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Proposed Office Development
Naylor Drainage Ltd, Cawthorne, Barnsley
Coal Mining Risk Assessment

Report Reference: ESP.8670.3946

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Proposed Office Development
Naylor Drainage Ltd, Cawthorne, Barnsley
Coal Mining Risk Assessment

Prepared for:
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Report Reference: **ESP.8670.3946**

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General Notes

1 Introduction

1.1 Background

Naylor Drainage Ltd (hereafter known as the Client) are proposing to replace an existing industrial building with a new modular office structure. The Earth Science Partnership Ltd (ESP), Consulting Engineers, Geologists and Environmental Scientists, were instructed by Frith:Blake Consulting Ltd (acting on behalf of the Client) to prepare a Coal Mining Risk Assessment (CMRA) to identify and evaluate potential subsidence hazards from past mine workings which could impact on the development proposals. The site location is shown on Inserts 1 and 2 in Section 2.1.

A Phase One desk study assessment has also been prepared for the proposed development, concurrently with this CMRA (ESP, 2023), and should be read in conjunction with this report.

We have no precise details of the proposed development, but we understand that it will be a relatively lightweight, modular office structure, with hard surfaced external areas. The site boundary has been provided by the Client (on desk study information, e.g. historical maps) and, for the purpose of this assessment, this boundary is presumed to represent the footprint of the proposed office structure.

1.2 Objective and Scope of Works

The scope of works of this preliminary risk assessment is in general accordance with the published Coal Authority guidance on a risk based approach to development (Coal Authority, 2014). Specifically:

- to obtain and review relevant desk study data on the site relating to past coal mining; and
- to identify and evaluate the risks (individually and cumulatively) to the proposed development (based on desk study data on at this stage).

The precise scope of works was mutually developed and agreed with the Client by ESP within an agreed budget and comprised a desk study review of available historical Ordnance Survey maps, geological maps, memoirs, and a Coal Authority mining report obtained for the site by ESP, assessment, and reporting. No intrusive investigation has been undertaken at this stage.

The contract was awarded based on a competitive tender quotation. The terms of reference for the assessment are as laid down in the Earth Science Partnership emailed proposal of 25th July 2023. The assessment was undertaken over a short time period in late July 2023. This report is issued as a digital version only.

1.3 Limitations of Report

This report represents the findings of an assessment of risks associated with possible past shallow coal mining and mine entries on the site. The brief did not require an assessment of the implications for any other end use, nor of other geotechnical or geo-environmental hazards (e.g., contamination, slope stability and landfill/ alluvial gas risks). These hazards are considered further in the Phase One desk study report (ESP, 2023). It should also be appreciated that no intrusive investigation has been completed at this stage. The report is not a comprehensive site characterisation and should not be construed as such.

At the Client's request, the assessment was expedited and completed within a few working days. Therefore, it has only been possible to consider readily available desk study information (partly provided by the Client). It should be appreciated that further information on the mining is available for the site (e.g. from the Coal Authority) which, due to time constraints, it has not been possible to review as part of this assessment.

Where preventative, ameliorative or remediation works are required, professional judgement will be used to make recommendations that satisfy the site-specific requirements in accordance with good practice guidance.

Consultation with regulatory authorities will be required with respect to proposed works as there may be overriding regional or policy requirements which demand additional work to be undertaken. It should be noted that both regulations and their interpretation by statutory authorities are continually changing.

This report represents the findings and opinions of experienced geotechnical specialists. Earth Science Partnership does not provide legal advice and the advice of lawyers may also be required.

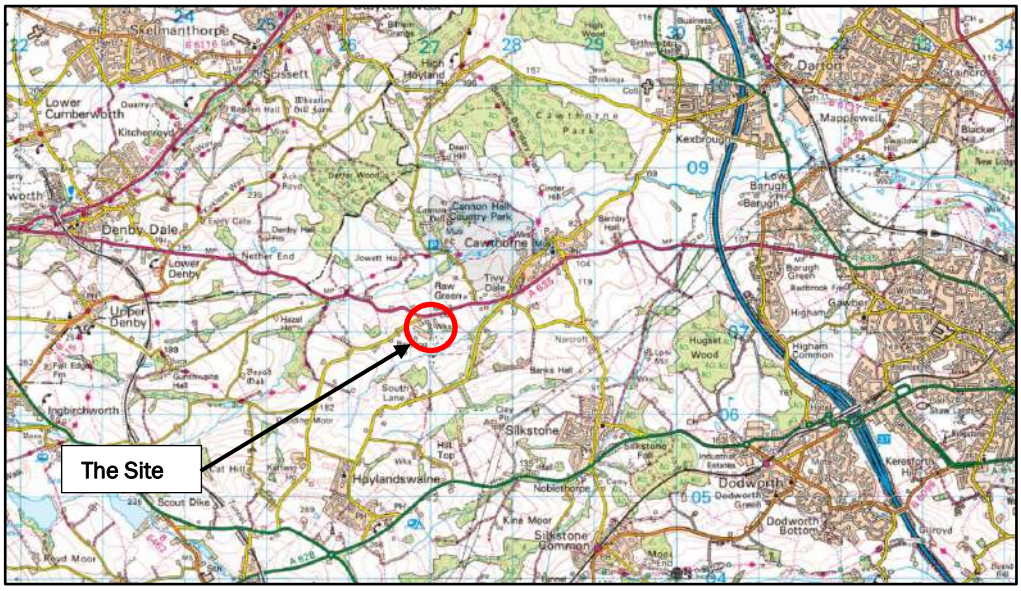
2 Desk Study and Field Reconnaissance Visit

The information presented in this section was obtained from desk-based research of sources detailed in the text, including historical maps (Appendix A), a mining report obtained by the Client from the Coal Authority (Appendix B), and borehole records available on the website of the British Geological Survey (BGS, Appendix C). Further desk study information reviewed is discussed as referenced in the text.

No site visit has been undertaken as part of this assessment and the site description is based on available desk study resources.

2.1 Site Location and Description

The site is located at the premises of Naylor Drainage Ltd, in the village of Clough Green, Cawthorne, to the west of Barnsley, South Yorkshire. The National Grid Reference of the centre of the site is (SE) 426965 407140, and the postcode of the premises is S75 4AD. A Site Location Plan is presented as Insert 1 below.



Insert 1: *Site Location Plan from Ordnance Survey 1:25,000 scale map.*
Reproduced with permission (OS License No.: AL100015788).

The site, as defined by the Client, comprises a rectangular parcel of land, of 75m length (south-west to north-east) and 35m width (north-west to south-east), lying in the northern part of the Client's factory premises . From recent aerial photographs, it appears to comprise an area of open ground within the premises, currently used for the storage of materials, but until recently occupied by an industrial building. We understand that the previous building superstructure was demolished in 2021, but foundations, much of the former floor slab, and sub-structures remain in the ground.

Lane Head Road (the A635) runs east to west between Barnsley and Holmfirth, to the north of the Client's premises, with the remaining area around the works comprising open farmland.

The general topography in the area appears to be relatively flat and level. A topographic survey for the site of the proposed office, provided by the Client, indicates that it lies at around 122m OD.

2.2 Site History

2.2.1 Published Historical Maps

The site history has been assessed from a review of available historical Ordnance Survey County Series and National Grid maps provided by the Client. Extracts from the historical maps are presented in Appendix B and the salient features since the First Edition of the County Series maps are summarised in Table 1 below.

Table 1: *Review of Historical Maps*

Date	On-Site	In Vicinity of Site
1850 - 1906	The site lay predominantly within one enclosure, with the main building of a brick works occupying the east of the area. In the south-eastern margins of the site, an apparent railway line led to a clay pit (further to the south. A well is shown in the south-eastern corner – this was replaced by a mine shaft by 1906.	An 'old shaft' is shown some 200m north of the site, just south of the main road.
1929 - 1951	The brick works had been extended further west and was now known as the Stoneware Works. The shaft remains in the south-east of the site.	No significant changes
1960 - 1965	The works had been further extended. The shaft in the south-east of the site is no longer named, but a circular feature is shown is its former position (suggesting the shaft may remain).	The former shaft is no longer shown just south of this road. An air shaft is shown just to the east of an area of filling some 55m south-east of the site.
1983 to present	The works building remains on site, but was now part of a larger works building complex to the south and south-west. The shaft is no longer evident.	No significant changes.

Notes to Table 1:

1. Extracts from historical maps presented in Appendix A.
2. The above summary concentrates on mining features. Other features of geotechnical or geo-environmental importance may be present, but have not been considered.
3. Features may have been present on site between the dates of the individual mapping, and it should be appreciated that these cannot be identified from the map review.

2.2.2 Other Sources

No further historical information has been identified for this assessment.

2.3 Previous Investigations and Assessments

We are not aware of any major previous geotechnical or geo-environmental investigations or assessments at the site.

The Client has provided us with a copy of a Coal Mining Risk Assessment (CMRA) for an extension in the north-western margins of the Client's premises (west of the subject site), prepared by Haigh Huddleston and Associates in July 2021. This assessment appears to have been based on apparently limited historical mapping, borehole records from the British Geological Survey (BGS), a CON29M mining report from the Coal Authority, and information on the Coal Authority website. The assessment was not completed in accordance with the Coal Authority published guidance (Coal Authority, 2014).

The report concluded that a third of that site was formerly part of an unlicensed opencast mine workings, that extended further east and south (i.e. across the majority of the current Naylor Drainage premises). Haigh Huddleston and Associates recommended an intrusive investigation, via boreholes and trial trenches. ESP have not been provided with any records from this investigation, and we do not know if it was undertaken.

It should be noted that ESP do not agree with the Haigh Huddleston and Associates conclusions with regards to the extent of the former opencast workings – see Section 3.1.3 for further discussion.

