNIT 1<br>GEOLOGICAL SITE SECTIONS                      |             |          |     |     |
| <b>INFORMATION</b>                                                       |             |          |     |     |
| <b>JPG</b><br>www.jpg.group<br>E admin@jpg.group   T +44 (0)113 263 1155 |             |          |     |     |
| 4173-JPG-ZZ-ZZ-DR-G-1120 S2 P01                                          |             |          |     |     |









**Site Photograph 1 - View to the North from the Proposed Location of the Retaining Wall:** The blue flag (circled) denotes the position of north-east corner of northern building with the highway fence line visible to the right.



**Site Photograph 2 - View to the South from the Proposed Location of the Retaining Wall:** The blue flag (circled) denotes the position of south-east corner of northern building with the highway fence line covered in vegetation to the left.





**Site Photograph 3 - View to the South along the Highway Fence Line**



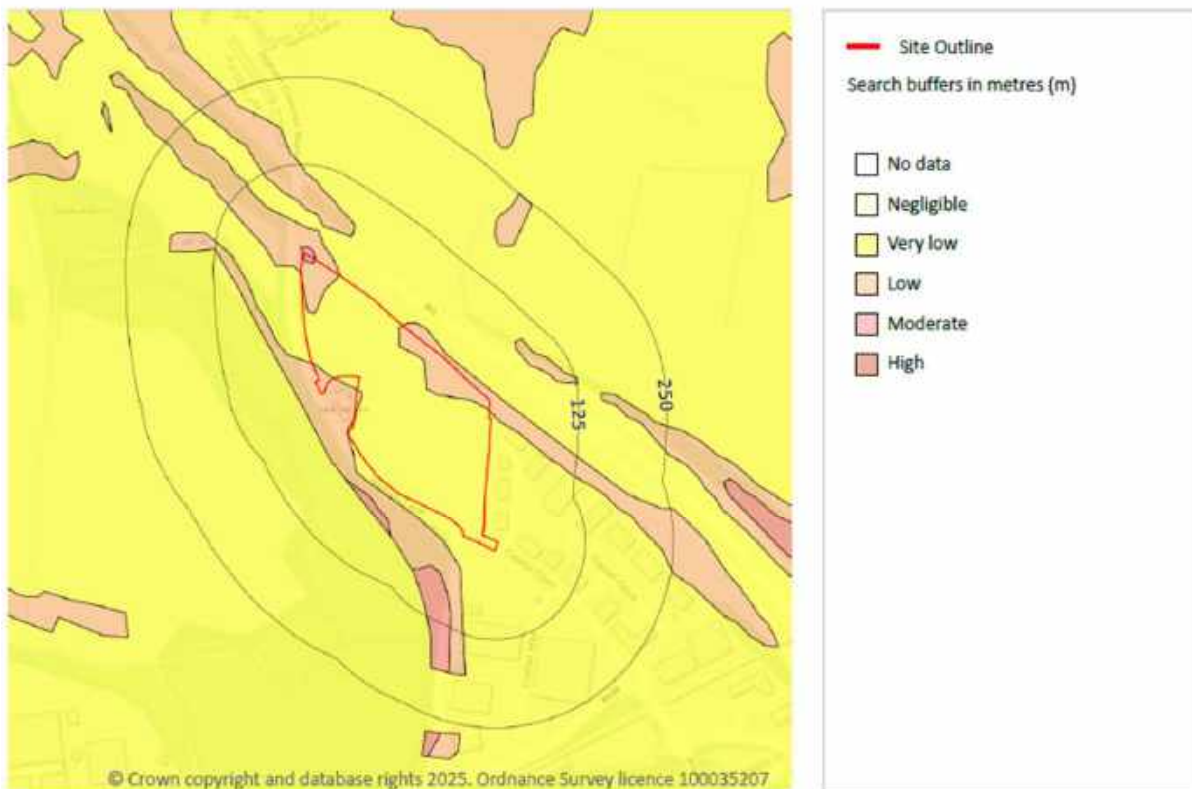


**Site Photograph 4 - View to the East over the Highway Fenceline (North):** A highway maintenance walkway and stairs was identified leading to the motorway. Note the horizontal platform prior to the cutting.



**Site Photograph 5 - View to the East over the Highway Fenceline (South):** A motorway communications installation was identified adjacent to the motorway. Note the horizontal platform of several metres prior to the cutting.

## Natural ground subsidence - Landslides



### Natural Ground Subsidence - Landslides Map from Groundsure

## **Appendix B**

JPG Geoenvironmental Desk Study Report, 2025





## **GEOENVIRONMENTAL DESK STUDY REPORT**

**Higham Lane North  
Dodworth  
Barnsley**

**Reference**

**4173-JPG-XX-XX-RP-G-0605-S2-P01**

**Date**

**July 2025**

**Author**

**EJS**

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## 6.0 Further Investigations

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### APPENDICES

#### Appendix A Figures

Figure 1 – Site Location Plan

Figure 2 - Aerial Photograph

The Harris Partnership. Proposed Industrial Development. Capitol Park, Junction 37 M1, Higham Lane, Barnsley. Reference, 11138-1-(P)111. Revision E. Date 08.2022.

#### Appendix B Site Photographs

#### Appendix C Historical Maps

#### Appendix D BGS Borehole Records

#### Appendix E CON29 Report

#### Appendix F Notes on Limitations



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## CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Commercial Development Projects Limited  
Huddersfield Road  
ELLAND  
HX5 9BW

This report has been prepared for the sole use and reliance of the above-named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

## DOCUMENT HISTORY

| Revision | Date     | Revision Details | Status | Author(s) | Approved |
|----------|----------|------------------|--------|-----------|----------|
| P01      | 28.07.25 | First Issue      | Final  | EJS       | JBW      |





## EXECUTIVE SUMMARY

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Address</b>                  | Higham Lane North, Dodworth, Barnsley                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>National Grid Reference</b>       | NGR 431541, 406356.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Current Site Use</b>              | The site is irregular in shape and occupies an area of approximately 5.96 hectares. It generally consists of sloping arable farmland, which is divided into two similar sized fields by mature trees and overgrown hedgerows.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Proposed Development</b>          | It is proposed to develop the site for an industrial end use, comprising two large units with associated service yards, car park spacing and soft landscaping areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Site History</b>                  | <p>The site has remained farmland since the earliest mapping. Two small ponds were located on the western/ north western boundary and later infilled. Two separate buildings associated with Lane Head (referred to as Lane Head Farm on later mapping) were shown in the south from 1850 to 1961 and from 1970 to 2014. A circular structure assumed to be a pond was shown partially on site from 1850 to 1890. A building associated with Lane Side Farm was shown to encroach onto the site from 1961 to 1991.</p> <p>The surrounding area has generally remained farmland. The M1 motorway was constructed in 1970 adjacent to the northeastern boundary. The land to the southwest was used as a spoil heap associated with the Old Silkstone Colliery and Higham Colliery. Old Silkstone Colliery (originally known as Church Lane Colliery) was active until approximately 1993 and was later redeveloped as Dodworth Business Park by 2002. Higham Lane colliery, located to the northwest, was active until approximately 1982.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Site Setting</b>                  | <p><b>Geology</b> – The Groundsure report indicates a large area of worked ground along the northern boundary associated with the construction of the M1 motorway. No superficial deposits are shown on site. Bedrock geology is shown to comprise mudstone, siltstone and sandstone of the Pennine Middle Coal Measures Formation in the north and sandstone of the Haigh Moor Rock Formation in the south of the site. The overall dip of the solid geology is shown as 5 degrees to the northeast. The hill in the south of the site corresponds with the sandstone unit shown to outcrop on the geological maps in this part of the site.</p> <p><b>Mining</b> – The site is underlain by the Top Haigh moor and the Low Haigh Moor coal seams at shallow depth. The possibility of historical underground workings in the aforementioned two coal seams below the site cannot be discounted. On this basis, a rotary borehole investigation is required to investigate the coal seams and presence of coal workings. The Top Haigh Moor coal seam has been subject to opencast mining to the north and northeast of the site in the Hunters Cottage opencast site. There is the possibility that the infilled opencast workings encroach onto the northeast. Ground investigation is required to investigate the presence of the infilled opencast in this location. There are no recorded mine entries on the site. However, the possibility of unrecorded mine entries (shafts, adits or bell pits) cannot be discounted.</p> <p><b>Quarry/Mineral Extraction</b> – There are 14 records of surface ground workings recorded within 250m of the site, two of these are recorded to be on site and relate to 'Cuttings'. The accompanying plan indicates that the surface ground workings encroach onto the northern boundary of the site. Other records close to the site include cuttings, refuse heaps, unspecified disused workings and collieries.</p> <p><b>Hydrogeology</b> – The bedrock is classified as a Secondary A aquifer.</p> <p><b>Hydrology</b> – The site is located within the Don and Rother catchment area. There are several inland rivers, not influenced by tidal action within 250m of the site, the closest being located 30m to the southwest of the site.</p> <p><b>Landfills and Waste</b> – There is one record of a historical landfill site within 500m. The landfill is located approximately 382m to the north and took commercial waste.</p> <p><b>Radon</b> – No radon protective measures are required for new buildings.</p> <p><b>Unexploded Ordnance</b> – The site is presented as a low unexploded ordnance (UXO) risk.</p> |
| <b>Environmental Risk Assessment</b> | <p>Based on the proposed industrial end use and history of the site, the following potential pollutant linkages may be present:</p> <ul style="list-style-type: none"> <li>• Development and maintenance workers and future site end users (employees) could come into contact with soils and groundwater containing elevated concentrations of potential contaminants and hazardous ground gases/soil vapours.</li> <li>• The underlying Secondary A Aquifer could become contaminated due to the leaching and migration of potential contaminants in the made ground.</li> <li>• Controlled waters could become contaminated due to leaching and migration of potential contaminants from the made ground.</li> <li>• Buildings and services could be affected by potential contaminants in the made ground.</li> <li>• Plants in landscaped areas could be affected by phytotoxic elements in the made ground.</li> </ul> <p>These are based on current site conditions and do not consider exposure pathways following any remediation of the site as part of the proposed development.</p> <p>Based on the conceptual site model, the site is considered to be low to moderate risk with respect</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



|                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                       | to contamination in soils and hazardous ground gases. This designation will be largely dependent on the nature of any made ground and hazardous ground gases present on or adjacent to the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Preliminary Engineering Assessment</b>                                                                                                                             | <p><b>Foundations and Ground Floor Slab</b> - The anticipated earthworks indicate that foundations in areas of cut will bear onto natural soils/rock, whereas foundations in areas of fill will bear onto engineered soils. The earthworks contractor will be required to provide sufficient bearing capacity and settlement characteristics of the underlying engineered fill. Foundation design will be confirmed through information obtained during the ground investigation. Foundation design will need to take in to account the presence of coal workings below the site, if proven.</p> <p><b>Earthworks</b> – Given the nature of the site sloping from the centre of the southern field into the northern corner of the site, cut and fill earthworks are likely to be required in order to achieve a suitable development platform. An assessment of the suitability of the natural 'cut' soils for re-use in the earthworks will be required. The earthworks design will need to take into consideration the presence of shallow coal below the site. If coal workings are identified during the site investigation, there is potential for extraction of the worked coal seam(s) below the site as part of the earthworks.</p> <p><b>Groundwater</b> – The presence of groundwater will need to be assessed as part of any ground investigation. Based on historical ground investigation, groundwater has been recorded at varying depths between 136.30m and 149.98m AOD. The groundwater gradient was generally recorded to slope to the north west.</p> <p><b>Obstructions</b> - Based on the site history, the presence of significant obstructions is considered unlikely.</p> <p><b>Roads, Pavements and Hardstanding Surfaces</b> - As significant earthworks are proposed, this will result in changes to the sub-grade materials. The earthworks should be designed to achieve a suitable CBR value for the proposed development.</p> <p><b>Chemical Attack on Buried Ground</b> - Samples of made and natural ground should be obtained and submitted to the laboratory for testing in order to assess the sulphate content and acidity and hence the concrete class required for buried concrete to the latest standard.</p> <p><b>Retaining Structures</b> – As it is proposed to raise ground levels in the north of the site in order to create a level development platform for Unit 1, it is anticipated that significant retaining structures will be required in order to ensure that the slope adjacent to the northern boundary of the site is not surcharged. Consideration should be given to the changes in the hydrology and hydrogeology due to the development including proposed drainage and the consequential effects on the embankment. It is proposed that further ground investigation be targeted in the location of the proposed retaining structure in the north to facilitate the design.</p> |
| <b>Further Work Required</b>                                                                                                                                          | <p>Based on the findings of the Desk Study Report, we recommend the following scope of investigative works.</p> <ul style="list-style-type: none"> <li>• Rotary openhole boreholes to investigate possible shallow coal workings and also the possibility of the backfilled opencast site encroaching in the northeast.</li> <li>• Rotary cored boreholes to inform foundation design and obtain rock core samples for strength testing. The boreholes will enable the installation of hazardous ground gas and groundwater monitoring wells.</li> <li>• Trial pits in order to assess the shallow ground conditions at the site and confirm the composition, extent, depth and nature of the made ground and underlying natural strata.</li> <li>• Cable percussive and window sample boreholes with in-situ tests in order to assess the ground conditions at the site and confirm the composition, extent, depth, and nature of any made ground and underlying natural ground. The boreholes will enable the installation of hazardous ground gas and groundwater monitoring wells.</li> <li>• Chemical analysis of soil, soil leachate and groundwater samples.</li> <li>• Geotechnical testing to classify materials and inform foundation design and geochemical testing to assess the Aggressive Chemical Environment for Concrete classification.</li> <li>• Monitoring of gas and groundwater wells for hazardous ground gases and groundwater level.</li> </ul> <p>On completion of the above, a Phase 2 Geoenvironmental Ground Investigation Report, to include a Tier 2 Generic Quantitative Risk Assessment, and engineering recommendations will be prepared. In relation to the proposed retaining structure adjacent to the M1, a separate Ground Investigation Report will be produced.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>This sheet is intended as a summary only of the assessment of the site in relation to ground condition. It does not provide a definitive engineering analysis.</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



## **1.0 INTRODUCTION**

### **1.1 Instruction**

JPG (Leeds) Limited (JPG) has been instructed by Commercial Development Projects Limited to provide a Geoenvironmental Desk Study Report for a proposed industrial development off Higham Lane, Barnsley.

### **1.2 Objectives**

The main objective of the Geoenvironmental Desk Study is to identify potential geotechnical and environmental issues that may represent constraints to the proposed development of the site.

### **1.3 Scope of Works**

The scope of works for the desk study includes the following:

- Site inspection and description.
- Review of contemporary and historical Ordnance Survey publications and available aerial photographs.
- Obtain a Mining Remediation Authority (MRA) coal mining report and any relevant abandonment plans/reports, if applicable.
- Consultations with regulatory authorities, where appropriate.
- Review of geological publications (including hydrology, hydrogeology and soil survey publications, where appropriate).
- Review of previous reports, if available.
- Review of the radon status of the site.
- An environmental database search.
- Outline environmental risk assessment.
- Preliminary engineering recommendations with respect to mining, foundations, ground floor and pavement design.
- Recommendations for further work, where appropriate; and
- Presentation of the findings in a tabular non-technical summary.

### **1.4 Location**

The site is located approximately 3km west of Barnsley town centre. The approximate centre of the site is located at NGR 431541, 406356.

A site location plan is given as Figure 1 in Appendix A.



## 1.5 Site Description and Topography

A site walkover was carried out by a JPG engineer on 16 July 2025.

The site is irregular in shape and occupies an area of approximately 5.96 hectares. It generally consists of sloping arable farmland, which is divided into two similar sized fields by mature trees and overgrown hedgerows.

The site can be accessed via two farm tracks off Higham Lane, located in the south and east of the site. The northern field falls gradually to the northwest, with ground levels of approximately 155m AOD in the south falling to approximately 145m AOD in the north. A hill is present in the southern field, the highest point of which is approximately 163m AOD.

An overhead telecoms line crosses the northern field from the northwest to the east, before continuing to follow the eastern boundary of the southern field. There is also a telecoms transmitter, surrounded by a metal post and chain link fence, in the eastern corner of the site.

The northeastern boundary of the site comprises a wooden fence running parallel to the M1 motorway, which is located within a cutting adjacent to the site. Higham Lane abuts the southwestern boundary of the site. Higham Lane is raised on an embankment adjacent to the northwest of the site before crossing the M1 via an overbridge. The eastern, southern and western boundaries consist of mature trees and overgrown hedgerows.

Higham Manor and Lane Side Farm are large residential properties halfway along the southwestern boundary of the site. Higham Manor and Lane Side Farm are surrounded by a stone walls, wooden fences and thick hedgerows, separating them from the site. Capitol Park, a commercial development, is present to the east.

An aerial photograph of the site is provided as Figure 2 in Appendix A. A selection of photographs is provided in Appendix B.

## 1.6 Development Proposals

It is proposed to develop the site for an industrial end use, comprising two large units with associated service yards, car park spacing and soft landscaping areas.

A proposed site layout plan showing the location of the proposed development is referenced below, a copy of which is presented in Appendix A of this report.

- The Harris Partnership. Proposed Industrial Development. Capitol Park, Junction 37 M1, Higham Lane, Barnsley. Reference, 11138-1-(P)111. Revision E. Date 08.2022.

## 1.7 Limitations

The general limitations to the nature of the investigation are outlined in Appendix F.