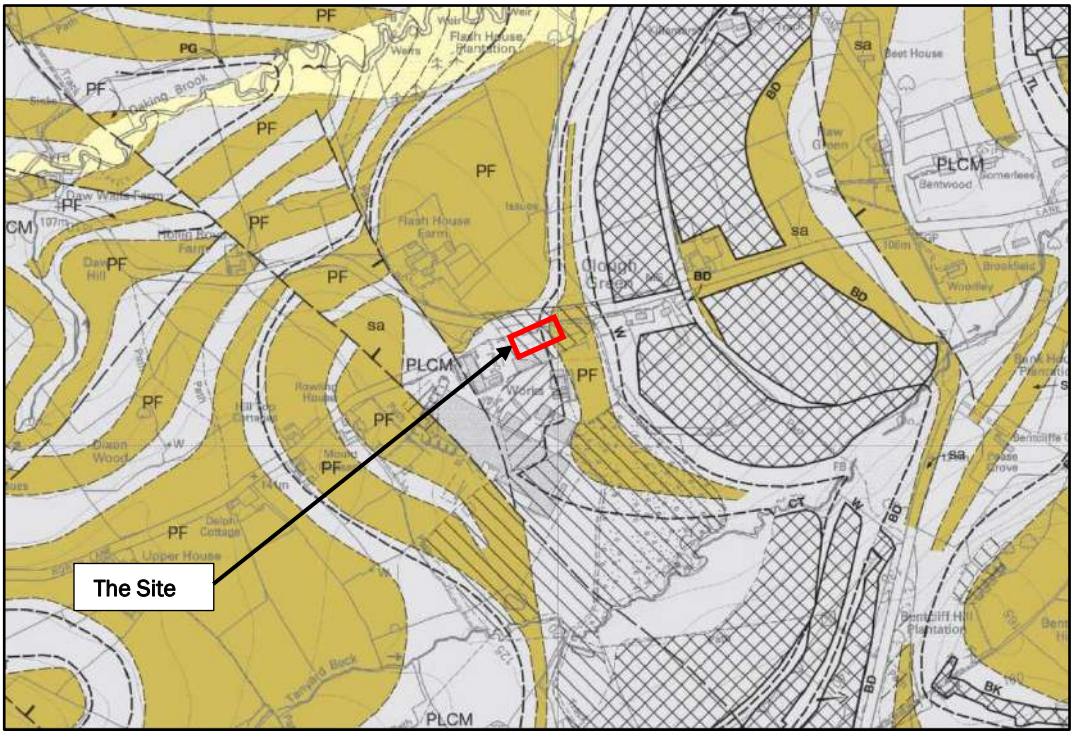
2.4 Geology

2.4.1 Published Geology

The published 1:10,560 scale geological map for the area of the site (Sheet SE20NE) indicates the site to be underlain by Made Ground overlying bedrock of the Pennine Lower Coal Measures Formation (PLCM on Insert 2) and Penistone Flags (PF on Insert 2). An extract of the geological map is presented as Insert 2 below.

The Pennine Lower Coal Measures comprise interbedded mudstones, sandstone and siltstones, with larger sandstone beds known as the Penistone Flags, comprising fine-medium grained, flaggy sandstones, in beds up to 15m thickness. The bedrock strata also contain subordinate coal seams, ironstone veins, marine bands and fireclays (see below for further discussion).

A north-south orientated, major fault is shown to the west of the site, with two leaves located some 75 and 170m to the west.



Insert 2: Extract from BGS Geological Map Sheet SE20NE, original 1:10,560 scale.
Reproduced with permission (BGS licence number: C15/05 CSL)

The conjectural outcrop of the Cumberworth Thin Coal seam is shown to run through the eastern margins of the site in a north-south direction, with the Whinmoor Coal seam outcropping 95m to the east, and the Black Band seam some 240m further east. An unnamed thin coal is shown to crop out some 250m to the west of the Cumberworth Thin Coal north of the site, but this outcrop is absent immediately west of the site.

The Whinmoor coal seam is indicated to be of variable thickness in the area (between 0.2 and 1.4m), with the Cumberworth Thin Coal being much thinner (up to 200mm thickness). Further thin coal seams underlie the above succession. Ironstones comprise sandstone bands rich in iron, whilst fireclays comprise mudstones which have properties making it suitable for ceramic manufacture.

Based on the seam outcrop pattern, the dip of the bedrock strata is likely to be the east. Therefore, the Whinmoor coal seam is not expected to underlie the site, with the Cumberworth Thin Coal only present beneath the eastern margins.

Substantial areas of 'infilled ground' are shown to the east of the site (cross hatched on Insert 2), some 120m to the east at their closest point.

2.4.2 Available BGS Borehole Records

One borehole record is available from within the Client's premises (ES20NE-159 - shown some 45m south-west of the site), and five available records on Lane Head Road some 200m to the north-east (SE20NE-07). The borehole records are summarised below:

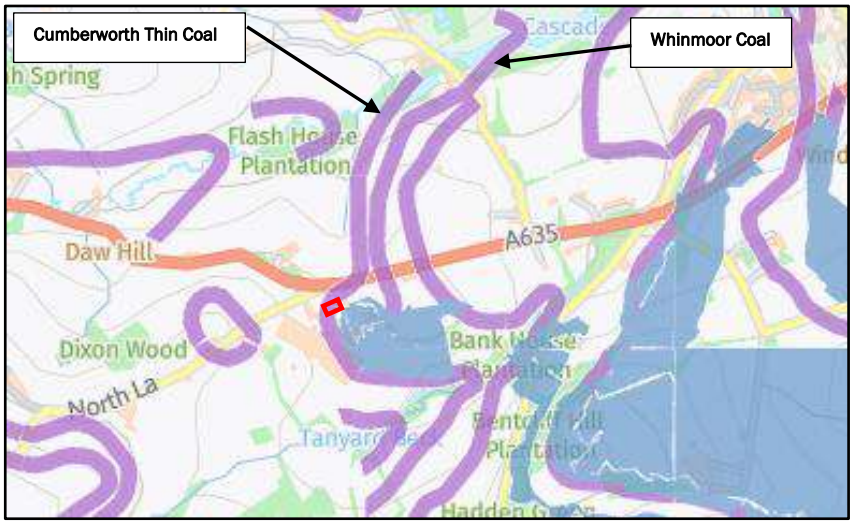
- **SE20NE-159** – a rotary well drilled in 2012 apparently for a water well by Mud Drilling Ltd, and reportedly encountering 'fill' to 0.4m, 'clay' to 1.8m and interbedded mudstone, shale and sandstone bedrock to 98.5m depth. One coal seam was reported of 300mm thickness at 33.0m depth.
- **SE20NE-07a** – a cable percussion (shell and auger) borehole with rotary coring follow on, drilled in 1975 by South Yorkshire County Council, and encountering Topsoil over 'dark brown, sandy, stoney clay' (probable subsoil), grey brown mottled silty clay of firm consistency, with mudstone and siltstone gravel to 1.8m depth. Weathered bedrock was encountered at 1.8m as a dark grey silty shaley clay of firm consistency, with mudstone and coal gravel to 4.5m depth. Bedrock comprising predominantly mudstone was encountered to the base of the borehole at 10m depth. Coal and disturbed ground was reported between 6.0 and 7.3m depth (1.3m thickness), and thin (150 to 200mm) coal seams were indicated at 8.0 and 8.4m depth.
- **SE20NE-07b** – similar to the above, but with mudstone bedrock at 3.0m depth, and a cavity and 'loose ground' between 5.9 and 7.7m depth (1.8m).
- **SE20NE-07c** – similar to the above, but with coal between 5.9 and 6.5m depth (0.6m).
- **SE20NE-07d** – similar to the above, but with mudstone bedrock at 4.3m depth, and a coal seam between 5.0 and 6.1m depth (1.1m).
- **SE20NE-07e** – similar to the above, but with mudstone bedrock at 4.4m depth, and a coal seam between 7.6 and 8.8m depth (1.2m).
- **SE20NE-07f** - similar to the above, but with mudstone bedrock at 4.0m depth, and two cavities between 5.3 and 6.4m (1.1m), and 7.1 and 8.2m depth (1.1m).

2.5 Coal Authority Records

2.5.1 Coal Authority Website

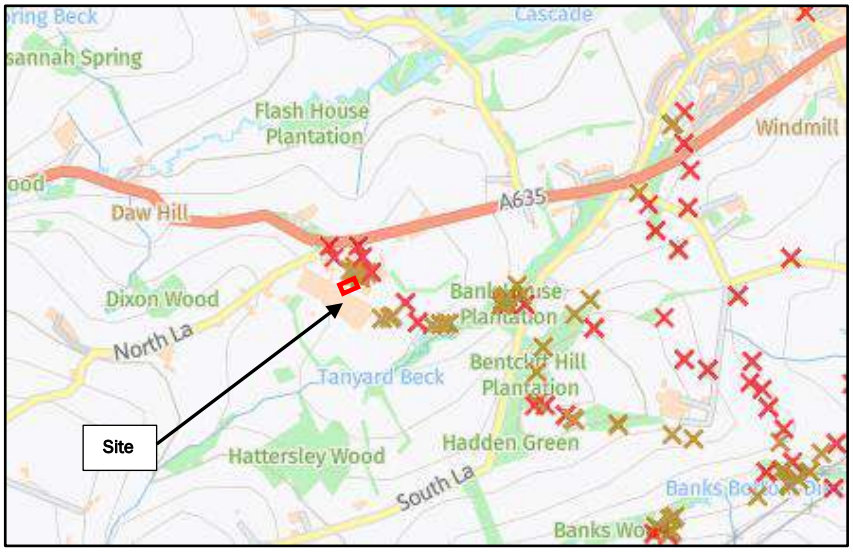
Reference to the Coal Authority website (CA, 2023) provides the following salient information:

- Coal seams are shown cropping out north-south some 100 and 240m to the east of the site. These are likely to be the Whinmoor and Black Band coal seams, as shown on the geological map (Section 2.4.1). A further seam crosses the western margins of the site, which is believed to be the Cumberworth Thin coal seam.
- Past shallow mine workings are recorded beneath the Client's premises just to the south-east of the site (east of the outcrop of the Cumberworth Thin coal seam) – as shown in Insert 3 below. Note that these recorded past workings do not extend to beneath the site of the proposed office development.



Insert 3: Recorded Past Shallow Mine Workings
(after Coal Authority website)

- All the remainder of the Client's premises (including the site of the proposed office development) are shown to be underlain by 'probable shallow mine workings'.
- There are a large number of recorded mine entries on the Client's premises, as shown in Insert 4 overleaf. These include the old shaft shown on the northern boundary on historical maps, and the mine shaft shown in the south-east of the proposed office development site (see Section 2.2.1).
- The whole of the Client's premises (including the site of the proposed office development) is shown to have been previously part of surface mining (opencast) site – as shown on Insert 5 overleaf.
- A zone of 'Development High Risk' is shown to cover the whole of the Naylor Drainage premises, including the site of the proposed office development.



Insert 4: Recorded Mine Entries
(after Coal Authority website)



Insert 5: Recorded Past Surface Mining (Opencast)
(after Coal Authority website)

The Coal Authority website suggests that the mine shaft in the south-east of the site is some 2m in diameter and 7.6m depth. It is given a 'departure' distance of 5m, which represents the likely accuracy of its actual position.

2.5.2 Coal Authority Mining Report

A consultants mining report was obtained by the Client from the Coal Authority for the site of the proposed office development in July 2023, and is presented as Appendix B of this report. This indicates that, based on the available Coal Authority records:

- The outcrop of the 'Low Whinmoor' coal seam is shown to the west of the site, some 12m to the north-west at its closest point - it is noted that this seam name and outcrop location does not correlate with any coal seams shown on the published geological map.
- There is no recorded past underground coal mining beneath the site.
- There are probable unrecorded shallow workings beneath the site.
- No spine roadways are recorded at shallow depth.

- There are five recorded mine shafts and eight recorded mine entries within the larger Naylor Drainage premises, including that shown on historical maps in the south-east of the site of the proposed office (ref. 426407-002). All mine entries are reported to have worked coal.
- There are four abandonment plans available, showing the recorded extent of mine workings beneath the area.
- The whole of the Client's premises, including the site of the proposed office development, were located within a historical unlicensed opencast site.
- The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m of the enquiry boundary, since 31 October 1994.
- There is no current Stop Notice delaying the start of remedial works or repairs to the property.
- The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
- No mine gas emissions are recorded within 500m of the enquiry boundary.
- No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

The above represents a summary of the factual statements made by the Coal Authority (or shown on their plans). ESP have identified a number of inconsistencies within the above and these are discussed further in Section 3.

2.6 Mining Information from Other Sources

2.6.1 Regional Memoirs

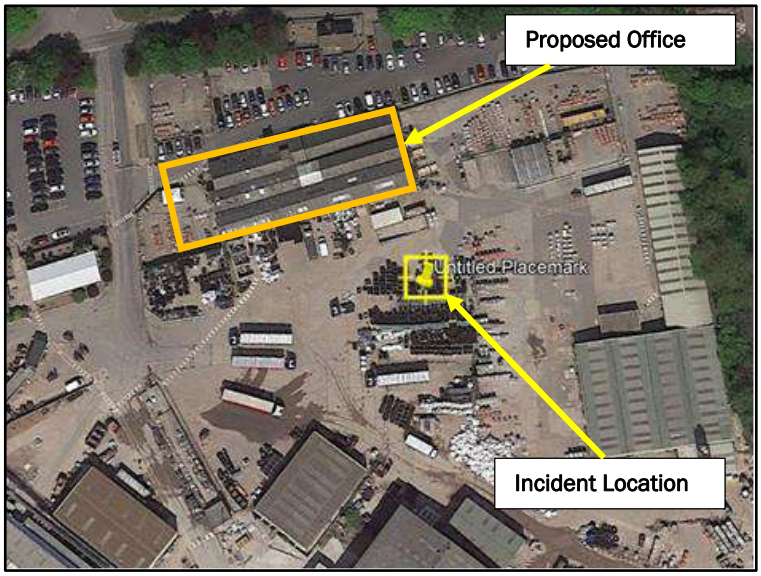
Insufficient time has been available in the preparation of this assessment for the regional geological memoir for the area to have been obtained. However, further British Geological Survey (BGS) documents have been obtained on-line and contain salient information for this mining assessment.

Sheppard (2005) suggests that the Whinmoor coal seam forms a cap to the Penistone Flags geological unit, and is overlain by the Whinmoor Rock, a flaggy, thin bedded, fine-grained sandstone. Sheppard does not mention the Cumberworth or Low Whinmoor coal seams.

From Lake (2006), it would appear that the Whinmoor coal seam is the common basal seam of the worked Coal Measures, was around 1m thickness, and was worked locally at crop, but less commonly at depth in the Barnsley area. It commonly has a shale roof, which contradicts Sheppard (2005). Lake does not mention the Cumberworth coal seam, suggesting that it may not have been worked in the Barnsley area, nor the Low Whinmoor coal seam.

2.6.2 Coal Authority Correspondence

The Client has provided us with a copy of correspondence from the Coal Authority dating from October 2022 regarding the site which, for ease of reference, is reproduced in Appendix D. This appears to comprise an email exchange between the Client and the Coal Authority regarding a slumped concrete slab believed to be some 60m south of the site of the proposed office development, as shown on Insert 6 overleaf.



Insert 6: Location of Incident Referred to in Coal Authority Correspondence (after Client) Proposed office footprint indicative only.

In response to the incident, the Coal Authority state that:

'I can now confirm that there is no recorded shaft or adit at the location of the slumped concrete slab. There are shallow clay workings beneath the Yard approximately 7m beneath the surface and a small band of ancillary coal only 25cm thick was taken during that extraction. The much thicker fireclay was extracted by bord and pillar methods to maintain surface support. It is possible that the wash-out from the fire displaced some near surface foundation soils into the past voiding, but I can confirm that this is not considered a coal mining subsidence event under the 1991 Act as it is clearly a Fireclay Mine with no economically recoverable coal other than by the working of the economically viable fireclay.'

3 Identification and Assessment of Site Specific Coal Mining Risks

3.1 Preliminary Conceptual Ground Model

3.1.1 Anticipated Ground and Groundwater Conditions

Based on the available information, we consider that the site is likely to be underlain by the following strata:

Made Ground: of unknown nature and depth, but Made Ground is anticipated beneath the site, possibly comprising colliery spoil. The thickness of Made Ground may vary across the site. Possibly increasing in thickness on the southern margins, in the area of past tipping (see ESP, 2023);

Weathered Bedrock: anticipated to be present as gravelly clays (weathered mudstone).

Coal Measures bedrock: anticipated from depths of around 2m (based on the nearby borehole record – see Section 2.4.2) and to comprise predominantly mudstone. Bands of fireclay, ironstone and thin coal seams are anticipated, within the bedrock succession.

Groundwater: reported at depths of around 90m in the nearby borehole (see ESP, 2023). However, perched water within the shallower soils cannot be discounted.

The above Conceptual Ground Model should be confirmed by intrusive investigation prior to finalising design.

3.1.2 Shallow Coal

The Coal Authority identify the outcrop of a coal seam just to the west of the site of the proposed office development. Based on the outcrop pattern, the bedrock in the area is indicated to dip to the east, so this seam would be expected to underlie the site at shallow depth, and may be the thin coal seam reportedly extracted along with fire clay (see Section 2.6.2). The Coal Authority mining report suggests that this is the 'Low Whinmoor' coal seam.

However, the above outcrop does not correlate with any shown on the published geological map. Given the available information, it is possible that this seam may be the Cumberworth Thin coal seam, which is indicated to be only thin in the area, reportedly around 200mm. It is noted that the seam associated with the recorded fireclay workings was of similar thickness (250mm - Section 2.6.2). The different outcrop position may be due to additional information from abandonment plans available to the Coal Authority but not necessarily to the British Geological Survey. Coal seams in the UK commonly have alternative names and we consider that it is probable that the 'Low Whinmoor' is a local name for the Cumberworth Thin coal seam.

The groundwater well, located some 45m south-west of the proposed office development, is located to the east of the outcrop of the seam as reported by the Coal Authority. Therefore, with a dip to the east would be expected to have encountered the coal seam at shallow depth. No seam is reported above 30m within the borehole.

Based on the available geological information, the coal seam identified at around 5.0 to 7.0m depth in the boreholes some 200m to the north-east (see Section 2.4.2) is likely to be the Whinmoor seam. Its position correlates with the outcrop pattern shown on geological maps and its identified thickness (commonly around 1m) broadly correlates with its reported thickness.

3.1.3 Extent of Former Opencast Workings

In their mining report and on their website, the Coal Authority indicate that the Client's premises was all formerly located within an opencast mine working. However, reference to historical mapping casts doubt on this.

The site was initially developed in the mid-1800s as a brick works. Map evidence indicates that this original building remained on site (albeit extended at various times) until demolished two years ago. In addition, map evidence indicates various boundaries between parcels of land to the south and west of the site (the current Client's premises) to have remained the same throughout history, until the ceramic works expanded to occupy these areas.

In addition, the borehole record for the groundwater well some 45m of the site (shown to have been located within the opencast site by the Coal Authority), only shows only 0.4m of Made Ground, underlain by clay and with bedrock at 2.0m depth. This shallow depth of Made Ground and to bedrock would appear to be very unlikely were the borehole located within a past opencast site.

The historical mapping does not show any large opencast excavations in the area, however, there are otherwise unexplained changes in field boundaries to the south-east of the Client's premises between the maps dated 1951 and 1965, which may be indicative of an opencast site. This area is also underlain by the Whinmoor coal seam, which is not expected to be present beneath the site of the proposed office development. This seam is of sufficient thickness that an opencast working could have been economically feasible.

Given the above, and particularly the proven geology, and the consistency in building footprints, field boundaries etc through over the last 100 years of history, we do not consider the extent of the opencast shown by the Coal Authority to be correct, and the site is not part of a former opencast site.

3.2 Identified Coal Mining Risks

3.2.1 Summary of Mining Hazard

The potential coal mining risks identified at the site are summarised in Table 2 below:

Table 2: *Identified Coal Mining Risks*

Coal Mining Issue	Identified Hazard	Risk Assessment
Underground Coal Mining (recorded at shallow depth[1])	No	See Section 3.2.2
Underground Coal Mining (unrecorded shallow[1])	Possible	
Underground Ironstone Mining (recorded at shallow depth[1])	No	See Section 3.2.3
Underground Ironstone Mining (unrecorded shallow[1])	Unlikely	
Underground Fireclay Mining (unrecorded shallow[1])	Yes	See Section 3.2.4
Recorded Mine Entries (shafts and adits)	Yes	See Section 3.2.5
Unrecorded Mine Entries (shafts and adits)	Possible	
Recorded Coal Mining Geology (fissures)	No	None identified.

Table 2: Identified Coal Mining Risks (cont.)

Coal Mining Issue	Identified Hazard	Risk Assessment
Recorded Past Mine Gas Emissions or Potential	Possible	See Section 3.3.
Recorded Surface Coal Mining Hazard	Yes, but unlikely	See Section 3.2.6
Unrecorded Surface Mining (opencast workings)	Unlikely	

Notes to Table 2:
1. The Coal Authority defines shallow depth as within 30m of the ground surface.
2. Identified risks are discussed further in the following sections.

3.2.2 Shallow Coal Mine Workings

The Coal Authority indicate recorded mine workings just to the south-east of the site. It is not clear which seam was worked but, from the available geological information, it could have been the Whinmoor coal. The Authority also state that there are 'probable' unrecorded coal workings beneath the site itself. Based on their information, this is likely to be the Low Whinmoor coal seam, which they state crops out to the west and is indicated to be 'workable' in the mining report. However, as discussed in Section 3.1.2, this seam could be the Cumberworth Thin seam, which is recorded as only 200mm or less in thickness, and we consider would not be economically 'workable'. Only 'thin' coal seams are shown on the geological succession beneath the Cumberworth seam, and no shallow coal was recorded within the borehole drilled for the groundwater well some 45m south-west of the site.

Given the available information, we consider that the only shallow coal seams beneath the site would be thin (possibly 200mm or less), and are unlikely to have been economic to have worked. Therefore, we consider that the risk of shallow coal workings beneath the site is likely to be Low. However, this should be confirmed by further intrusive investigation (see Section 3.4).

3.2.3 Shallow Ironstone Mine Workings

We have identified no evidence of possible shallow ironstone workings beneath the site.