## 2.0 SITE HISTORY

### 2.1 Ordnance Survey Mapping

Historical maps for the site were obtained from Groundsure. These have been reviewed to establish the previous uses of the site and identify any potentially contaminative historical uses or potential geotechnical constraints to the proposed development.

A summary of the relevant map information is provided in Table 2.1 and copies of the Ordnance Survey (OS) maps are provided in Appendix C.

**Table 2.1 – Summary of Relevant Historical Map Information**

| Date(s) & Scale                              | Feature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1850 1:10,560</b>                         | <b>The site comprises several parcels of undeveloped fields. Multiple field boundaries are shown trending north to south and east to west. Dodworth Lane cuts across the northwest of the site. A building presumed to be associated with an adjacent farm is shown in the southern corner of the site. A small pond is shown on the northwestern boundary.</b><br>Higham Lane is annotated as Dodworth Lane. The site is located to the north of Dodworth and north of the Sheffield and Lincolnshire railway, which is shown approximately 450m to the south of the site. Lane Head farm is shown adjacent to the southern corner of the site. Lane Side farm is shown adjacent to the southwestern boundary of the site. The surrounding land generally comprises fields with areas of woodland.                                                                                                                                                                                                                                                                                            |
| <b>1890 – 1891 1:10,560<br/>1893 1:2,500</b> | <b>A farm track is shown to extend along the western boundary.</b><br>A pump is shown at Lane Head farm, approximately 15m to the south of the site.<br>A small pond is shown to encroach on the northwestern most part of the site, beyond which there is some potentially infilled ground.<br>Higham colliery is shown approximately 500m to the northwest of the site. Church Lane Colliery (Old Silkstone Collieries on later plans) with associated reservoirs, coke ovens (labelled on later plans) and spoil heaps, is shown approximately 550m to the southwest of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>1904 1:10,560<br/>1906 1:2,500</b>        | <b>No significant changes to the site.</b><br>Higham Colliery is now labelled as disused. Church Lane Colliery is now referred as Old Silkstone Collieries.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>1929 1:10,560</b>                         | <b>No significant changes to the site.</b><br>Reservoirs and spoil heaps associated with Higham Colliery are shown approximately 500m to the northwest of the site. Higham Pumping Station is shown approximately 700m northwest of the site. The coke ovens and large reservoir at Old Silkstone Colliery are no longer presented on the plans. However, the spoil heaps (assumed to be colliery waste) have increased in size to approximately 400m to the southwest of the site. The pump at Lane Head farm is no longer shown on the plans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>1938 1:10,560</b>                         | <b>No significant changes to the site or the surrounding area.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>1948 1:10,560</b>                         | <b>No significant changes to the site or the surrounding area.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>1956 1:10,560</b>                         | <b>No significant changes to the site.</b><br>The spoil heap (slag heap on later plans – assumed to be colliery spoil) associated with Old Silkstone Colliery has continued to increase in size, it is now shown approximately 200m to the south west of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>1961 1:2,500<br/>1966 1:10,560</b>        | <b>The ponds on the western boundary and in the north western corner are no longer shown on the plans. The building in the southern corner associated with Lane Head farm is no longer shown and a track is shown in this location. A building associated with Lane Side Farm is shown to the north of the farm, with the northeastern corner of the building possibly extending into the site.</b><br>The spoil heap at Old Silkstone Colliery (now referred to as a Mine) is shown as a slag heap (presumed colliery spoil) and is approximately 150m to the south of the site. A long linear feature (referred to as a conveyor on later plans) is shown approximately 400m to the west of the site connecting Old Silkstone Colliery and a 'mine' shown in the area of the disused Higham Colliery. Large opencast workings are shown approximately 400m to the north of the site. Smaller opencast workings are shown approximately 750m to the northeast of the site (adjacent to Pogmoor). A second Lane Head (shown as a farm) is located approximately 200m to the south of the site. |
| <b>1970 1:2,500<br/>1973 1:10,000</b>        | <b>There is now only one field boundary shown on site, trending east to west. A small building (presumed dwelling) is shown in the south of the site, adjacent to Lane Head</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



|                               |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |  | <p><b>(now also labelled as a farm). The raised section (embankment) of Higham Lane is shown along the western boundary of the site.</b></p> <p>The M1 motorway (shown as a cutting) bounds the northeastern boundary of the site. The slag heap (presumed colliery spoil) associated with the southwestern mine (Old Silkstone Colliery) is approximately 50m to the southwest of the site. The opencast workings are no longer shown on the plans. Part of the Sheffield and Lincolnshire Railway is shown to be dismantled, approximately 400m to the southeast of the site.</p> |
| 1982 1:2,500 & 1:10,000       |  | <p><b>No significant changes to the site.</b></p> <p>Both Lane Head Farms are shown as one large farm. The southern part of the former slag heap (presumed colliery spoil) appears to have been landscaped. The conveyor only extends to the start of the slag heap, approximately 400m to the northwest of the site. A disused tip assumed to be associated with Higham Colliery is shown approximately 500m northwest, with the associated 'mine' no longer shown on the plans.</p>                                                                                               |
| 1991 1:2,500<br>1993 1:10,000 |  | <p><b>The building associated with Lane Side Farm which extended into the site no longer appears on the plans.</b></p> <p>The slag heap to the west is now referred to as disused workings. The southwestern mine (Old Silkstone Colliery) is no longer shown on the plans, with Fall Bank Industrial Estate being developed in that area, approximately 750m to the southwest of the site.</p>                                                                                                                                                                                     |
| 2002 1:10,000                 |  | <p><b>No significant changes to the site.</b></p> <p>Dodworth Business Park has been built over the former Old Silkstone Colliery, between approximately 500m and 750m to the southwest of the site.</p>                                                                                                                                                                                                                                                                                                                                                                            |
| 2014 1:10,000                 |  | <p><b>No significant changes to the site.</b></p> <p>Several small units are shown immediately to the east of the site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2025 1:10,000                 |  | <p><b>Buildings in the south of the site no longer shown.</b></p> <p>Further development of Capitol Park to the east.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



## 2.2 Historical Aerial Imagery

Available aerial imagery dating from December 2002 to April 2025 has been reviewed on Google Earth Pro.

A summary of the aerial photography is provided in Table 2.2.

**Table 2.2 – Summary of Aerial Photography**

| Date(s)        | Feature                                                                                                                                                                                                                                                                                                                                                          |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 2002  | <b>The site comprises open fields separated by a line of trees aligned east to west. A small building is located in the south of the site.</b><br>The M1 extends northwest to southeast to the north of the site. Adjacent land is shown agricultural including a farm to the south. A residential building is in construction adjacent to the western boundary. |
| December 2003  | <b>A pylon is present in the north east of the site.</b><br>No significant changes are shown off of the site.                                                                                                                                                                                                                                                    |
| September 2008 | <b>No significant changes are shown on the site.</b><br>Five small units and associated infrastructure have been constructed to the east of the site. The farm to the south is no longer shown. The residential buildings to the west have been completed.                                                                                                       |
| December 2009  | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| June 2015      | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| June 2016      | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| April 2018     | <b>No significant changes are shown on site.</b><br>Construction of large units to the south of the site.                                                                                                                                                                                                                                                        |
| May 2019       | <b>No significant changes are shown on site.</b><br>Industrial estate to the east has significantly expanded with multiple small units being constructed.                                                                                                                                                                                                        |
| April 2020     | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| April 2021     | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| May 2022       | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| June 2023      | <b>No significant changes are shown on or off the site.</b>                                                                                                                                                                                                                                                                                                      |
| April 2025     | <b>Building in the south of site has been demolished.</b><br>No significant changes are shown off of the site.                                                                                                                                                                                                                                                   |

## 2.3 Summary of Site History

In summary, the site has remained farmland since the earliest mapping. Two small ponds were located on the western/ northwestern boundary and later infilled. Two separate buildings associated with Lane Head (referred to as Lane Head Farm on later mapping) were shown in the south from 1850 to 1961 and from 1970 to 2014. A circular structure assumed to be a pond was shown partially on site from 1850 to 1890. A building associated with Lane Side Farm was shown to encroach onto the site from 1961 to 1991.

The surrounding area has generally remained farmland. The M1 motorway was constructed in 1970 adjacent to the north eastern boundary. The land to the southwest was used as a spoil heap associated with the Old Silkstone Colliery and Higham Colliery. Old Silkstone Colliery (originally known as Church Lane Colliery) was active until approximately 1993 and was later redeveloped as Dodworth Business Park by 2002. Higham Lane colliery, located to the northwest, was active until approximately 1982.



## 3.0 SITE SETTING

### 3.1 Geology

The Groundsure Report and the following geological publications have been consulted:

- British Geological Survey (BGS), Sheet 87, Barnsley, 1:50,000 scale, Solid and Drift Edition, published 2008.
- BGS, Sheet SE30NW, Barnsley 1:10,000 scale, dated 2005.
- BGS, The Pennine Lower and Middle Coal Measures formations of the Barnsley district, Internal Report IR/06/135, dated 2006.
- BGS Onshore GeoIndex (<http://mapapps2.bgs.ac.uk/geoindex/home.html>).
- BGS, Lexicon of Named Rock Units.

The Groundsure report indicates a large area of worked ground along the northern boundary associated with the construction of the M1 motorway. Further made ground and infilled ground associated with historical spoil heaps and historical opencast coal sites are indicated approximately 32m to the southwest and 72m to the northeast of the site respectively.

No superficial deposits are shown on site. Bedrock geology is shown to comprise mudstone, siltstone and sandstone of the Pennine Middle Coal Measures Formation in the north and sandstone of the Haigh Moor Rock Formation in the south of the site.

The overall dip of the solid geology is shown as 5 degrees to the northeast. The hill in the south of the site corresponds with the sandstone unit shown to outcrop on the geological maps in this part of the site.

### 3.2 Historical Boreholes

Historical borehole records have been obtained from the BGS Onshore GeoIndex. There are 38 BGS borehole records located within 250m of the site. summary of the records within 50m and over 3m in depth are presented in Tables 3.2.1 to 3.2.4 and copies are contained in Appendix D.

**Table 3.2.1 BGS Borehole Record Summary – SE30NW544 (on site)**

| Strata Description                                                             | Depth Range (m bgl) | Strata Thickness (m) |
|--------------------------------------------------------------------------------|---------------------|----------------------|
| Disturbed ground – friable/stiff, brown silty clay topsoil containing straw.   | 0                   | 0.15                 |
| Orange brown very gravelly sandy CLAY containing sandstone gravel and cobbles. | 0.15 – 0.85         | 0.70                 |
| Weak, black COAL.                                                              | 0.85 – 1.25         | 0.40                 |
| Grey-brown silty CLAY.                                                         | 1.25 – 1.50         | 0.25                 |





**Table 3.2.2 BGS Borehole Record Summary –SE30NW263 (27m west of the site) – Four trial pits around a pond, deepest pit summarised.**

| Strata Description                                                                 | Depth Range (m bgl) | Strata Thickness (m) |
|------------------------------------------------------------------------------------|---------------------|----------------------|
| Topsoil.                                                                           | 0.00 – 0.23         | 0.23                 |
| Firm brown sandy CLAY with sandstone fragments.                                    | 0.23 – 0.61         | 0.38                 |
| Stiff friable brown and grey silty CLAY.                                           | 0.61 – 1.67         | 1.06                 |
| Stiff friable grey silty CLAY with fragments of mudstone and ironstone from 2.40m. | 1.67 – 3.66         | 1.99                 |

**Table 3.2.3 BGS Borehole Record Summary – SE30NW343 (29m northwest of the site)**

| Strata Description                                                                                                 | Depth Range (m bgl) | Strata Thickness (m) |
|--------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|
| Grey clayey silty Topsoil.                                                                                         | 0.00 – 0.15         | 0.15                 |
| Stiff mottled grey and brown silty CLAY.                                                                           | 0.15 – 1.83         | 1.68                 |
| Soft pale grey SILTSTONE with silty mudstone laminations at base. Hard below 2.75m.                                | 1.83 – 4.57         | 2.74                 |
| Moderately hard, mid grey silty MUDSTONE, less silty at base; mainly unbroken with closed vertical joints.         | 4.57 – 7.15         | 2.58                 |
| COAL with bands of carbonaceous mudstone.                                                                          | 7.15 – 7.62         | 0.47                 |
| Soft black carbonaceous shaley MUDSTONE, with fragments of coal and hard ironstone.                                | 7.62 – 9.30         | 1.68                 |
| Moderately hard, mid grey silty MUDSTONE, with closed vertical joints.                                             | 9.30 – 10.82        | 1.52                 |
| Hard pale grey SILTSTONE, with open and closed near vertical joints.                                               | 10.82 – 13.41       | 2.59                 |
| Hard, mid grey very silty MUDSTONE, with thin ironstone bands.                                                     | 13.41 – 16.00       | 2.59                 |
| Hard pale grey slightly iron stained SILTSTONE with silty mudstone laminations towards base, open vertical joints. | 16.00 – 18.59       | 2.59                 |

**Table 3.2.4 BGS Borehole Record Summary – SE30NW500 (35m east)**

| Strata Description                                                                                                                                   | Depth Range (m bgl) | Strata Thickness (m) |
|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|
| Topsoil: Friable brown silty sandy CLAY with angular fine to medium gravel with pottery fragments.                                                   | 0.00 – 0.20         | 0.20                 |
| MADE GROUND: Firm to stiff greyish brown occasionally mottled orange slightly sandy silty CLAY with some angular fine to coarse gravel of sandstone. | 0.20 – 0.60         | 0.40                 |
| MADE GROUND: Stiff grey silty CLAY with some occasional gravel of mudstone.                                                                          | 0.60 – 1.55         | 0.95                 |
| Stiff orange mottled grey slightly sandy silty CLAY with fine to medium gravel including ironstone nodules (completely weathered bedrock).           | 1.55 – 2.60         | 1.05                 |
| Grey highly weathered MUDSTONE recovered as clayey gravel of mudstone. Hydrocarbon odour.                                                            | 2.60 – 3.00         | 0.40                 |
| Grey moderately weathered slightly sandy SILTSTONE, weak to moderately weak.                                                                         | 3.00 – 3.35         | 0.35                 |

Topsoil is encountered from ground level to depths of between 0.15m and 0.23m, mean 0.18m bgl. Weathered bedrock of mudstone and siltstone is encountered in all logs at depths of between 0.85m and 1.83m, mean 1.48m bgl.

The following coal seams outcrop on or close to the site and are anticipated at shallow depth beneath the site (youngest to oldest).

- Top Haigh Moor Coal.
- Low Haigh Moor Coal.



Based on the generalised vertical section included on the 1:10,000 scale geological map, the Top Haigh Moor coal seam has a recorded thickness of 0.69m to 1.19m and is separated from the Low Haigh Moor coal seam by approximately 10m; this later coal seam has a recorded thickness of between 0.42m and 1.02m and is indicated to be present as two distinct leaves.

### 3.3 Coal Mining

The site lies within a Mining Remediation Authority (MRA) Coal Mining Reporting and High Risk Development Area. A CON29 mining report has been obtained for this report. This is referenced below and included in Appendix E of this report.

- CON29 Coal Mining Report. Higham Lane, Higham, Barnsley, S75 1PN. Reference: 51003510134001, Dated 7 July 2025.

The CON29 mining report states:

*'The property is in a surface area that could be affected by underground mining in 6 seams of coal at 90m to 290m depth and last worked in 1966. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.'*

*'In addition, the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some point in the past. The potential presence of workings at or close to the surface should be considered particularly prior to any site works or future development activity, as ground movement could still be a risk.'*

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

*'The property is not in an area where the Coal Authority has received an application for and is currently considering whether to grant a licence to remove or work coal by underground methods.'*

*'There are no recorded coal mine entries known to the Coal Authority within, or within 20 metres of the boundary of the property.'*

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

It is considered that possible shallow workings relate to the presence of the Top Haigh and Low Haigh Moor coal seams at shallow depth beneath the site. The next named coal seam below the Low Haigh Moor is the Lidget. Based on the coal seam separation, the Lidget coal seam is not considered to pose a risk to the surface stability of the site.



A historical opencast site (known as the Hunters Cottage) is indicated immediately to the northeast of the site, beyond the M1 motorway. Abandonment plans indicate that the Swallow Wood and Top Haigh Moor coal seams were extracted by opencast methods. There is the potential, although considered unlikely, that this infilled opencast site including associated highwalls encroaches beneath the site in the northeast.

A coal mining risk assessment was previously prepared by JPG, this is referenced below and should be read in conjunction with this report.

- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Higham Lane North – Proposed Industrial Development at Dodworth. Report Ref. JAM/CMRA/4173.v1. Dated, January 2019 for Sterling Capitol PLC.

### 3.4 Quarrying/Mineral Extraction

The GS report provides information from the British Pits (BritPits) database. No BritPits are recorded on or within 500m of the site.

There are 14 records of surface ground workings recorded within 250m of the site, two of these are recorded to be on site and relate to 'Cuttings'. The accompanying plan indicates that the surface ground workings encroach onto the northern boundary of the site. Other records close to the site include cuttings, refuse heaps, unspecified disused workings and collieries.

### 3.5 Hydrogeology

The bedrock geology below the site is classified as a Secondary A Aquifer. These are described as *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formally classified as minor aquifer'*.

Groundwater vulnerability is classified as Medium risk of pollution.

The Groundsure report indicates that there is negligible potential risk of groundwater flooding occurring on the site. However, the risk of groundwater flooding occurring at the site should be assessed based on site specific information.