3.2.4 Shallow Fireclay Mine Workings

The site was a former clay works, manufacturing bricks and then ceramics. The clay was historically sourced from a surface clay pit to the south-west of the site (see Section 2.2.1). The succession around the Cumerworth and Whinmoor coal seams includes fireclays, which are mudstones with properties making them suitable for ceramic manufacture. In addition to surface pits, it is not uncommon for clay works to have also sourced clay from underground mine workings and, notwithstanding the Coal Authority records, given the absence of workable coal and ironstone beneath the site, we consider that the former mine shaft in the south-east of the site is likely to have accessed workings within a band of fireclay.

This appears to be confirmed by the Coal Authority correspondence from 2022 (see Section 2.6.2), which suggests fireclay workings at a depth of around 7m just to the south of the site. This also correlates with the reported depth of the mine shaft in the south-east of 7.6m depth and, given the presence of the mine shaft on the site margins, we cannot discount that fireclay workings also extended beneath the site of the proposed office development.

The Coal Authority suggest that these workings were mined using bord and pillar techniques, whereby the clay was extracted from roadways, leaving clay pillars behind to support the roof. The workings may not have been backfilled on abandonment.

The environmental data report for the site (ESP, 2023) does not indicate any records of clay mining within 500m of the site. However, it does appear that the Coal Authority do possess some records of workings beneath the site. Due to time constraints, we have not had the opportunity to consult with the Coal Authority regarding these workings and any records they may have. At this stage, the extent of the workings is not known, but we cannot discount that they could extend across the whole of the footprint of the proposed new office block. The height of the workings is also not known, but we would anticipate at least main roadways of over 1m height leading to the mine shaft (to allow easier transport of the clay).

Given the above, we consider that open workings of at least 1m height could be present at around 7m depth beneath the site of the proposed office development. The borehole for the groundwater well, located some 45m to the south-west, indicated bedrock at around 2m depth. Therefore, they may be only 5m bedrock (at most) above open fireclay workings. The roof of the fireclay workings is likely to be mudstone, and supported only on mudstone pillars.

The mudstone pillars supporting the roof of the workings will be weathering as they age and, as they weather, the pillars are likely to lose strength. Water will accelerate weathering of mudstone and, although the main groundwater body is reportedly significantly deeper (around 90m) than the workings, the presence of perched water within the workings cannot be discounted. In time the pillars will crumble and collapse - mudstone pillars are likely to be more susceptible to weathering and subsequent collapse than pillars of coal. The anticipated bedrock cover of 5m (or less) is considered insufficient to mitigate the risk of subsidence and, eventually, we consider that subsidence at the ground surface is almost inevitable.

Based on the above, we consider that if the shallow fireclay workings extend beneath the building footprint, the risks of subsidence at the site of the proposed office development are **Very High**, and could result in significant structural damage if not mitigated. However, much of the above is based on limited desk study information, and we recommend further desk study research and a comprehensive intrusive investigation to confirm the risk level and assess risk mitigation options prior to finalising design. At this stage, we anticipate that the workings are likely to require stabilisation by drilling and grouting.

It should be noted that subsidence above mine workings is a 'bottom up' mechanism and is independent of surface features, such as past land use or structural loadings. It should be appreciated that the potential subsidence risk will not be limited to the site of the proposed office building, and would extend to other areas underlain by shallow clay workings. The large number of mine shafts recorded within the Client's premises suggest that these workings may be extensive.

ESP are not legal specialists, but we understand that if subsidence were to occur above abandoned fireclay workings, the Coal Authority would not accept liability. This is also suggested by the Coal Authority correspondence (see Section 2.6.2). We recommend that the Client seek further legal advice should shallow fireclay workings be identified beneath the site.

3.2.5 Mine Entries

As discussed in previous sections, a mine shaft is located in the south-east of the site of the proposed office development (CA ref. 426407-002). This shaft is reportedly 2m in diameter and 7.6m depth and, contrary to the Coal Authority mining report records, based on available information, is likely to have accessed workings within a fireclay band beneath the site. The shaft location as identified by the Coal Authority is shown on Insert 7 below, and the Coal Authority consider that the mapped location is likely to be accurate to around 5m.



Insert 6: Location of Mine Shaft. Shaft location, in yellow, after Coal Authority.
(aerial photograph after Google Earth)

No information is available on the any capping or backfilling of the mine shaft but, based on our experience, it may have been loosely backfilled with refuse, possibly fragments of old ceramics manufactured at the site. Such fill would be unconsolidated and loose, possibly with significant voiding, and could pose a risk to future foundations and pavements. We consider that the risk of settlement associated with collapse/movement of the shaft backfill is **High**.

We recommend further investigation to locate the mine shaft, and confirm its dimensions and nature and depth of backfill. Risk mitigation measures may then be considered – these will partly depend on the proximity of the mine shaft to the new structure. At this stage, we envisage that the existing shaft backfill would probably need removing and replacing with suitable compacted fill with the possible requirement for a suitably designed shaft cap.

3.2.6 Opencast Workings

As discussed in Section 3.1.3, we consider that, notwithstanding Coal Authority records, the site does not lie within a former opencast site. Prior to development, further discussions should be held with the Coal Authority, so that their records can be amended appropriately.

3.3 Mine Gas Migration

As discussed in Section 2.5.2, the Coal Authority has no record of a mine gas emission requiring action in the vicinity of the site. The presence of shallow coal within the workings (see Section 2.6.2) suggests that hazardous mine gas could be present. A mine gas risk assessment based on the guidelines published by Wilson et al (2021) is likely to be required – information on the ground conditions and state of the fireclay would be required to undertake this assessment, so should be undertaken following the further investigation (see Section 3.4).

3.4 Recommended Further Mining Investigation

We recommend further investigation and assessment prior to development in order to confirm the mining risk, and allow any risk mitigation measures to be designed. We recommend the following:

- Further liaison with the Coal Authority as to the records they hold on fireclay workings and the mine shaft located in the south-eats of the site.
- Rotary drillholes to identify the nature of the bedrock beneath the site and, in particular, the depth and extent of abandoned mine workings beneath the site. Given the mining setting, we recommend at least six rotary open-hole drillholes to depths of 20m. One drillhole should be extended to 30m depth.
- If identified, gas wells could be installed within open mine workings and monitored for a period to confirm the levels of hazardous ground gas present.
- Further investigation to accurately locate the mine shaft, and identify the depth and nature of any shaft backfill materials. The form of the investigation to locate the shaft will depend on the nature of the site surface in the immediate vicinity. For example, geophysical surveying may be a useful first phase to identify any sub-surface anomalies which could represent the shaft and its backfill. Once located, trial trenching could be used to accurately locate the shaft and identify its diameter, shaft lining and shallow filling. Rotary drillholes will be required to confirm the shaft depth and nature of the deeper backfill.

It should be appreciated that the above investigation concentrates on identifying the potential risks posed by shallow mine workings and the mine shaft. Further investigation would be required to inform foundation and pavement design and address any contamination risks (see ESP, 2023).

4 Conclusions

The Phase One (desk study based) Coal Mining Risk Assessment has identified that:

- The site of the proposed new office block lies within an area of coal mining;
- No shallow coal workings are anticipated;
- The available historical and geological desk study evidence suggests that the site does not lies within a former opencast site, as suggested by Coal Authority;
- The area just to the south of the site is reportedly underlain at around 7m depth by abandoned workings within a fireclay band;
- These workings are likely to have been accessed from a mine shaft on the south-eastern margins of the proposed office site;
- We cannot discount that these shallow fireclay mine workings extend beneath the subject site;
- If present, these workings will pose a potentially significant subsidence risk to the proposed office development; and
- Further assessment and intrusive investigation is recommended prior to finalisation of the development design.

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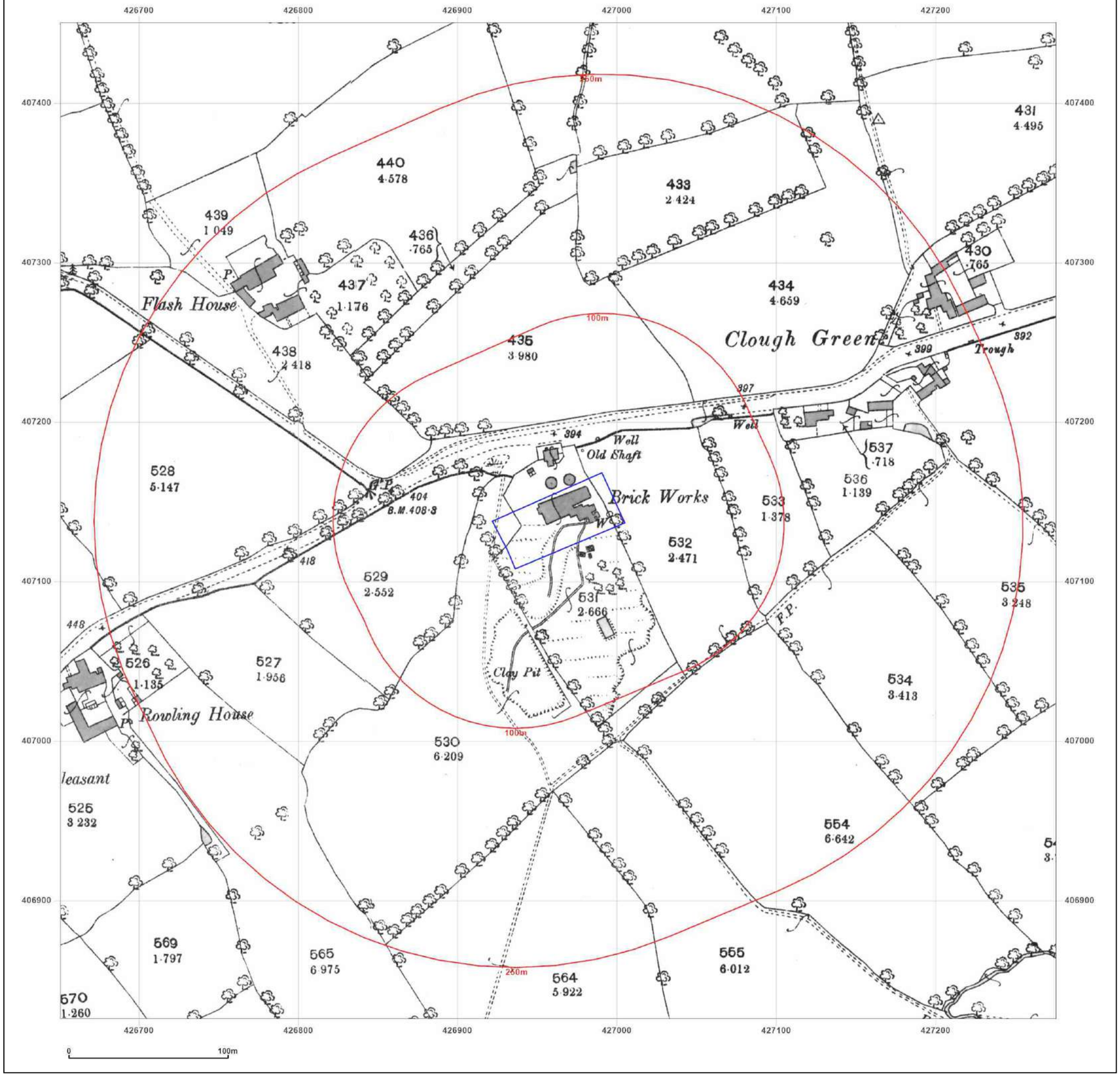
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APPENDIX A Extracts from Historical Maps



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Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: County Series

Map date: **1893**

Scale: 1:2,500

Printed at: 1:2,500

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

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Site Details:

unspecified

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Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: County Series

Map date: **1906**

Scale: 1:2,500

Printed at: 1:2,500

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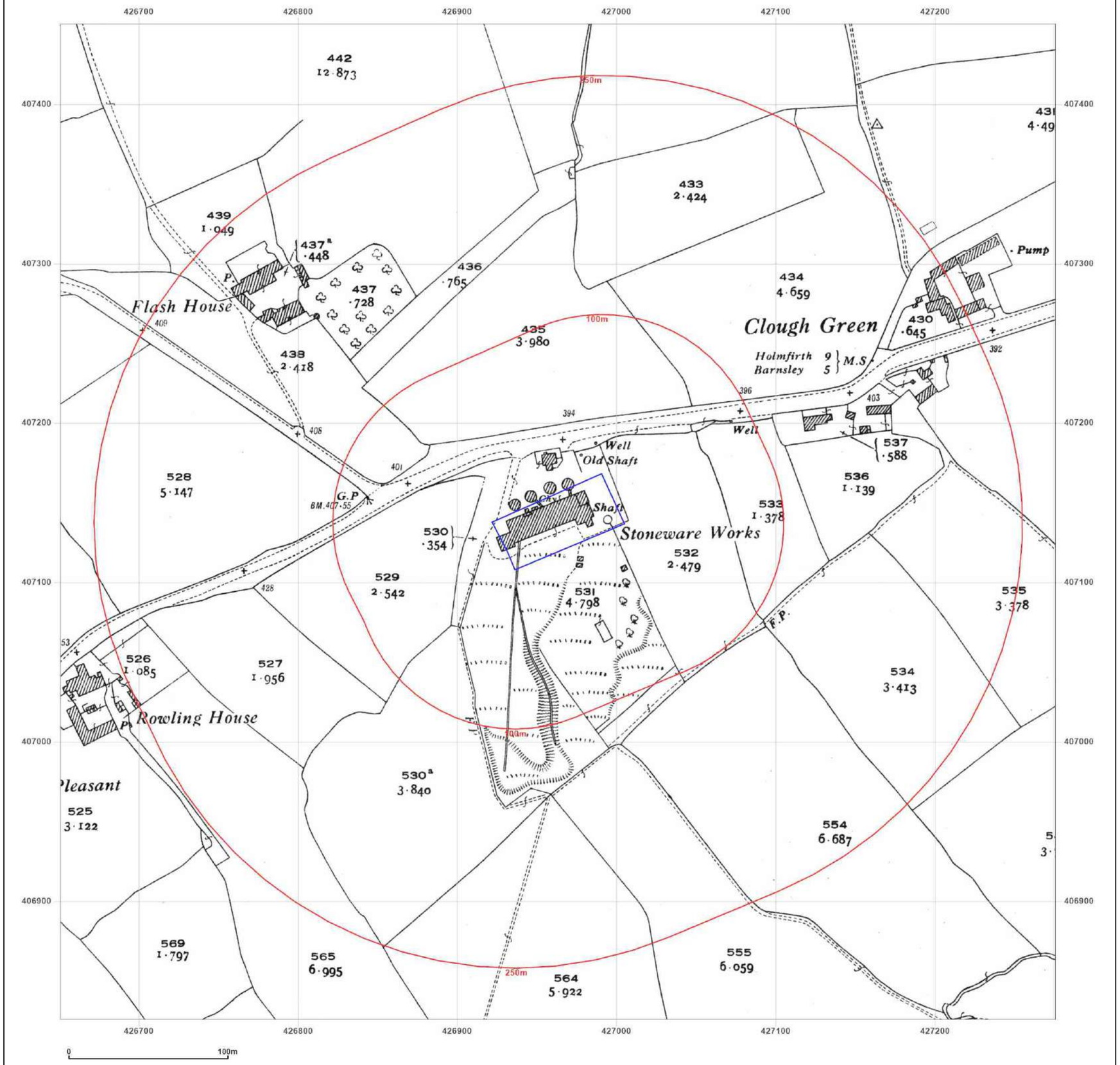
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Printed at: 1:2,500