The site does not lie within 500m of an Environment Agency Groundwater Source Protection Zone (SPZ).

There are no records of active groundwater abstraction licenses within 500m of the site.

There are no active potable water abstraction licences within 2km of the site.



### 3.6 Hydrology

The site is located within the Don and Rother catchment area. There are several inland rivers, not influenced by tidal action within 250m of the site, the closest being located 30m to the southwest of the site.

There are no active surface water abstraction licences within 500m of the site.

There are two recorded active discharge consents to controlled waters within 500m of the site. These are summarised in Table 3.6.

**Table 3.6 – Summary of Active Discharge Consents**

| Distance and Direction from the Site | Location              | Type             | Discharge        | Receiving              |
|--------------------------------------|-----------------------|------------------|------------------|------------------------|
| 192m west                            | Dodworth Colliery Tip | Trade discharges | Process Effluent | Trib of Silkstone Beck |
| 217m west                            | Dodworth Colliery Tip | Trade discharges | Process Effluent | Trib of Silkstone Beck |

Information on the gov.uk website and provided in the Groundsure report indicates that the majority of the site lies within Flood Zone 1 with a 1 in 1000 (0.1%) chance of flooding each year.

### 3.7 Pollution Incidents to Controlled Waters

There are three Environment Agency Recorded Pollution Incidents within 500m of the site, two of which recorded a significant impact on land, these are summarised in Table 3.7 below.

**Table 3.7 – Summary of Environment Agency Recorded Pollution Incidents with Significant Impacts**

| Distance and Direction from the Site | Incident Date | Incident Identification | Pollutant                       | Impacts                                                                                                                     |
|--------------------------------------|---------------|-------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 33m southwest                        | 20/02/2013    | 1088231                 | Chemically contaminated run off | Water Impact: Category 2(Significant Impact)<br>Land Impact – Category 4 (No Impact)<br>Air Impact – Category 4 (No Impact) |
| 206m west                            | 06/04/2018    | 1603339                 | Minewater                       | Water Impact: Category 2(Significant Impact)<br>Land Impact – Category 4 (No Impact)<br>Air Impact – Category 4 (No Impact) |
| 457m southwest                       | 22/04/2002    | 73573                   | Minewater                       | Water Impact: Category 4(No Impact)<br>Land Impact – Category 3 (Minor Impact)<br>Air Impact – Category 4 (No Impact)       |

### 3.8 Environmental Permits and Registers

There are no recorded active Control of Major Accidents Hazard (COMAH) sites within 1km of the site.

There are no historical records of Integrated Pollution Control (IPC) authorisations within 1km of the site.

There are no records of Part A(1) or Part A(2)/B licensed industrial activities within 500m of the site.



There are no records of sites determined as Contaminated Land under Part 2A of the Environmental Protection Act (EPA) 1990 within 500m of the site.

### 3.9 Landfills and Waste

The Groundsure report includes information on active and former landfill sites supplied by the EA, the Local Authority and the BGS.

There is one record of an Environment Agency historical landfill site within 500m of the site. A summary of this is provided in Table 3.9.1 below.

**Table 3.9.1– Summary of Historical Environment Agency Landfill Sites**

| Distance and Direction from the Site | Site Address                                                   | Reference  | Operator    | Waste Type |
|--------------------------------------|----------------------------------------------------------------|------------|-------------|------------|
| 382m North                           | Football pitch to rear of Mines PH, Higham Common Road, Higham | 4400/(156) | Mr J Cooper | Commercial |

There is no recorded active landfill sites located within 1km of the site.

There are three records of waste treatment, transfer or disposal sites taken from historical mapping within 500m of the site. A summary of these is provided in Table 3.9.2 below.

**Table 3.9.2– Records of waste treatment, transfer or disposal sites within 500m**

| Distance and Direction from the Site | Type of Site                    | Grid Reference | Year |
|--------------------------------------|---------------------------------|----------------|------|
| 162m southwest                       | Ground Workings and Refuse Heap | 431401, 405803 | 1962 |
| 410m southwest                       | Ground Workings and Refuse Heap | 431335, 405709 | 1893 |
| 425m southwest                       | Ground Workings and Refuse Heap | 431305, 405707 | 1906 |

There is one waste exemption recorded within 500m of the site. This relates to Redrow Homes, located 414m south of the site. The exemption is described as the use of waste in construction and relates to non-agricultural waste only.





### 3.10 Industrial Land Use

16 potentially contaminative industrial sites (active) are recorded within 250m of the site. A summary of sites <100m is presented in table 3.10 below.

**Table 3.10 – Summary of Active Potentially Contaminative Industrial Land Use**

| Distance and Direction from the Site | Company                            | Address                                                              | Activity                            | Category                      |
|--------------------------------------|------------------------------------|----------------------------------------------------------------------|-------------------------------------|-------------------------------|
| 1m northeast                         | Mast                               | South Yorkshire, S75                                                 | Telecommunications Features         | Infrastructure and Facilities |
| 4m northeast                         | Electricity Sub Station            | South Yorkshire, S75                                                 | Electrical Features                 | Infrastructure and Facilities |
| 23m east                             | Chirmarn Yorkshire                 | Unit 5, Capitol Close, Dodworth, Barnsley, South Yorkshire, S75 3UB  | Recycling, Reclamation and Disposal | Recycling Services            |
| 24m northeast                        | Brebur                             | Unit 1, Capitol Close, Dodworth, Barnsley, South Yorkshire, S75 3UD  | Building Competent Suppliers        | Construction Services         |
| 32m east                             | Emcor UK Ltd                       | Unit 6, Capitol Close, Dodworth, Barnsley, South Yorkshire, S75 3UD  | Industrial Engineers                | Engineering Services          |
| 66m east                             | Silverstone Vehicle Management Ltd | Unit 2a, Capitol Court, Dodworth, Barnsley, South Yorkshire, S75 3UD | Vehicle Hire and Rental             | Hire Services                 |
| 77m east                             | PMP Surfacing                      | Unit 1, Capitol Court, Dodworth, Barnsley, South Yorkshire, S75 3UD  | Construction Completion Services    | Construction Services         |
| 90m southeast                        | Electricity Sub Station            | South Yorkshire, S75                                                 | Electrical Features                 | Infrastructure and Facilities |

There are no records of current or recent petrol stations within 500m of the site.

### 3.11 Radon Risks

The site is not in a radon affected area as defined by Public Health England with between 1% and 3% of properties above the action level. In accordance with the Building Research Establishment (BRE) publication BR211, no radon protective measures are required for new properties constructed on the site.

### 3.12 Unexploded Ordnance

The site is presented as a low UXO risk on online mapping<sup>1</sup>.

<sup>1</sup> <https://zeticauxo.com/guidance/risk-maps/>



### 3.13 Previous Reports

In 2017 an Environmental Appraisal was carried out by Wardell Armstrong. This included geological, hydrogeological and mining assessments with a conceptual site model. A brief summary of the conclusions are provided below.

- Wardell Armstrong. Environmental Appraisal. Capitol Park, Barnsley. Reference, SH11957/0001, dated September 2017.

The appraisal identified a risk of unrecorded mine workings within the Top and Low Haigh Moor coal seams beneath the site. The conceptual site model identified made ground and coal/mines gas as potentially significant onsite contamination sources. The model identified '*historical landfill associated with extensive past tipping and reclamation work*' as a source of offsite contamination.

In 2022, a ground investigation was carried out on site by Hydrock. The works were carried out in two phases and comprised of eight rotary open holes and 12 trial pits. The report is referenced below, and a summary of relevant information is provided.

- Hydrock. Ground Investigation Report. Higham Lane, Barnsley. Reference, 23055-HYD-XX-XX-RP-GE-0003\_S2\_P01, dated 5 May 2022.

Topsoil was encountered in all exploratory holes to an average depth of 0.30m bgl and comprised a soft sandy slightly gravelly clay. Made ground was encountered in two locations, both located on the northern boundary adjacent to the M1.

Bedrock strata of the Pennine Middle Coal Measures formation was encountered beneath the made ground in all locations. Weathered bedrock was encountered to depths of between 1.00m and 2.30m bgl and comprised firm to stiff, sandy, slightly gravelly clay with interbedded bands of coal, ironstone, sandstone and siltstone. Intact bedrock was encountered underlying the upper weathered material comprising mudstone interbedded with bands of coal, ironstone, sandstone and siltstone. Coal seams were encountered in ten of the exploratory locations at various depths, all coal seams were recorded as intact with no broken ground or other evidence of underground coal workings encountered.

The report identified the proposed retaining structure adjacent to the M1 as a significant geotechnical constraint and advised further investigation to obtain rock core samples and laboratory testing to inform geotechnical properties.

It should be noted that the site layout plan that recommendations are based on in the Hydrock report differs from the current scheme.



## 4.0 ENVIRONMENTAL RISK ASSESSMENT

### 4.1 Introduction

The statutory definition of contaminated land is given in the Environmental Protection Act, Part 2A, Section 78, 1990, which was introduced by the Environment Act, Section 57, Department of Environment, 1995 and is defined as:

Land, which appears to the Local Authority in whose area it is situated, to be in such a condition, by reason of substances in, on or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused (by the land).

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. The potential for harm to occur requires three conditions to be satisfied:

- Sources – The presence of substances (potential contaminants/pollutants), in or under the ground, that may cause harm or pollution.
- Receptors - The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora; and
- Pathway - The existence of a linkage between the Source and the Receptor.

In summary, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and an unacceptable risk of harm to available receptors.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the sensitivity of the intended end use of the site and the site's characteristics and environmental setting.

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk-based approach. This is set out in the Environment Agency's manual Land Contamination: Risk Management (LCRM), published in October 2020 and last updated on 20 July 2023.



The LCRM outlines the following stages of risk assessment:

|                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tier 1: Preliminary risk assessment (PRA)</b>            | As part of this assessment, the overall site objectives are defined. Current and historical information about the site and the potential contaminants expected to be present are assessed and an outline conceptual model (CM) is developed. The risks are assessed qualitatively, and the findings reported in the PRA (or desk study). The report recommends what further works would be required in order to assess whether the site is suitable for its proposed use. |
| <b>Tier 2: Generic quantitative risk assessment (GQRA)</b>  | The GQRA uses Generic Assessment Criteria, and a standard set of generic assumptions based on specific end uses in order to assess the risks to receptors. It includes the collection of more detailed information including laboratory analysis of soil and water samples in order to inform and assess the risks.                                                                                                                                                       |
| <b>Tier 3: Detailed quantitative risk assessment (DQRA)</b> | If pollutant linkages are confirmed as part of the GQRA, these are known as relevant pollutant linkages (RPLs) and further detailed assessment is required. At this tier, detailed site-specific information is collected to estimate the risk or to develop site-specific assessment criteria (SSAC). This may include collecting information about the receptor.                                                                                                        |

This Desk Study Report represents a Tier 1 Preliminary Risk Assessment.

## 4.2 Potential Sources

The following potentially contaminative sources may be present on or adjacent to the site:

- Made ground associated with adjacent land use and development, i.e. development of the M1 motorway and the adjacent industrial estate.
- Potential leaks and/or spills from fuel storage tanks and vehicles associated with former/current uses.
- Made ground associated with onsite sources, e.g. infilled ponds, reworked topsoil/made ground and demolition rubble.
- Hazardous ground gases/soil vapours associated with made ground, possible shallow coal and coal workings and localised areas of infilled land/ponds including adjacent land (colliery spoil heap and backfilled opencast sites).
- Shallow coal-rich made ground and/or natural ground, including coal seams, having elevated calorific value.



Potential contaminants which could be present on the site are listed below:

- Metals, metalloids and their compounds.
- Inorganic compounds, e.g. arsenic.
- Asbestos fibres/asbestos containing materials.
- Organic compounds including polycyclic aromatic hydrocarbons (PAH) and petroleum hydrocarbons (TPH).
- Volatile organic contaminants (VOCs).
- Pesticides and herbicides.
- Hazardous ground gases/soil vapours.
- Calorific Value associated with coal-rich made ground.

### **4.3 Potential Pathways**

Based on the available information and the proposed development of the site for a commercial (office) end use, the following potential exposure pathways will require consideration, both during the development works and on completion of construction:

- Ingestion, inhalation and/or dermal contact with contaminated soil and groundwater.
- Inhalation of hazardous ground gases/soil vapours/asbestos fibres.
- Leaching/migration of potential contaminants from soil into groundwater and surface water via surface infiltration, drainage and/or groundwater flow.
- Permeation of water supply pipes and other services by organic and aggressive contaminants; and
- Uptake of contaminants by planting in landscape areas.
- Combustible soils including presence of coal at or near surface.

### **4.4 Potential Receptors**

The potential receptors considered are:

- Development workers and future maintenance workers involved in excavations, e.g. foundations or where services are being installed or repaired following development.
- Future end users of the site, i.e. employees
- Controlled waters, i.e. inland river 30m to the south west and underlying Secondary A Aquifer.
- Buildings and infrastructure; and
- Planting in landscaped areas.





---

## 4.5 Pollutant Linkage Assessment

A potential pollutant linkage assessment has been completed and is summarised in the Conceptual Site Model (CSM), which is provided in Section 4.6. This is based on the proposed development of the site for a commercial end use (office development).

Based on the proposed industrial end use and history of the site, the following potential pollutant linkages may be present:

- Development and maintenance workers and future site end users (employees) could come into contact with soils and groundwater containing elevated concentrations of potential contaminants and hazardous ground gases/soil vapours.
- The underlying Secondary A Aquifer could become contaminated due to the leaching and migration of potential contaminants in the made ground.
- Controlled waters could become contaminated due to leaching and migration of potential contaminants from the made ground.
- Buildings and services could be affected by potential contaminants in the made ground.
- Plants in landscaped areas could be affected by phytotoxic elements in the made ground.

These are based on current site conditions and do not consider exposure pathways following any remediation of the site as part of the proposed development.



## 4.6 Conceptual Site Model & Risk Rating

The conceptual model is summarised in Table 4.6.

**Table 4.6 Preliminary Conceptual Model**

| Source                                                                                                                                                                                                                                                                                                                            | Pathway                                                                                      | Receptor                                                                                                                  | Risk Rating     | Comments                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>On-site Sources</b><br>Residual contamination within the made ground associated with former and current land uses.<br><br>Contamination from off-site historical industry.<br><br>Spills/leaks from historical tanks/vehicles on and off site.<br><br><b>Off-site Sources</b><br>Made ground associated with off-site sources. | Inhalation.<br><br>Ingestion.<br><br>Dermal contact.                                         | <b>Future Site Users.</b><br><br><b>Development Workers.</b>                                                              | Low             | Previous ground investigation identified minimal made ground on site.<br><br>JPG Ground investigation to confirm the thicknesses and nature of the made ground across site and establish the concentrations of potential contamination present.                                                                                                        |
|                                                                                                                                                                                                                                                                                                                                   | Leaching of mobilised contaminants.<br><br>Migration via surface water and groundwater flow. | <b>Controlled Waters.</b><br><br><b>Surface Water.</b><br>River Dearne<br><br><b>Groundwater.</b><br>Secondary Aquifer. A | Low             | <b>Controlled Waters</b><br>There are two recorded active discharge consents to controlled waters within 250m of the site.<br><br><b>Surface Water</b><br>There are no active licenced surface water abstractions within 500m of the site.<br><br><b>Groundwater</b><br>There are no active licenced groundwater abstractions within 500m of the site. |
| <b>Hazardous Ground Gases/Soil Vapours.</b>                                                                                                                                                                                                                                                                                       | Inhalation.                                                                                  | <b>Future End Users.</b><br><br><b>Development Workers.</b>                                                               | Low to Moderate | Gas monitoring to be undertaken as part of ground investigation.<br><br>Appropriate health and safety procedures to be in place during the construction phase of the development.                                                                                                                                                                      |
| <b>Areas of Phytotoxic Contamination.</b>                                                                                                                                                                                                                                                                                         | Root uptake.                                                                                 | <b>Vegetation.</b><br>Landscaping.                                                                                        | Low             | Ground investigation and sampling to establish levels of any phytotoxic contamination present.                                                                                                                                                                                                                                                         |
| <b>Aggressive Contaminants in Soil/Water.</b>                                                                                                                                                                                                                                                                                     | Direct contact.                                                                              | <b>Construction Materials.</b><br>Concrete and Services.                                                                  | Low to Moderate | Samples of made and natural ground should be obtained and submitted to the laboratory for testing in order to assess the sulphate content and acidity.                                                                                                                                                                                                 |

## 4.7 Risk Classification

Based on the conceptual site model, the site is considered to be **low to moderate risk** with respect to contamination in soils and hazardous ground gases. This designation will be largely dependent on the nature of any made ground and hazardous ground gases present on or adjacent to the site.

In order to assess further and classify the risks to human health, groundwater, surface water and buildings/services, a Phase 2 Geoenvironmental Ground Investigation, to include a Tier 2 Generic Quantitative Risk Assessment, will be required. The Phase 2 Geoenvironmental Ground Investigation will include chemical testing of soils, leachate and groundwater, as well as hazardous ground gas monitoring.



## **5.0 PRELIMINARY ENGINEERING ASSESSMENT**

### **5.1 Development Proposals**

It is proposed to develop the site for an industrial end use, comprising two large units with associated service yards, car park spacing and soft landscaping areas.

A proposed site layout plan showing the location of the proposed development is referenced below, a copy of which is presented in Appendix A of this report.

- The Harris Partnership. Proposed Industrial Development. Capitol Park, Junction 37 M1, Higham Lane, Barnsley. Reference, 11138-1-(P)111. Revision E. Date 08.2022.

### **5.2 Mining**

The Mining Remediation Authority reports and BGS 1:10,000 geological mapping show the site is underlain by the Top Haigh moor and the Low Haigh Moor coal seams at shallow depth. The Top Haigh Moor outcrops across the site, trending roughly north to south. The upper leaf of the Low Haigh Moor coal seam outcrops on/near the western site boundary and the lower leaf is shown to outcrop approximately 150m to the southwest.

The possibility of historical underground workings in the aforementioned two coal seams below the site cannot be discounted. On this basis, a rotary borehole investigation is required to investigate the coal seams and presence of coal workings.

If any shallow coal workings within influencing depth of the surface are proven beneath the site, then these will require stabilising, e.g. drilling and grouting or extraction prior to development.

The Top Haigh Moor coal seam has been subject to opencast mining to the north and northeast of the site in the Hunters Cottage opencast site. There is the possibility that the infilled opencast workings encroach onto the northeast of the site. Ground investigation is required to investigate the presence of the infilled opencast in this location.

There are no recorded mine entries on the site. However, the possibility of unrecorded mine entries (shafts, adits or bell pits) cannot be discounted.

### **5.3 Foundations/Ground Floor Construction**

Based on the findings of the desk study, ground conditions are likely to compromise topsoil or reworked natural over a minimal thickness of made ground, underlain by weathered and competent bedrock comprising mudstone, siltstone and sandstone.

It is anticipated that significant cut and fill earthworks will be required to create development platforms for the proposed industrial units.



The anticipated earthworks indicate that foundations in areas of cut will bear onto natural soils/rock, whereas foundations in areas of fill will bear onto engineered soils. The earthworks contractor will be required to provide sufficient bearing capacity and settlement characteristics of the underlying engineered fill.

The selection of foundation type will be governed by the nature of the proposed development and the thickness, strength and settlement characteristics of the underlying natural strata and engineered fill.

Foundation design will be confirmed through information obtained during the ground investigation.

Foundation design will need to take in to account the presence of coal workings below the site, if proven.

## **5.4 Earthworks**

Given the nature of the site sloping from the centre of the southern field into the northern corner of the site, cut and fill earthworks are likely to be required in order to achieve a suitable development platform. An assessment of the suitability of the natural 'cut' soils for re-use in the earthworks will be required as part of future investigation. The earthworks design will need to take into consideration the presence of shallow coal below the site.

In order to create the development platforms for the two industrial units, it is likely that soils/rock will be cut from the south of the site and used to raise levels in the north.

If coal workings are identified during the site investigation, there is potential for extraction of the worked coal seam(s) below the site as part of the earthworks.

Any earthworks specification should be in general accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.

## **5.5 Groundwater**

The presence of groundwater will need to be assessed as part of any ground investigation. Based on historical ground investigation, groundwater has been recorded at varying depths between 136.30m and 149.98m AOD. The groundwater gradient was generally recorded to slope to the north west.

## **5.6 Obstructions**

Based on the site history, the presence of significant obstructions is considered unlikely.



---

## **5.7 Roads, Pavements and Hardstanding Surfaces**

As significant earthworks are proposed, this will result in changes to the sub-grade materials. The earthworks should be designed to achieve a suitable CBR value for the proposed development.

## **5.8 Chemical Attack on Buried Ground**

Samples of made and natural ground should be obtained and submitted to the laboratory for testing in order to assess the sulphate content and acidity and hence the concrete class required for buried concrete to the latest standard.

## **5.9 Retaining Structures**

As it is proposed to raise ground levels in the north of the site in order to create a level development platform for Unit 1, it is anticipated that significant retaining structures will be required in order to ensure that the slope adjacent to the northern boundary of the site is not surcharged. Consideration should be given to the changes in the hydrology and hydrogeology due to the development including proposed drainage and the consequential effects on the embankment.

It is proposed that further ground investigation be targeted in the location of the proposed retaining structure in the north to facilitate the design.





## 6.0 FURTHER INVESTIGATIONS

Based on the findings of the Desk Study Report, we recommend the following scope of investigative works.

- Rotary openhole boreholes to investigate possible shallow coal workings and also the possibility of the backfilled opencast site encroaching in the northeast.
- Rotary cored boreholes to inform foundation design and obtain rock core samples for strength testing. The boreholes will enable the installation of hazardous ground gas and groundwater monitoring wells.
- Trial pits in order to assess the shallow ground conditions at the site and confirm the composition, extent, depth and nature of the made ground and underlying natural strata. Soil samples will also be obtained and submitted for chemical and geotechnical analysis to inform earthworks design.
- Cable percussive and window sample boreholes with in-situ tests in order to assess the ground conditions at the site and confirm the composition, extent, depth, and nature of any made ground and underlying natural ground. The boreholes will enable the installation of hazardous ground gas and groundwater monitoring wells.
- Chemical analysis of soil, soil leachate and groundwater samples in order to determine the concentrations of potential contamination on the site and classify selected materials for disposal off-site (not including WAC testing).
- Geotechnical testing to classify materials and inform foundation design and geochemical testing to assess the Aggressive Chemical Environment for Concrete classification.
- Monitoring of gas and groundwater wells for hazardous ground gases, methane, carbon dioxide, oxygen, flow rate and groundwater level.

On completion of the above, a Phase 2 Geoenvironmental Ground Investigation Report, to include a Tier 2 Generic Quantitative Risk Assessment, and engineering recommendations will be prepared.

In relation to the proposed retaining structure adjacent to the M1, a separate Ground Investigation Report will be prepared.

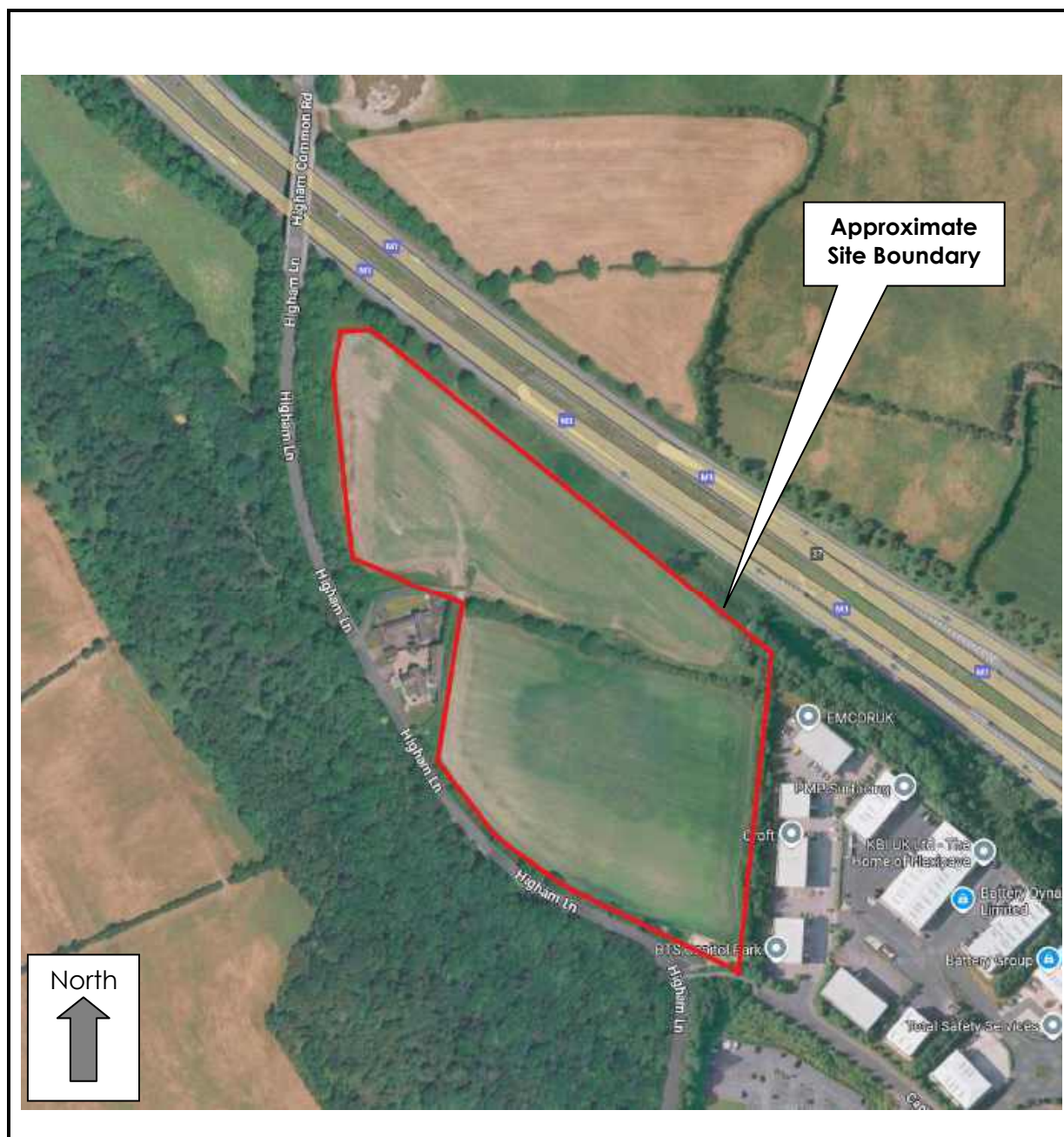


## **Appendix A   Figures & Drawings**



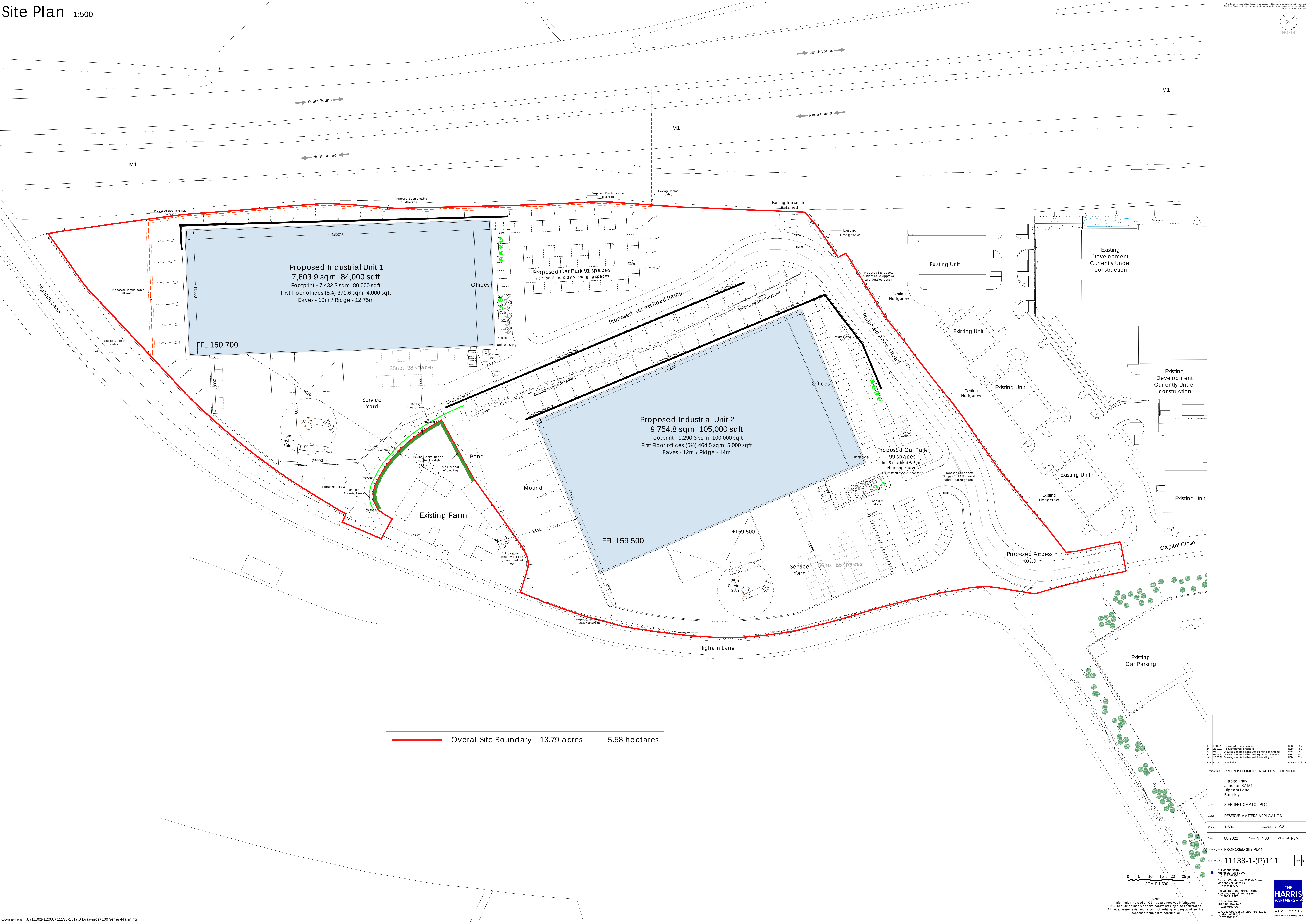
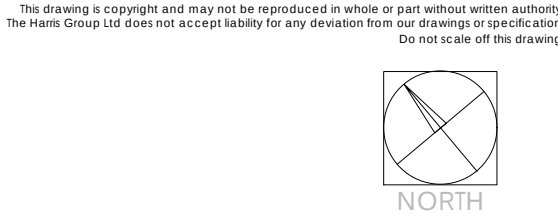
**Figure 1 – Site Location Plan**

|                   |                                                |
|-------------------|------------------------------------------------|
| <b>Site</b>       | <b>Higham Lane North, Dodworth, Barnsley</b>   |
| <b>Client</b>     | <b>Commercial Development Projects Limited</b> |
| <b>Job Number</b> | <b>4173</b>                                    |
| <b>Scale</b>      | <b>NTS</b>                                     |



| Figure 2 – Aerial Photograph |                                         |
|------------------------------|-----------------------------------------|
| Site                         | Higham Lane North, Dodworth, Barnsley   |
| Client                       | Commercial Development Projects Limited |
| Job Number                   | 4173                                    |
| Scale                        | NTS                                     |





Overall Site Boundary 13.79 acres 5.58 hectares

SCALE 1:500

|                                                                                                                                                                                                                                      |          |                                                |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------|--------------|
| Revision                                                                                                                                                                                                                             |          |                                                |              |
| A                                                                                                                                                                                                                                    | 17.09.23 | Highway layout amended                         | NBB PSM      |
| B                                                                                                                                                                                                                                    | 28.02.23 | Highway layout amended                         | NBB PSM      |
| C                                                                                                                                                                                                                                    | 08.02.23 | Drawing updated in line with planning comments | NBB PSM      |
| D                                                                                                                                                                                                                                    | 08.02.23 | Drawing updated in line with highway comments  | NBB PSM      |
| A                                                                                                                                                                                                                                    | 25.05.22 | Drawing updated in line with internal layouts  | NBB PSM      |
| Rev                                                                                                                                                                                                                                  |          | Description                                    | Rev By       |
| Project Title                                                                                                                                                                                                                        |          |                                                |              |
| PROPOSED INDUSTRIAL DEVELOPMENT                                                                                                                                                                                                      |          |                                                |              |
| Client                                                                                                                                                                                                                               |          |                                                |              |
| STERLING CAPITOL PLC                                                                                                                                                                                                                 |          |                                                |              |
| Status                                                                                                                                                                                                                               |          |                                                |              |
| RESERVE MATTERS APPLICATION                                                                                                                                                                                                          |          |                                                |              |
| Scale                                                                                                                                                                                                                                |          | 1:500                                          | Drawing Size |
| Date                                                                                                                                                                                                                                 |          | 08.2022                                        | Drawn By     |
| Drawing Title                                                                                                                                                                                                                        |          | 11138-1(P)111                                  | Rev          |
| Job-Client No                                                                                                                                                                                                                        |          | 11138-1(P)111                                  | Rev          |
| Location                                                                                                                                                                                                                             |          |                                                |              |
| Capitol Park Junction 37 M1 Higham Lane Barnsley                                                                                                                                                                                     |          |                                                |              |
| Notes                                                                                                                                                                                                                                |          |                                                |              |
| Information is based on OS map and received information. Assumed site boundary and site constraints subject to confirmation. All legal easements and status of existing underground services, locations are subject to confirmation. |          |                                                |              |
| THE HARRIS PARTNERSHIP                                                                                                                                                                                                               |          |                                                |              |
| A R C H I T E C T S                                                                                                                                                                                                                  |          |                                                |              |
| www.harrispartnership.com                                                                                                                                                                                                            |          |                                                |              |





## **Appendix B   Site Photographs**



**Photograph 1: Looking West from the South.**



**Photograph 2: Looking East from the Tree Line in the Centre of the Site.**



**Photograph 3: Looking North from the Centre of the Site.**



**Photograph 4: Land West along the Northern Boundary.**





**Photograph 5 : Looking South East along the Northern Boundary.**



**Photograph 6: Entrance to site from Higham Lane, North of Residential Property.**



**Photograph 7: Looking North from the Centre.**



**Photograph 7: Looking North from the South East.**





## **Appendix C   Historical Maps**



#### Site Details:

Higham Lane, Dodworth, S75

Client Ref: CMAPS-JPG-1231104-65579-070725  
Report Ref: CMAPS-JPG-1231104-65579-070725HIS\_LS\_1\_1  
Grid Ref: 431538, 406355