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Surveyed 1930
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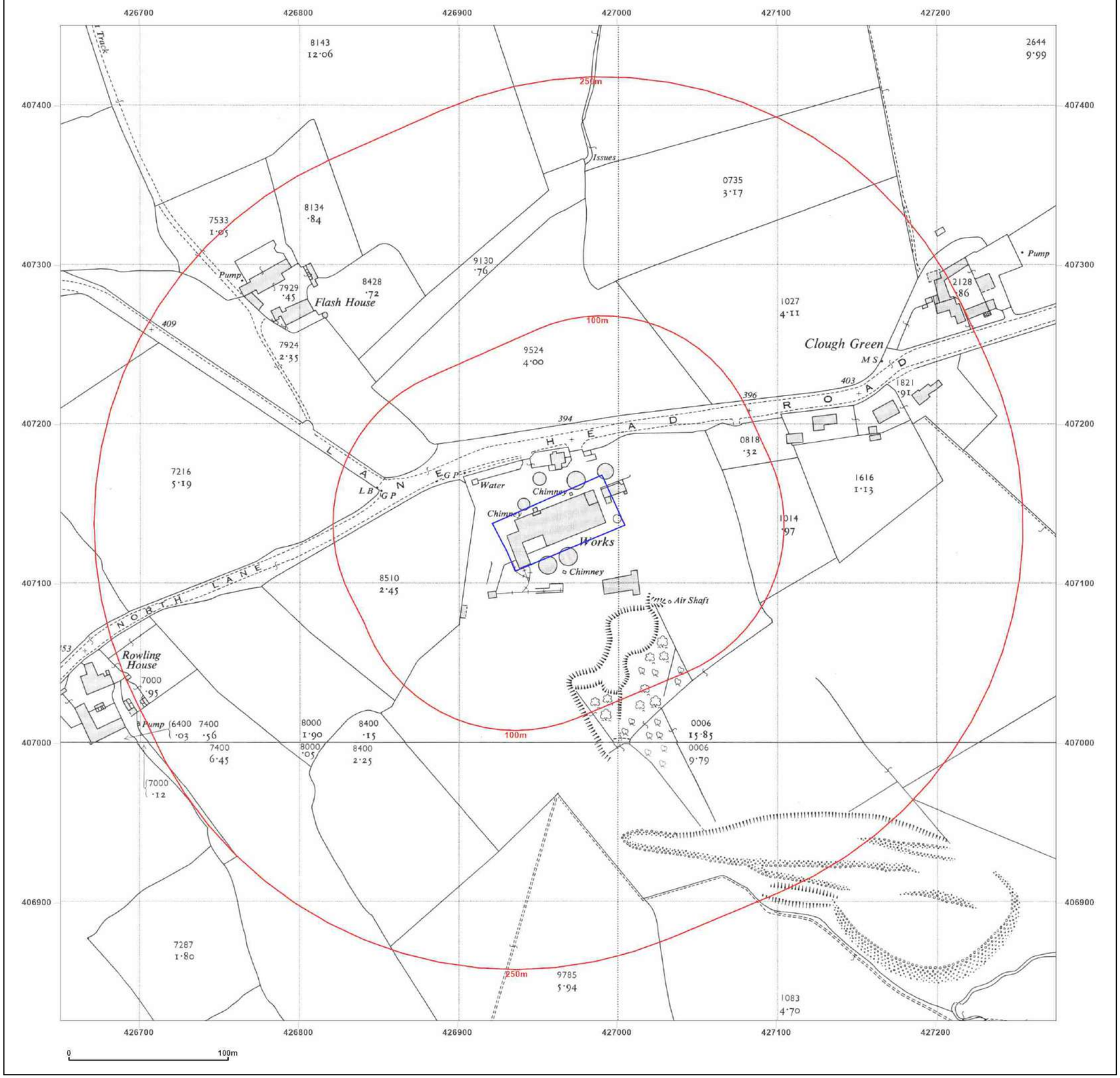
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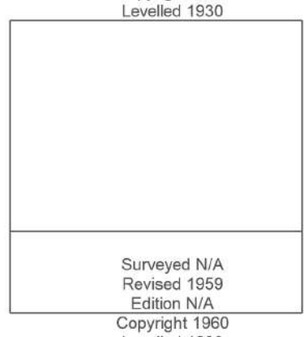
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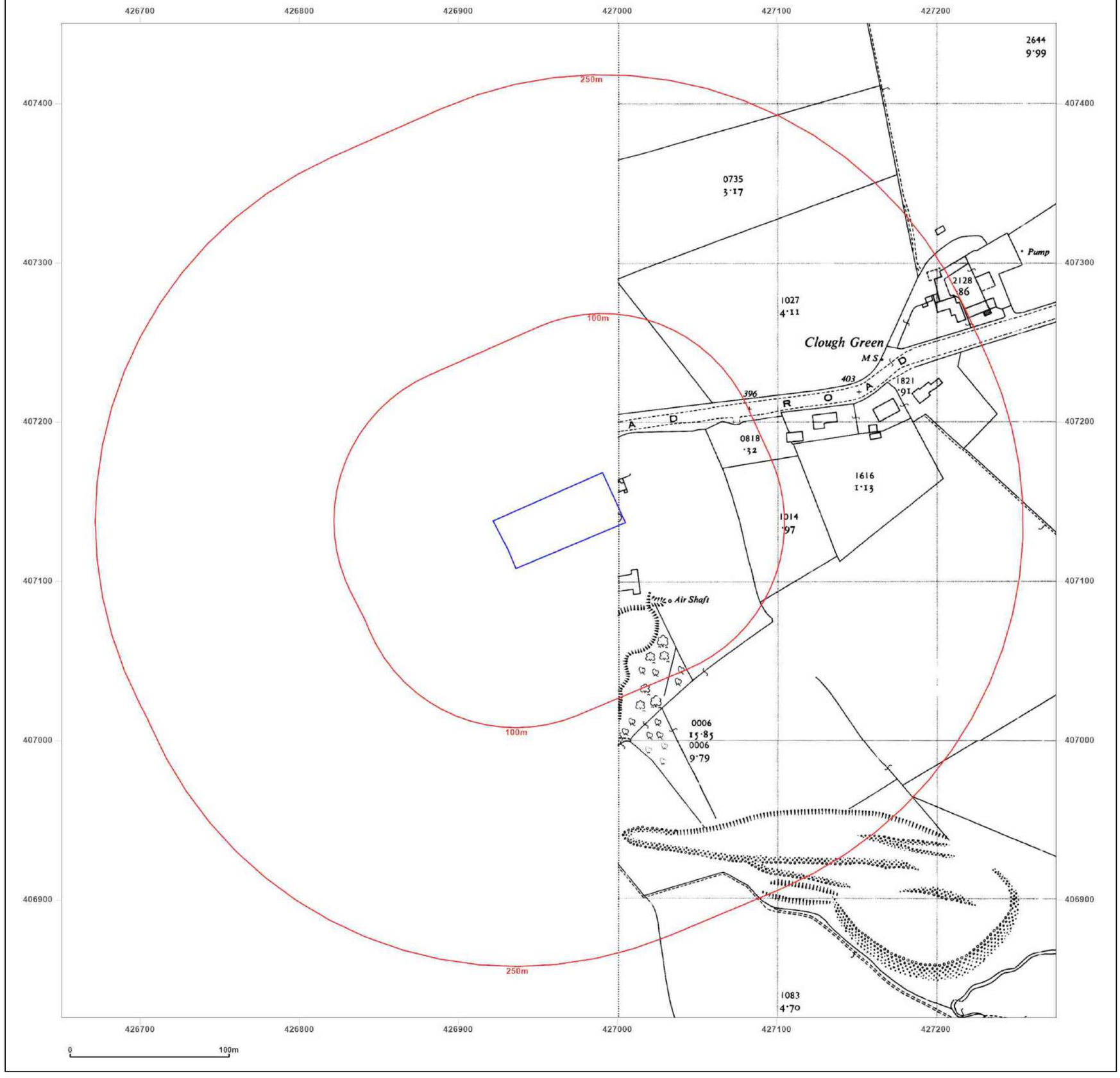
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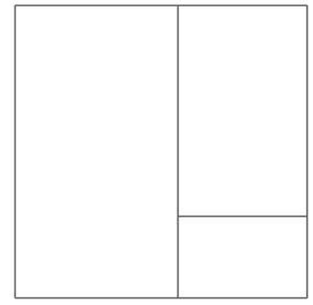
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Revised N/A
Edition N/A
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Surveyed 1963
Revised 1983
Edition N/A
Copyright 1983
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Surveyed 1963
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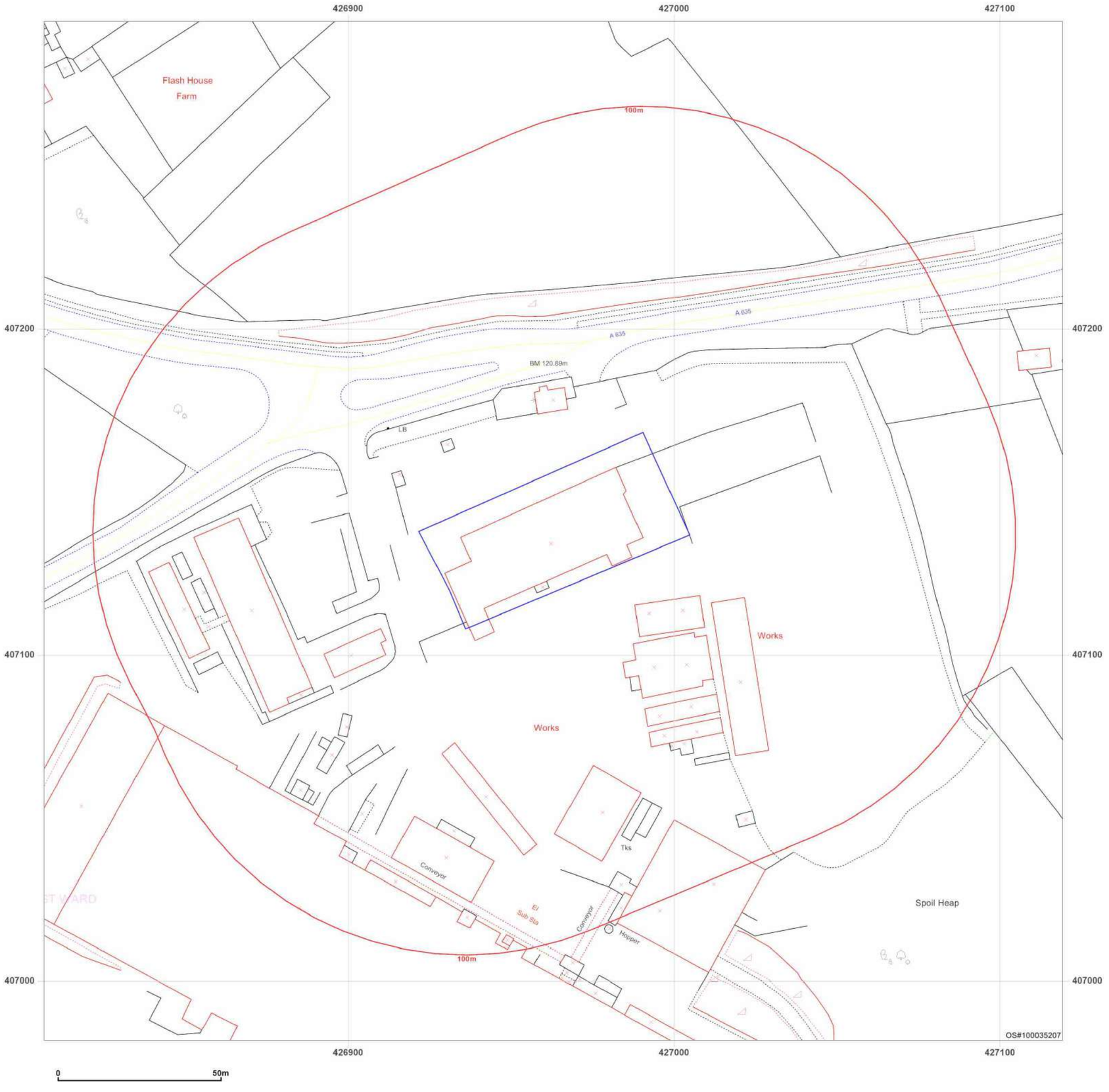