Map Name: County Series

Map date: 1893

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1893  
Edition N/A  
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Levelled N/A

Surveyed 1893  
Revised 1893  
Edition N/A  
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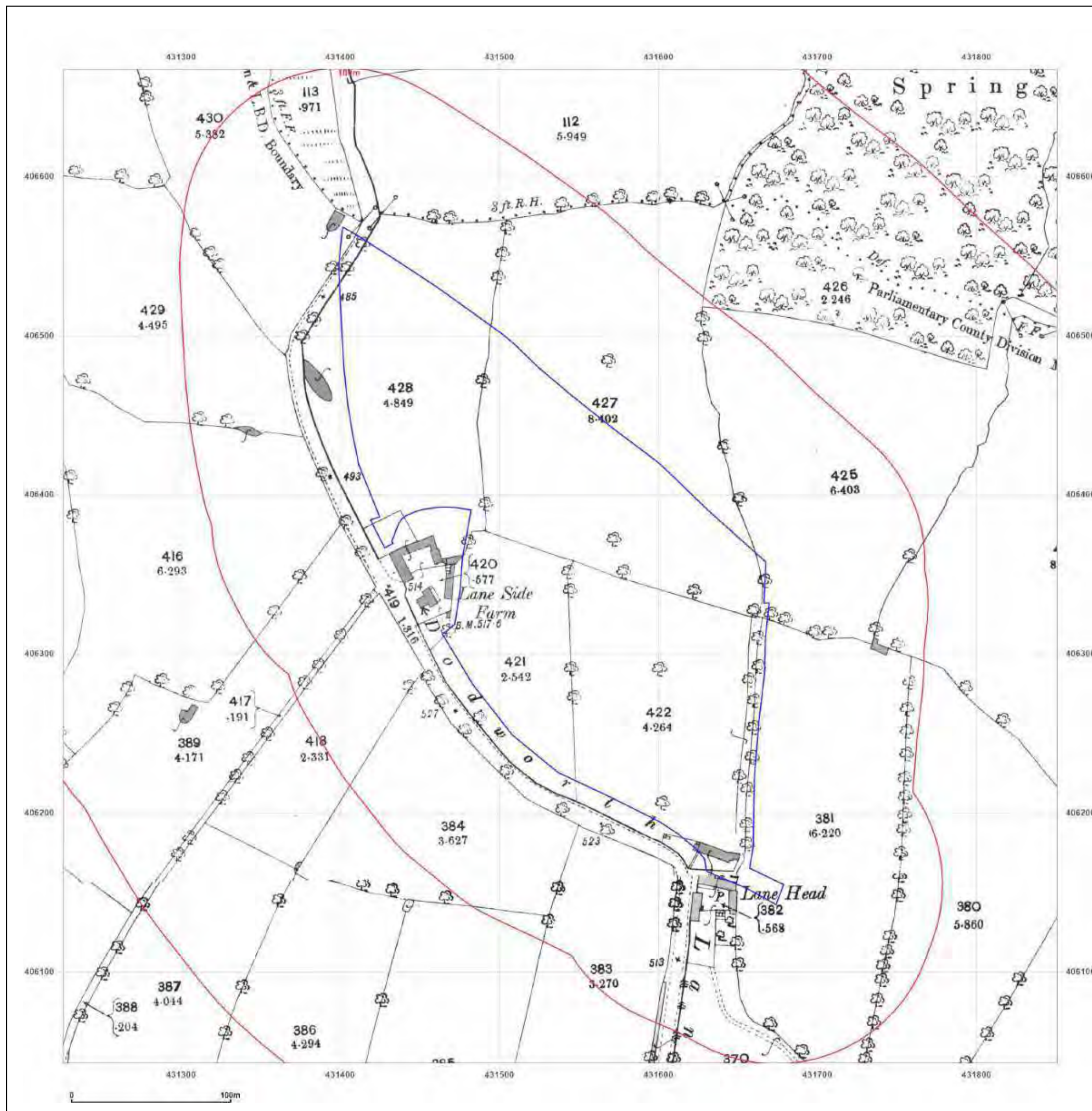
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#### Site Details:

Higham Lane, Dodworth, S75

**Client Ref:** CMAPS-JPG-1231104-65579-070725  
**Report Ref:** CMAPS-JPG-1231104-65579-070725HIS\_LS\_1\_1  
**Grid Ref:** 431538, 406355

**Map Name:** County Series

**Map date:** 1906

**Scale:** 1:2,500

**Printed at:** 1:2,500



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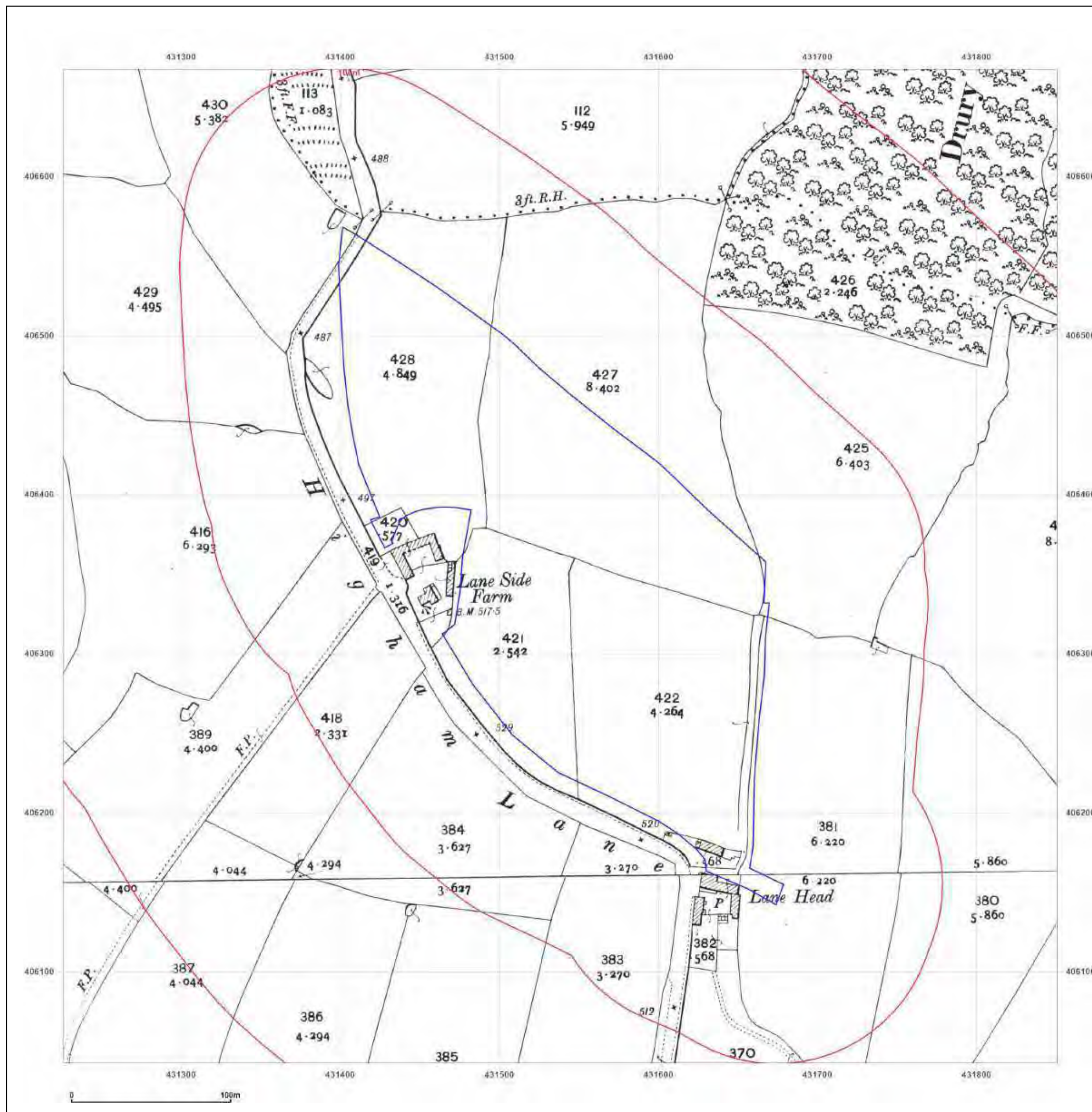
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#### Site Details:

Higham Lane, Dodworth, S75

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**Report Ref:** CMAPS-JPG-1231104-65579-070725HIS\_LS\_1\_1  
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Surveyed 1961  
Revised 1961  
Edition N/A  
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Levelled 1959



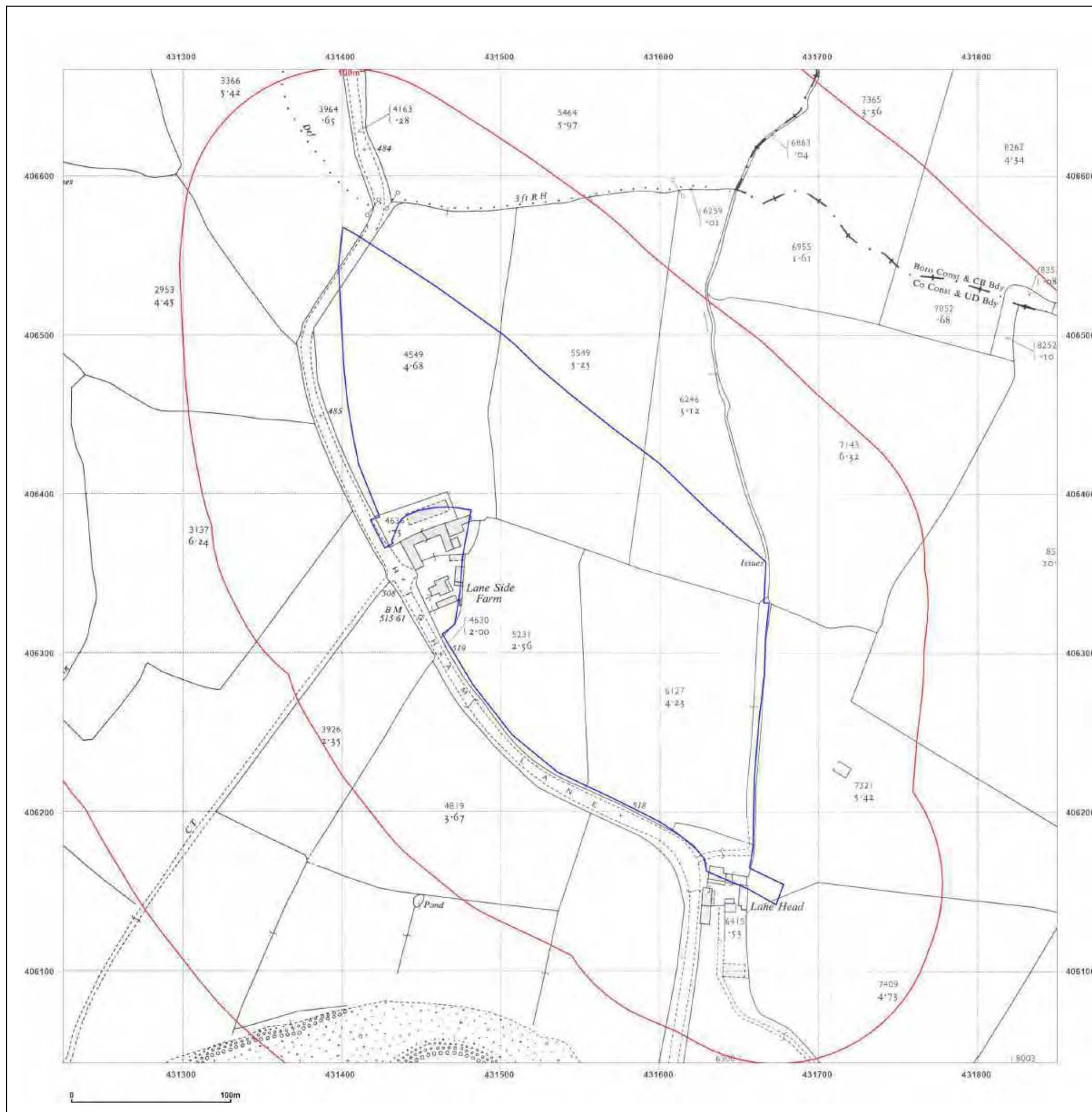
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#### Site Details:

Higham Lane, Dodworth, S75

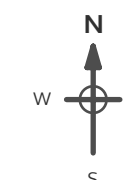
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Edition N/A  
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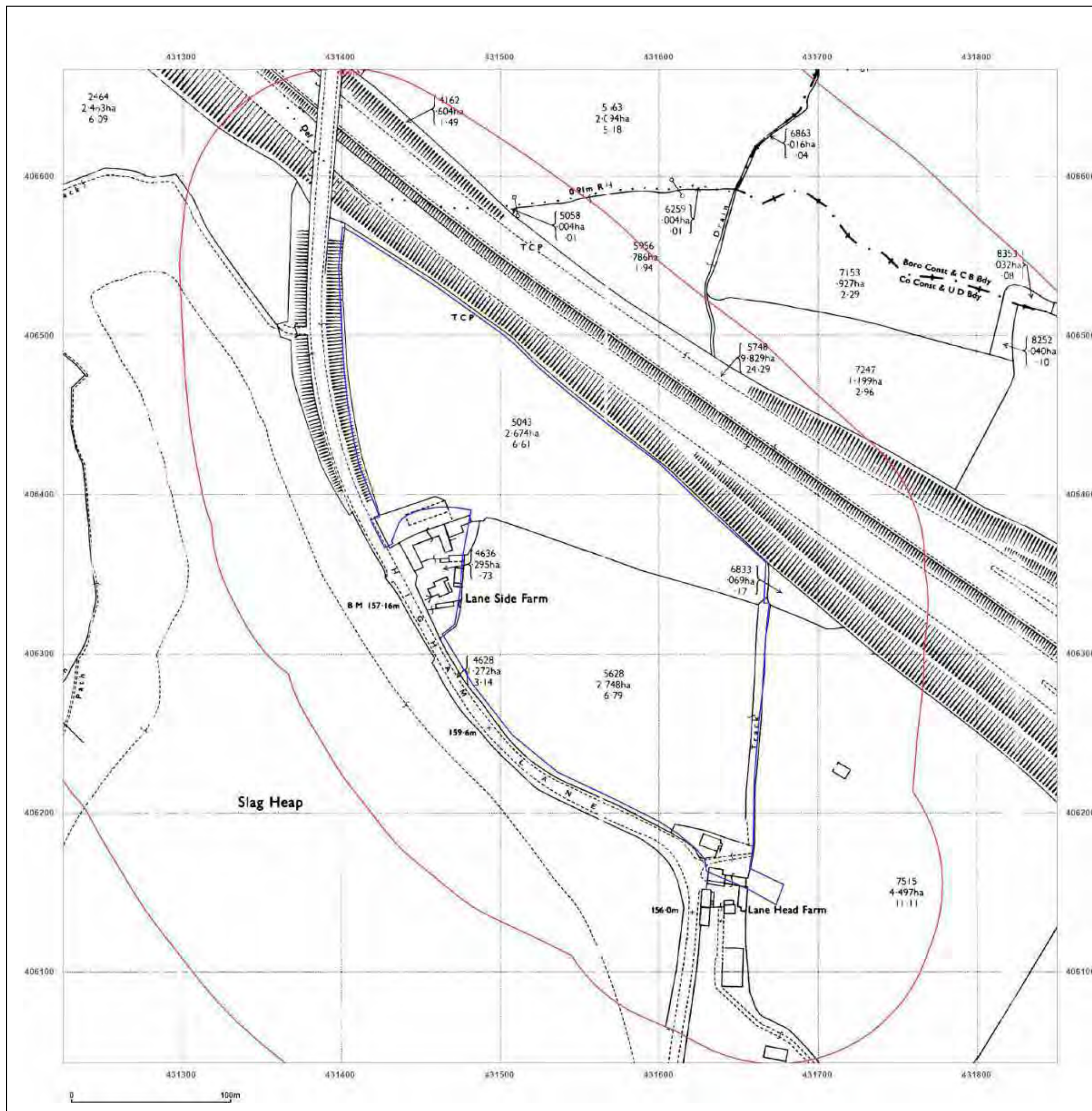
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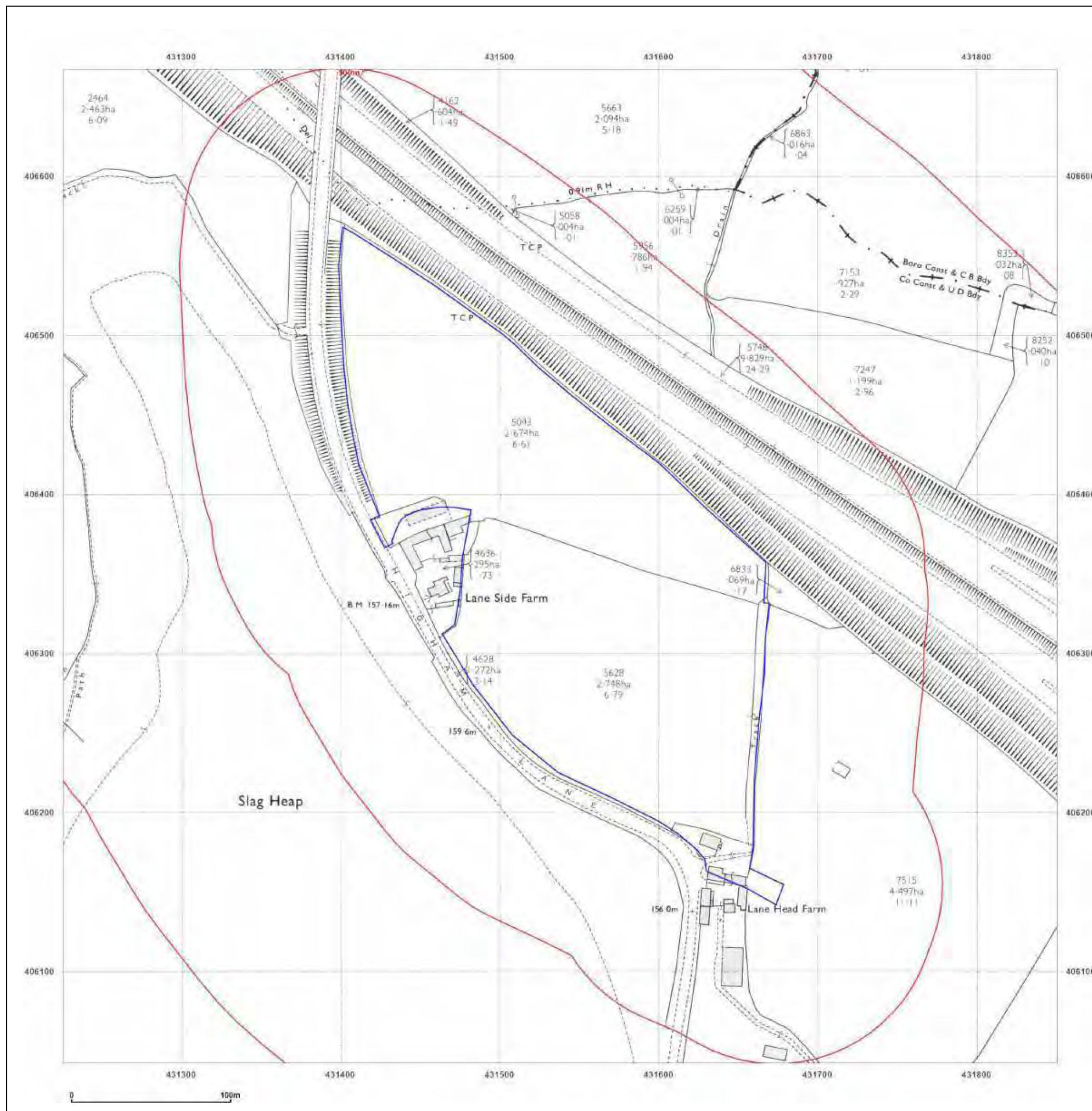
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#### Site Details:

Higham Lane, Dodworth, S75

Client Ref: CMAPS-JPG-1231104-65579-070725  
Report Ref: CMAPS-JPG-1231104-65579-070725HIS\_LS\_1\_1  
Grid Ref: 431538, 406355

Map Name: National Grid

Map date: 1982

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A  
Revised N/A  
Edition N/A  
Copyright 1982  
Landed 1963



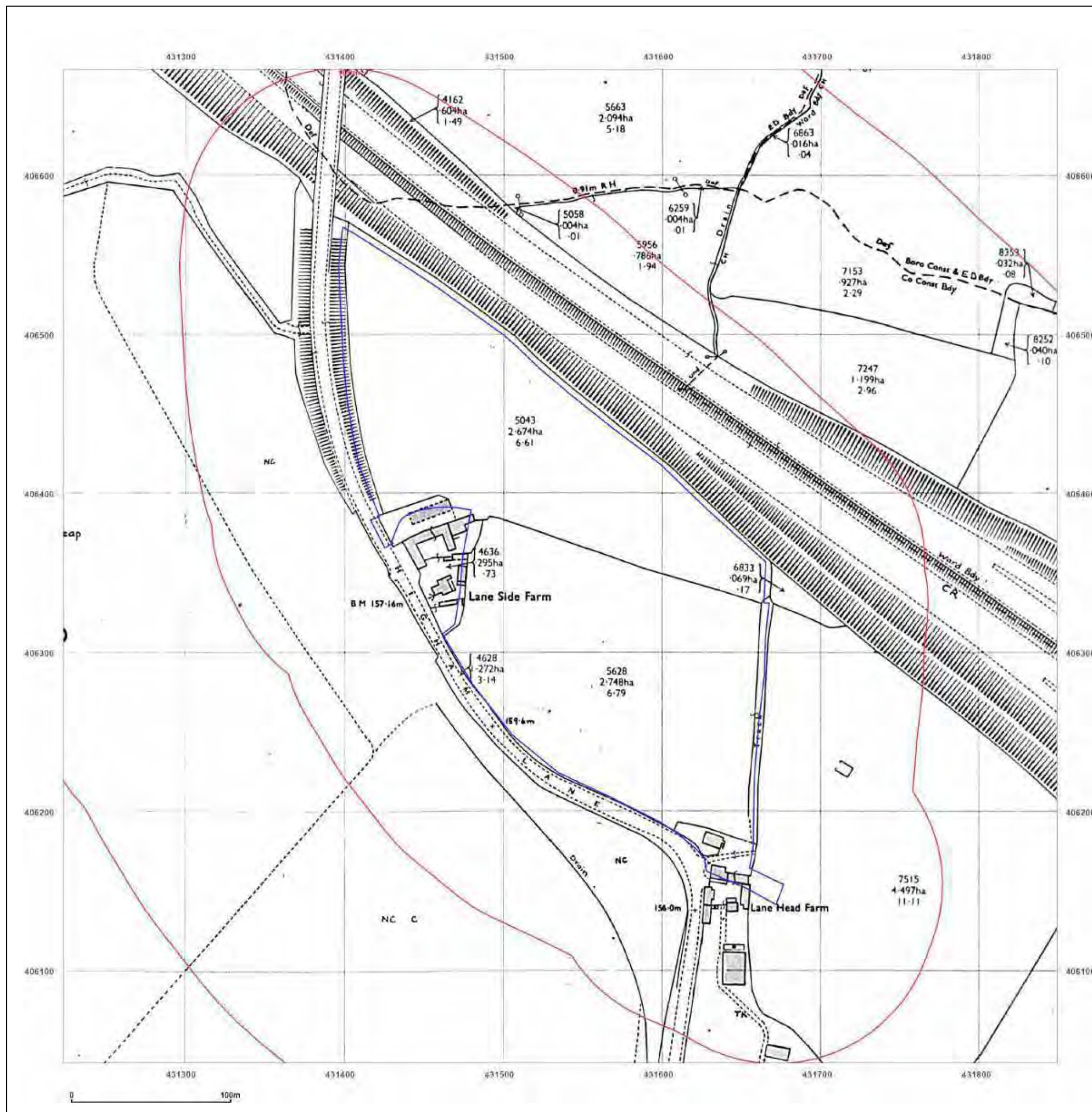
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#### Site Details:

Higham Lane, Dodworth, S75

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**Map Name:** National Grid

**Map date:** 1991

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1963  
Revised 1991  
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**Map Name:** National Grid

**Map date:** 1993

**Scale:** 1:2,500

**Printed at:** 1:2,500



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

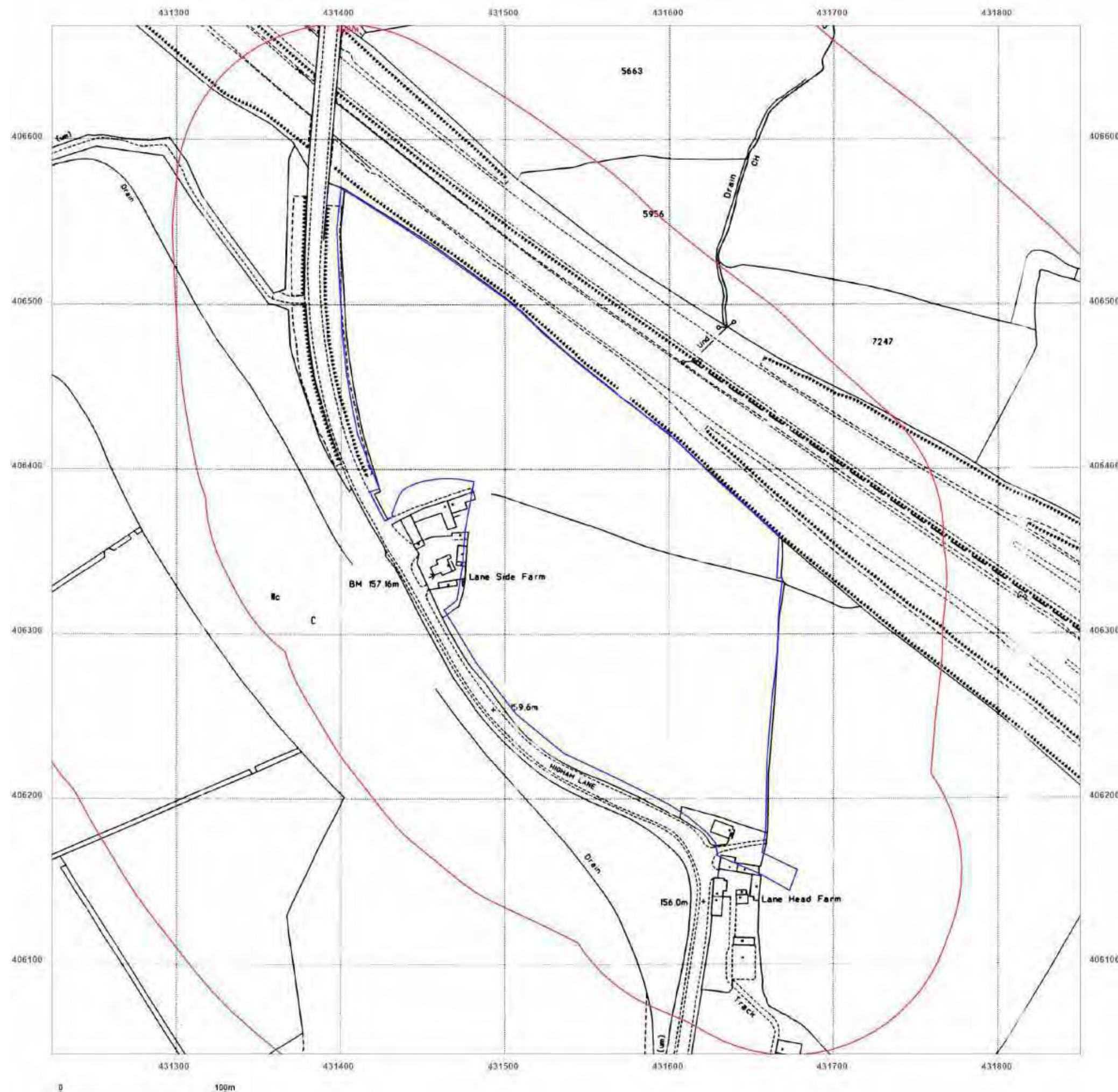


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#### Site Details:

Higham Lane, Dodworth, S75

Client Ref: CMAPS-JPG-1231104-65579-070725  
Report Ref: CMAPS-JPG-1231104-65579-070725HIS  
Grid Ref: 431538, 406355

Map Name: County Series

Map date: 1855

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1851  
Revised N/A  
Edition 1855  
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Levelled N/A



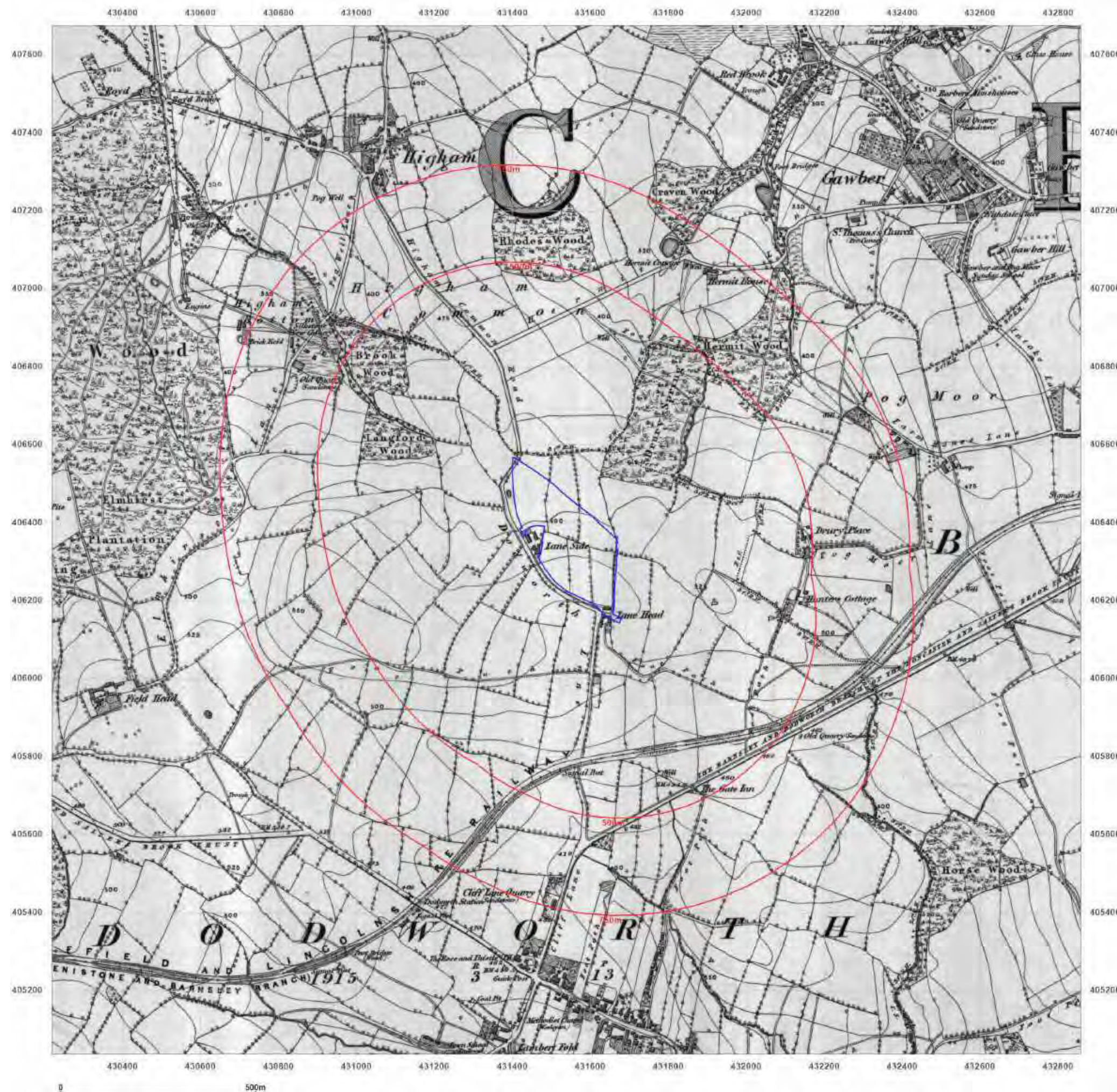
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#### Site Details:

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**Grid Ref:** 431538, 406355

**Map Name:** County Series

**Map date:** 1890-1891

**Scale:** 1:10,560

**Printed at:** 1:10,560



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Revised 1890  
Edition N/A  
Copyright N/A  
Levelled N/A