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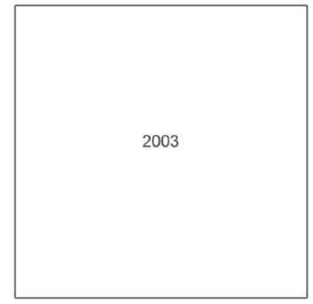
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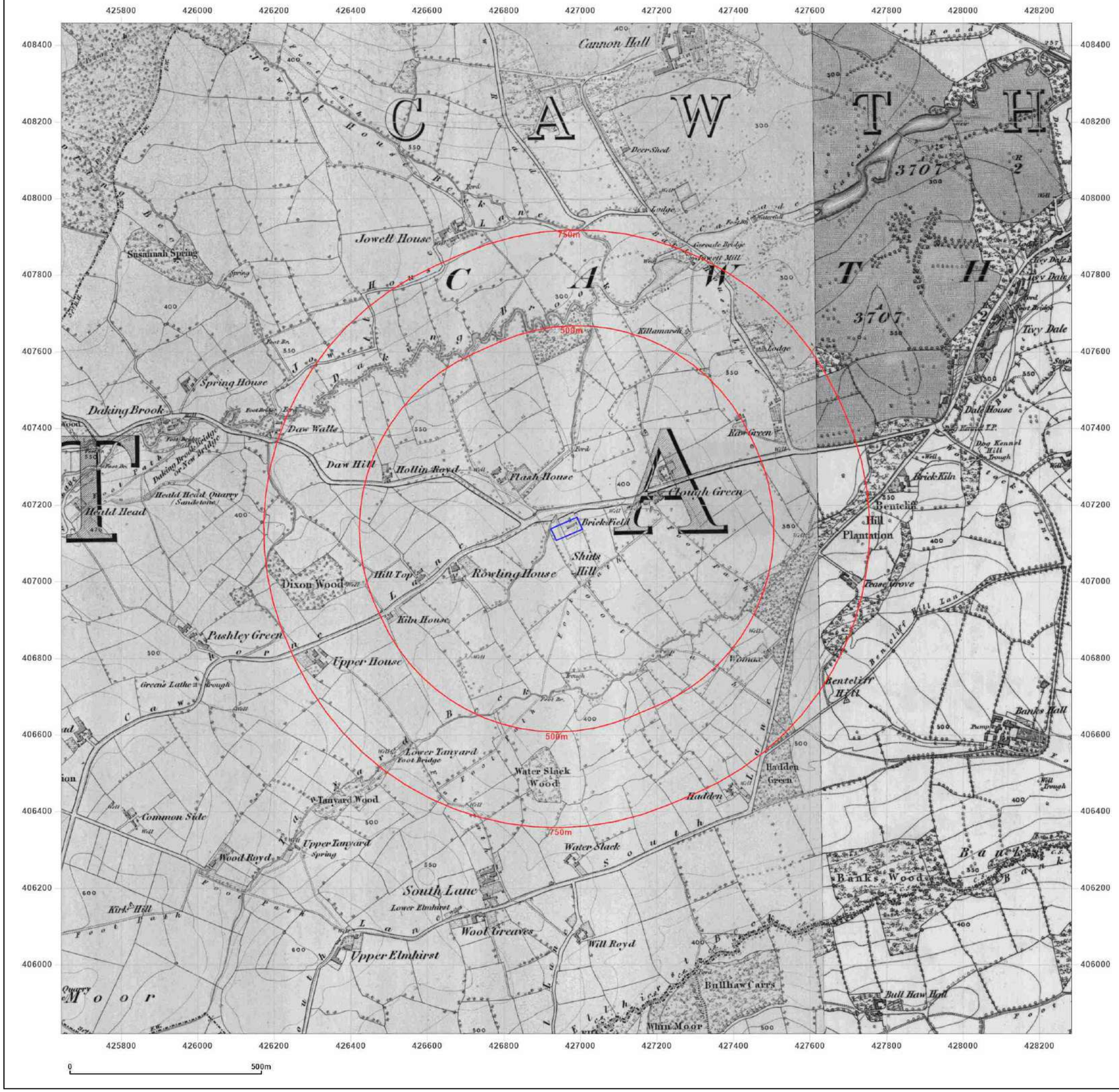
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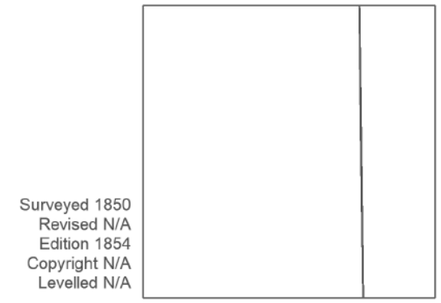
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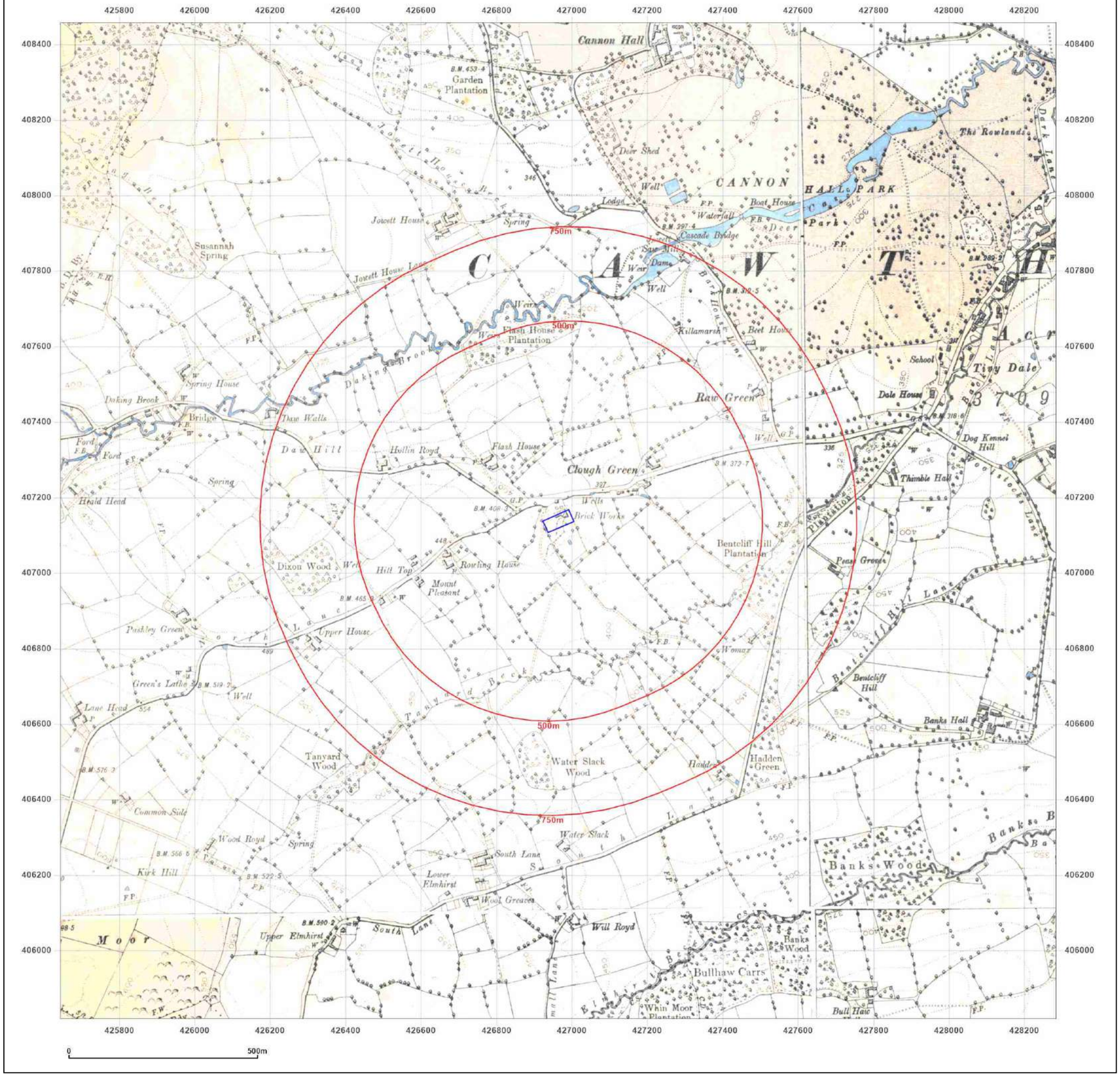
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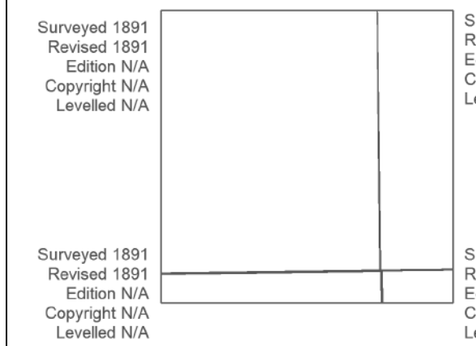
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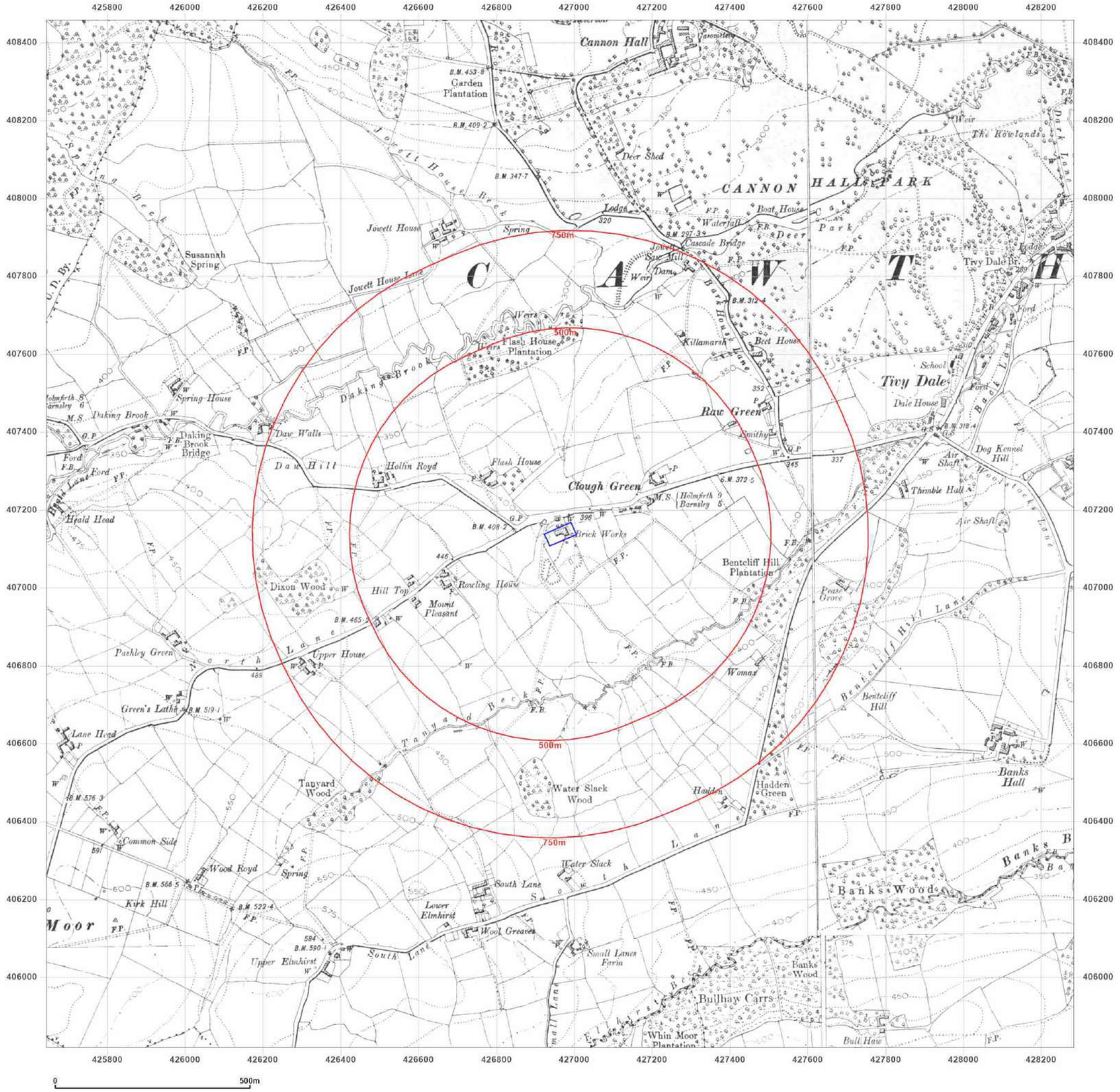
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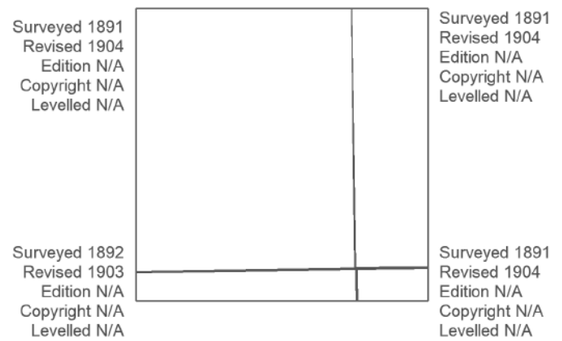
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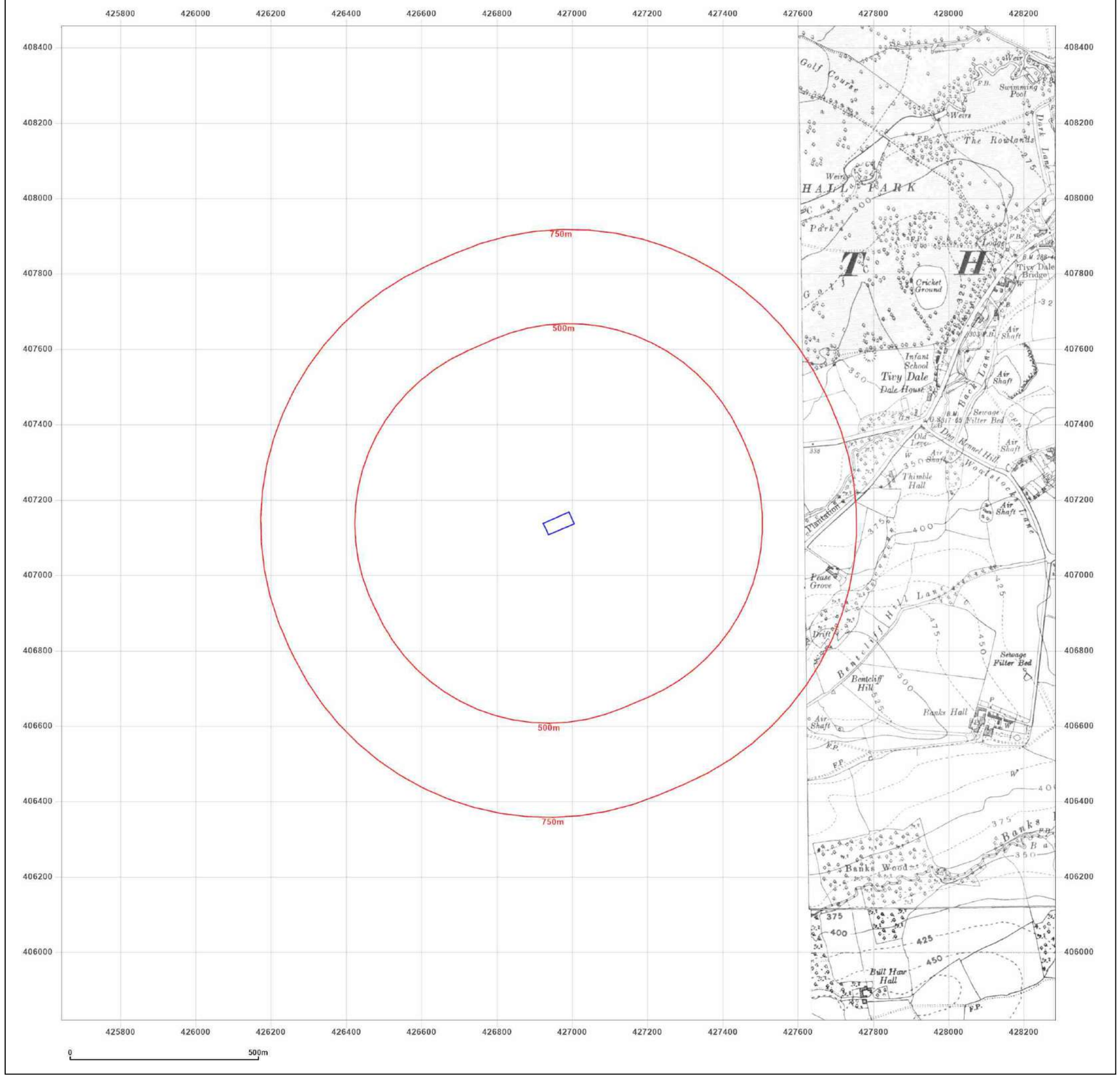