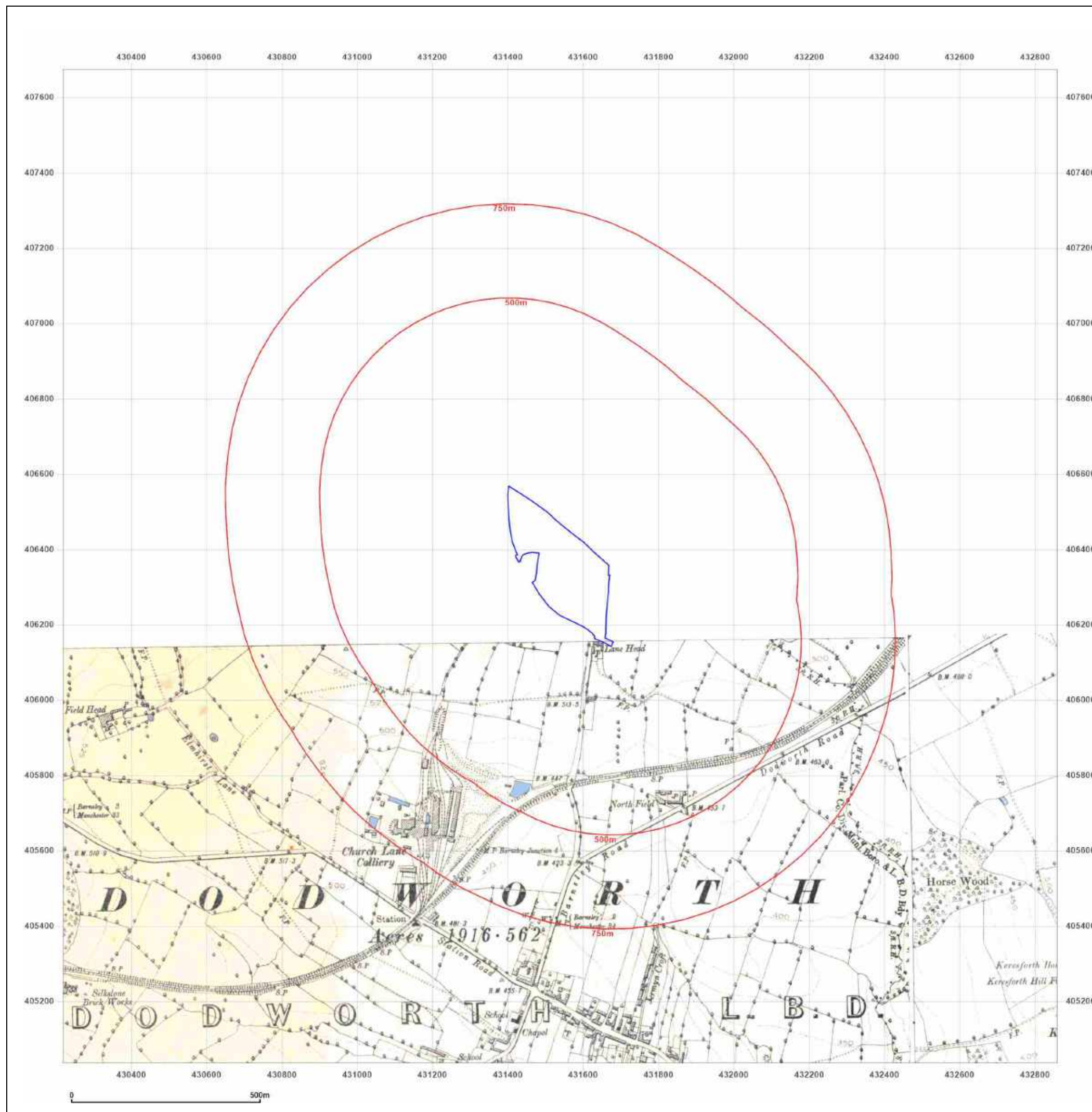
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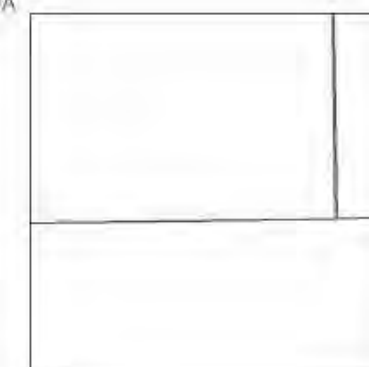
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Edition N/A  
Copyright N/A  
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Edition N/A  
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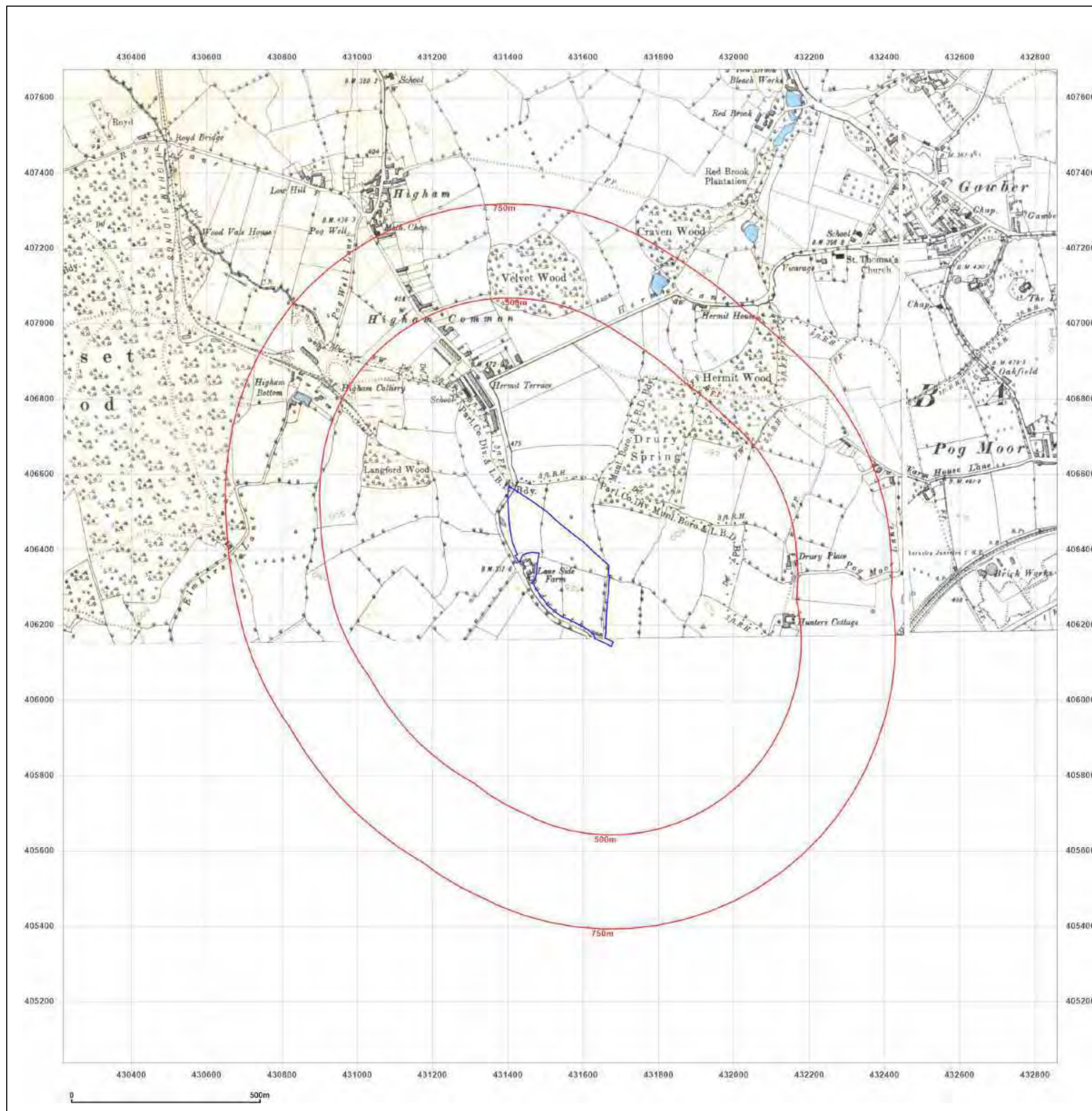
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**Map Name:** County Series

**Map date:** 1904

**Scale:** 1:10,560

**Printed at:** 1:10,560



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Revised 1904  
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Edition N/A  
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Edition N/A  
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Levelled N/A



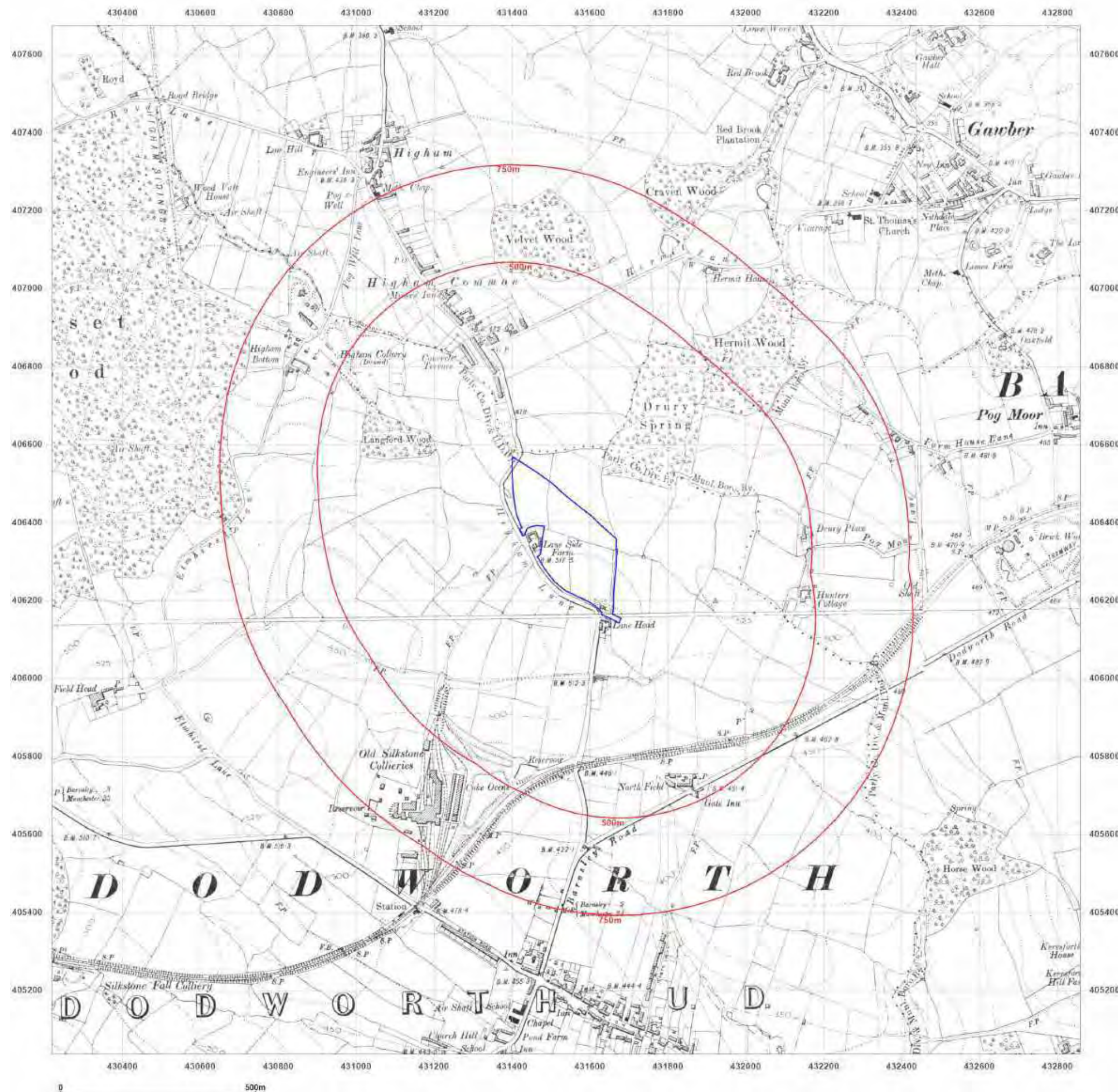
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**Map Name:** County Series

**Map date:** 1929

**Scale:** 1:10,560

**Printed at:** 1:10,560



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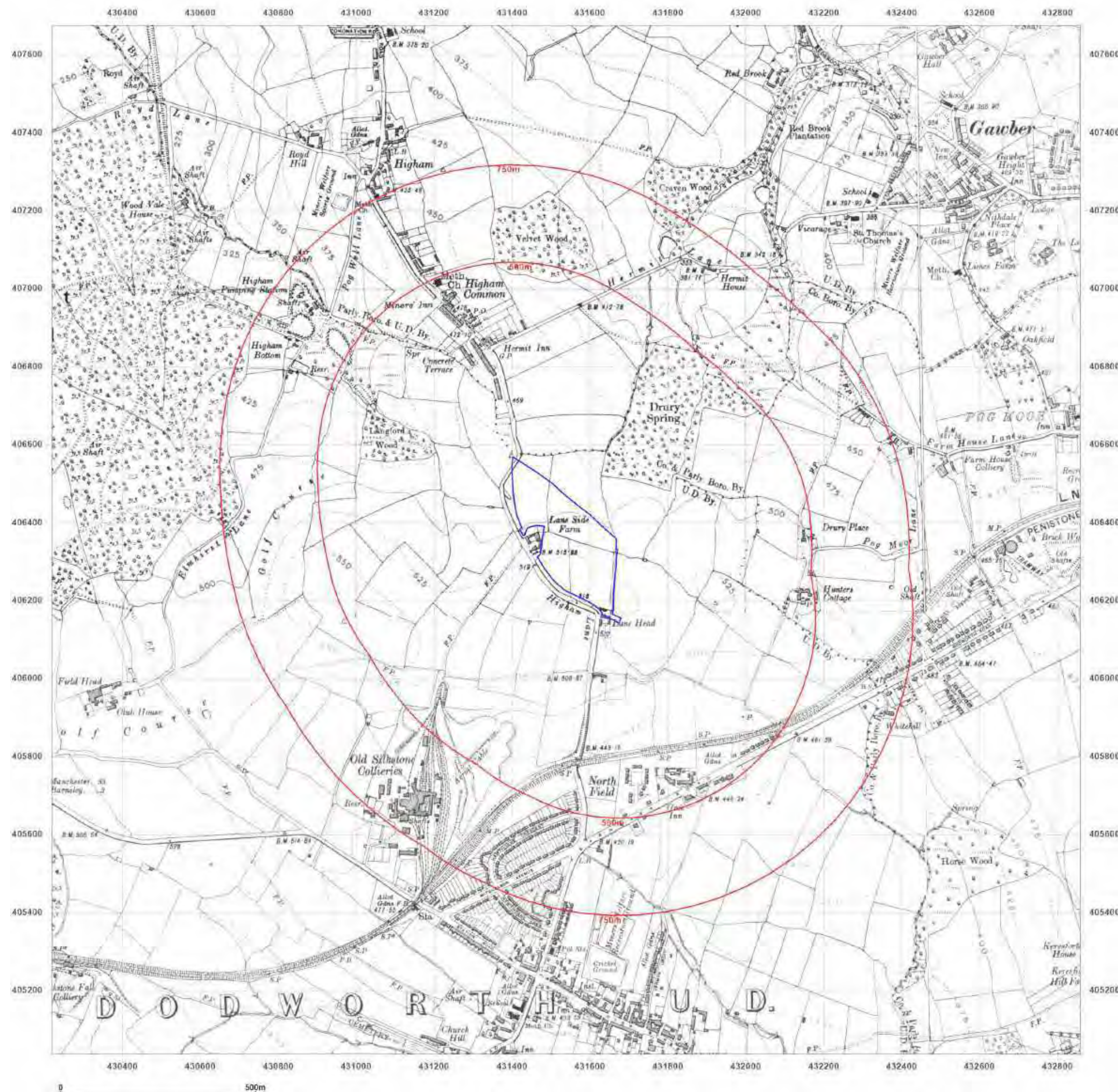
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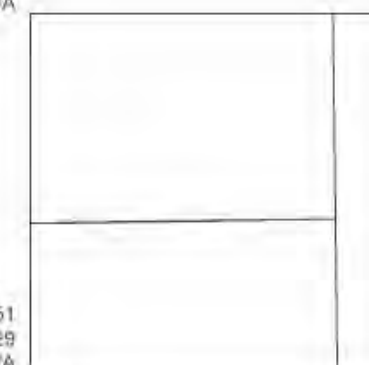
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Revised 1929  
Edition N/A  
Copyright N/A  
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Surveyed 1851  
Revised 1929  
Edition N/A  
Copyright N/A  
Levelled N/A



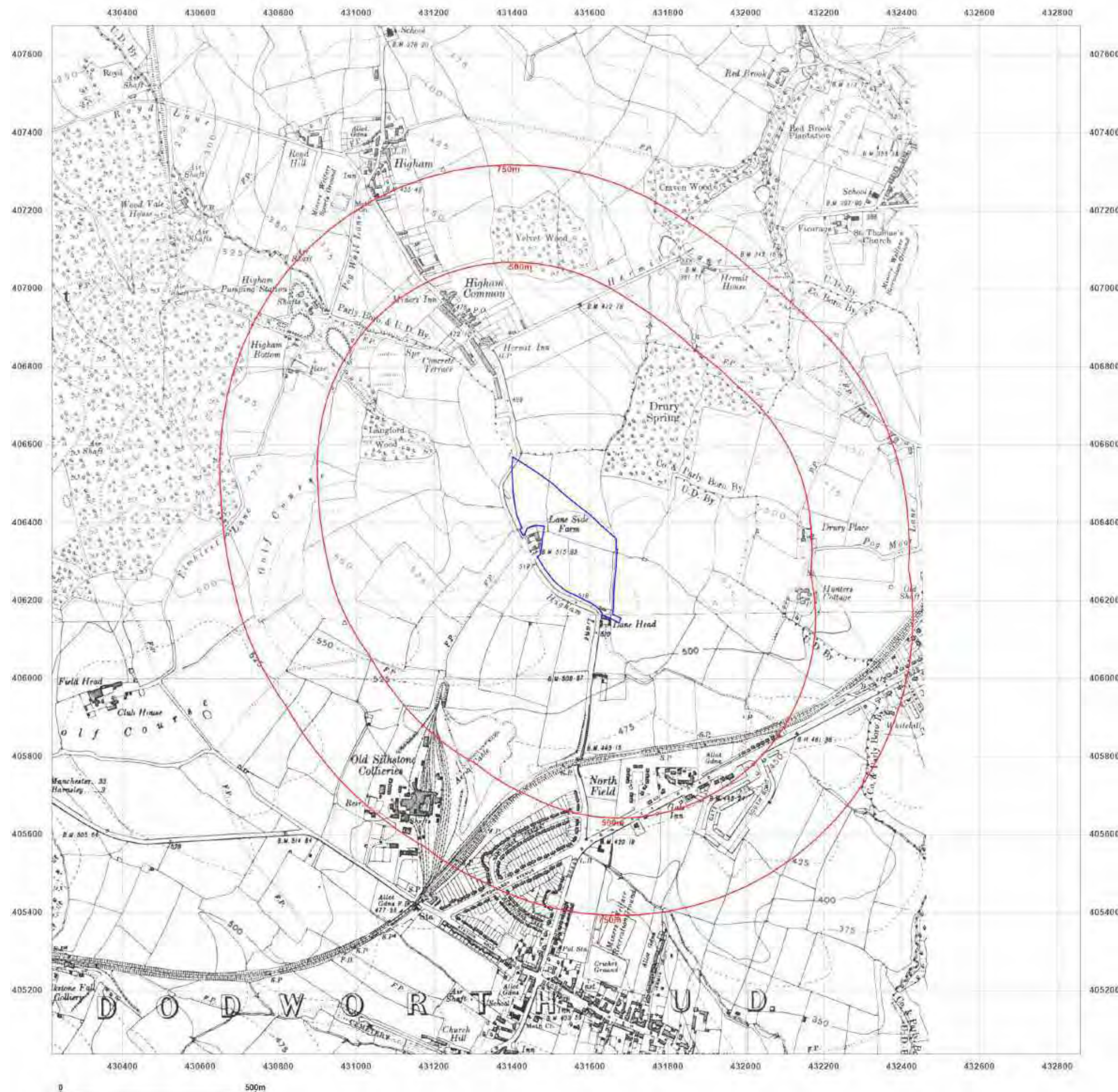
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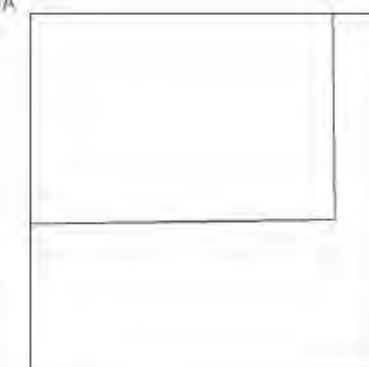
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Surveyed 1851  
Revised 1929  
Edition N/A  
Copyright N/A  
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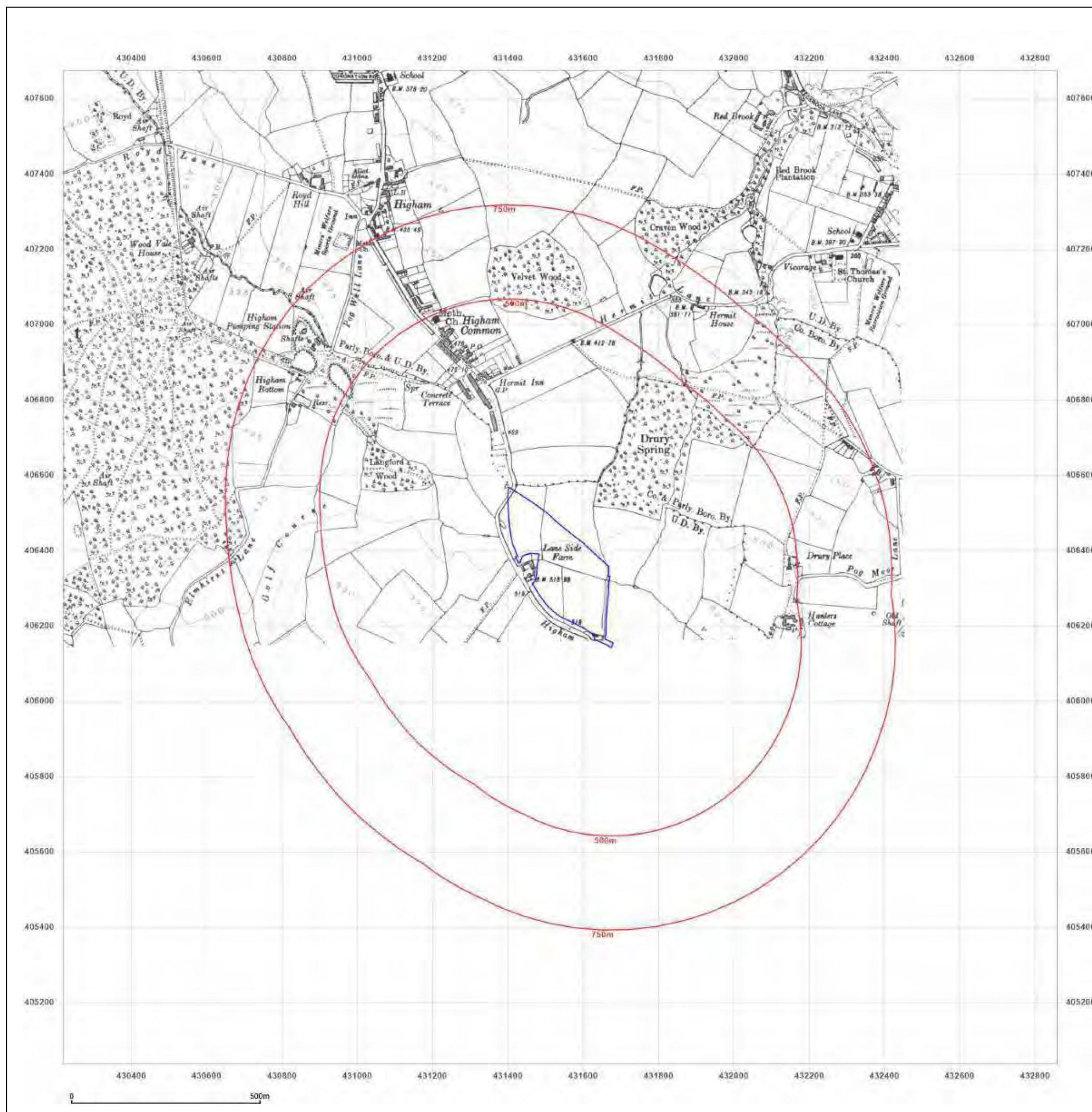
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**Map Name:** County Series

**Map date:** 1948

**Scale:** 1:10,560

**Printed at:** 1:10,560



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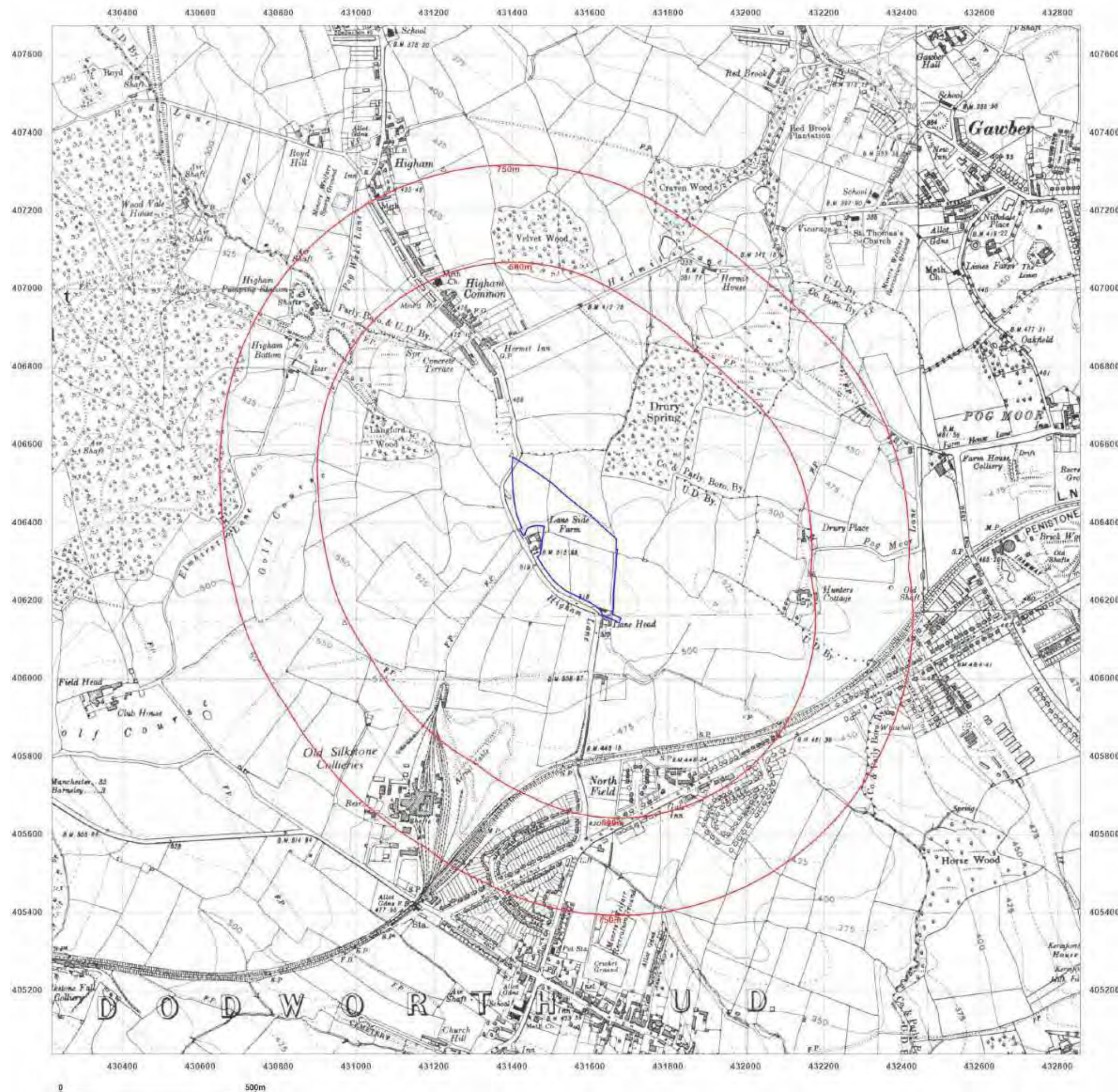
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#### Site Details:

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**Map Name:** Provisional

**Map date:** 1956

**Scale:** 1:10,560

**Printed at:** 1:10,560



Surveyed N/A  
Revised 1955  
Edition N/A  
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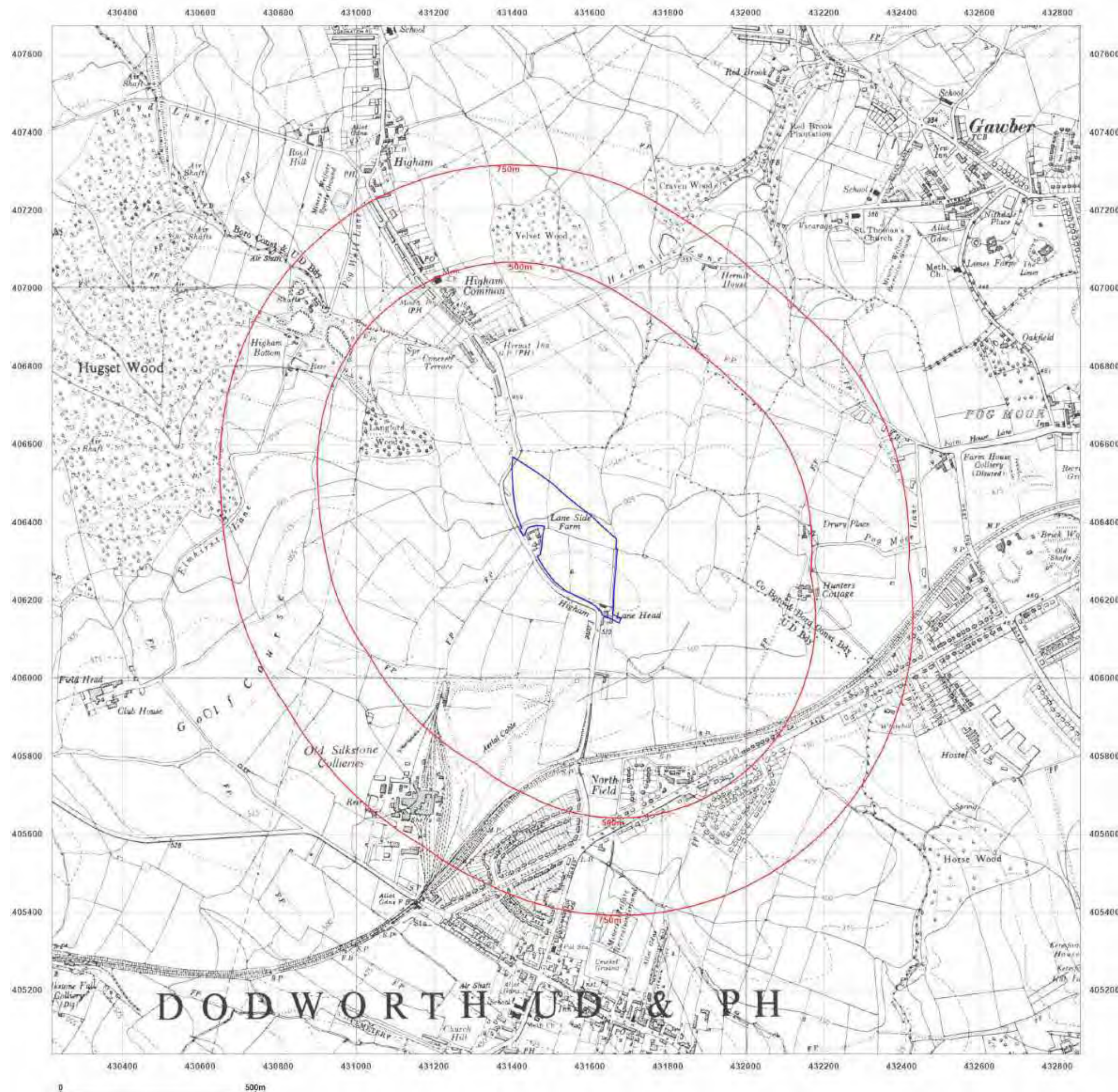
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**Map Name:** Provisional

**Map date:** 1966

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**Printed at:** 1:10,560



Surveyed 1966  
Revised 1986  
Edition N/A  
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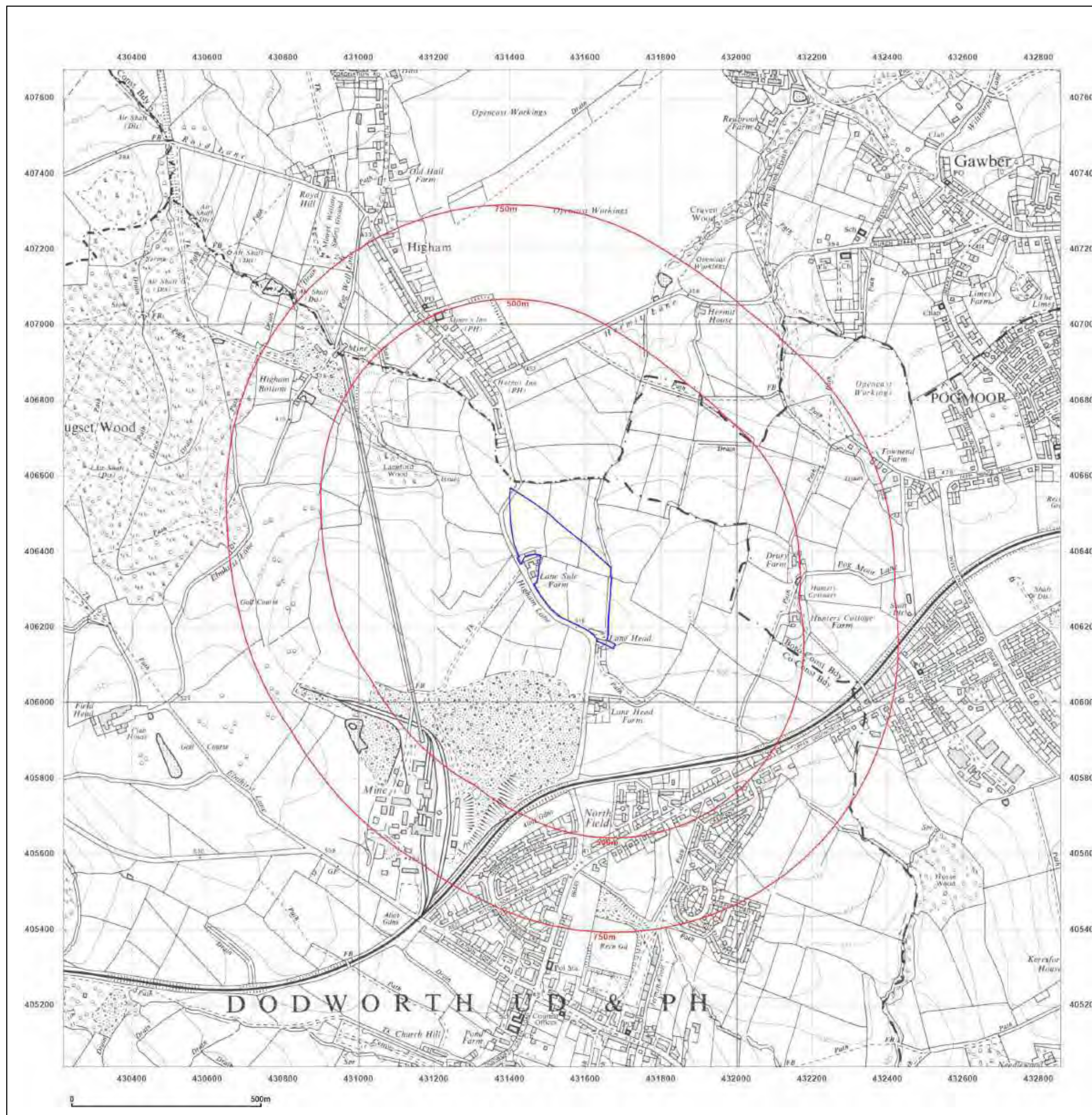
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**Map Name:** National Grid

**Map date:** 1973

**Scale:** 1:10,000

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