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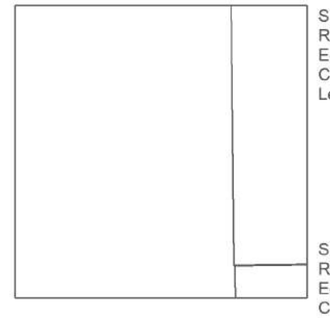
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Surveyed 1851
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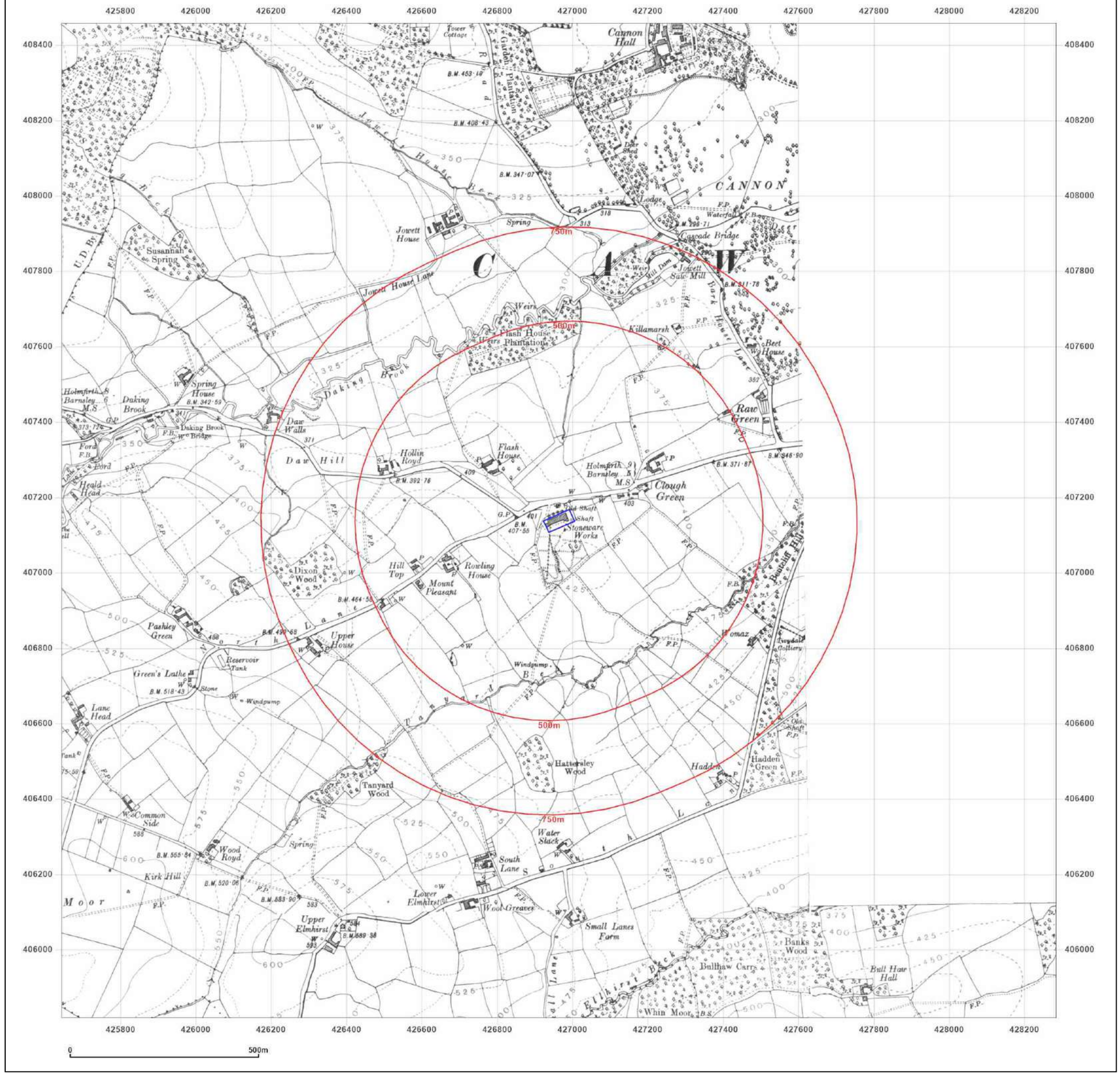
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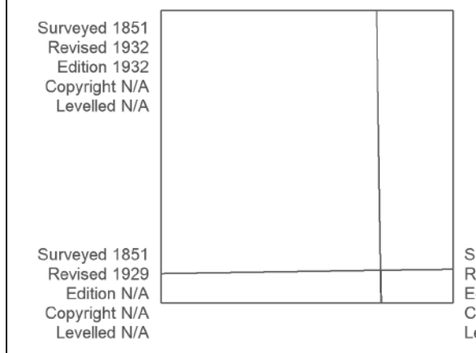
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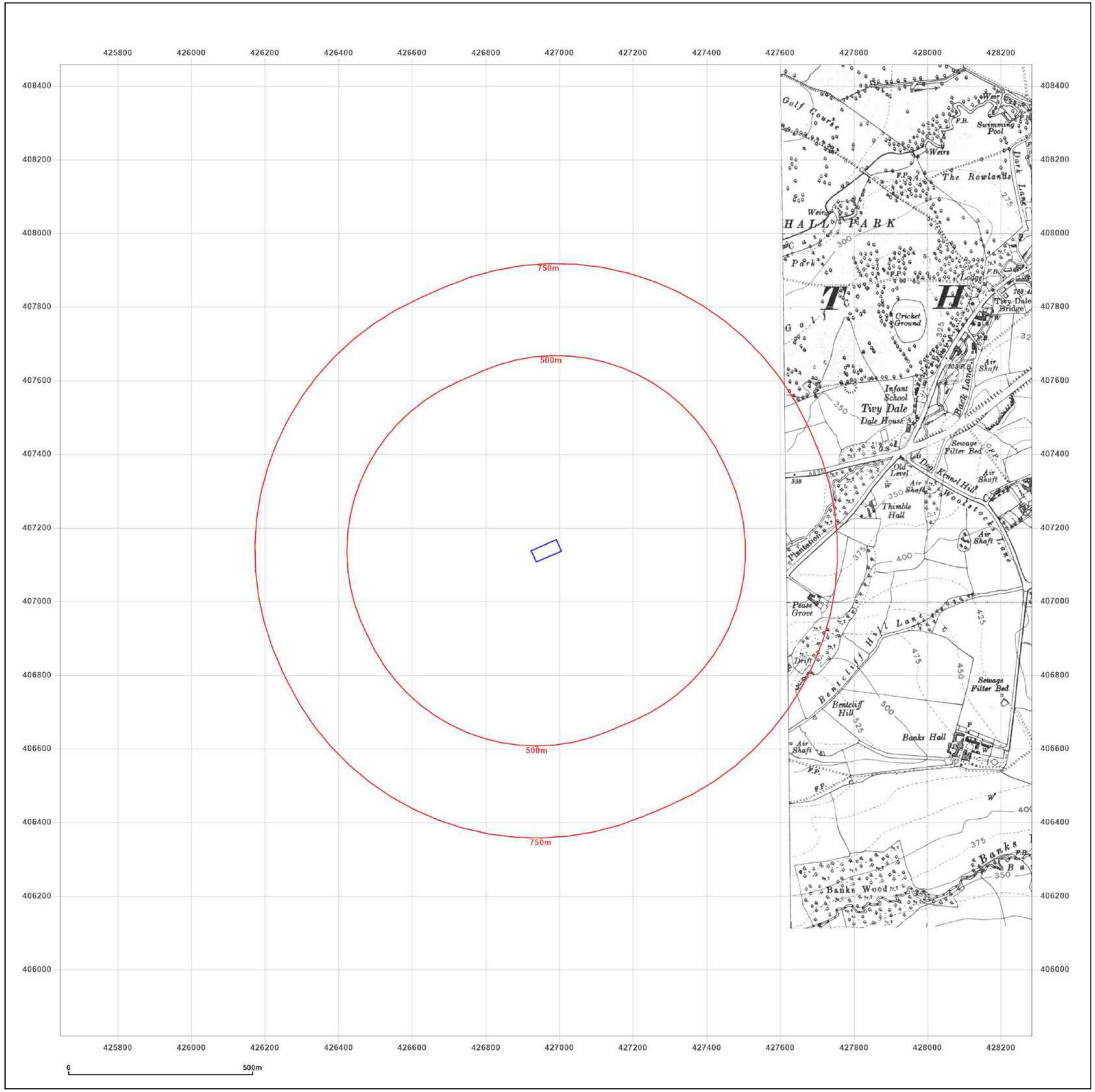
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Grid Ref: 426963, 407138

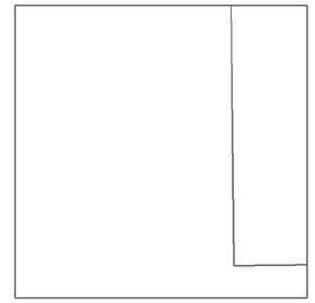
Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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

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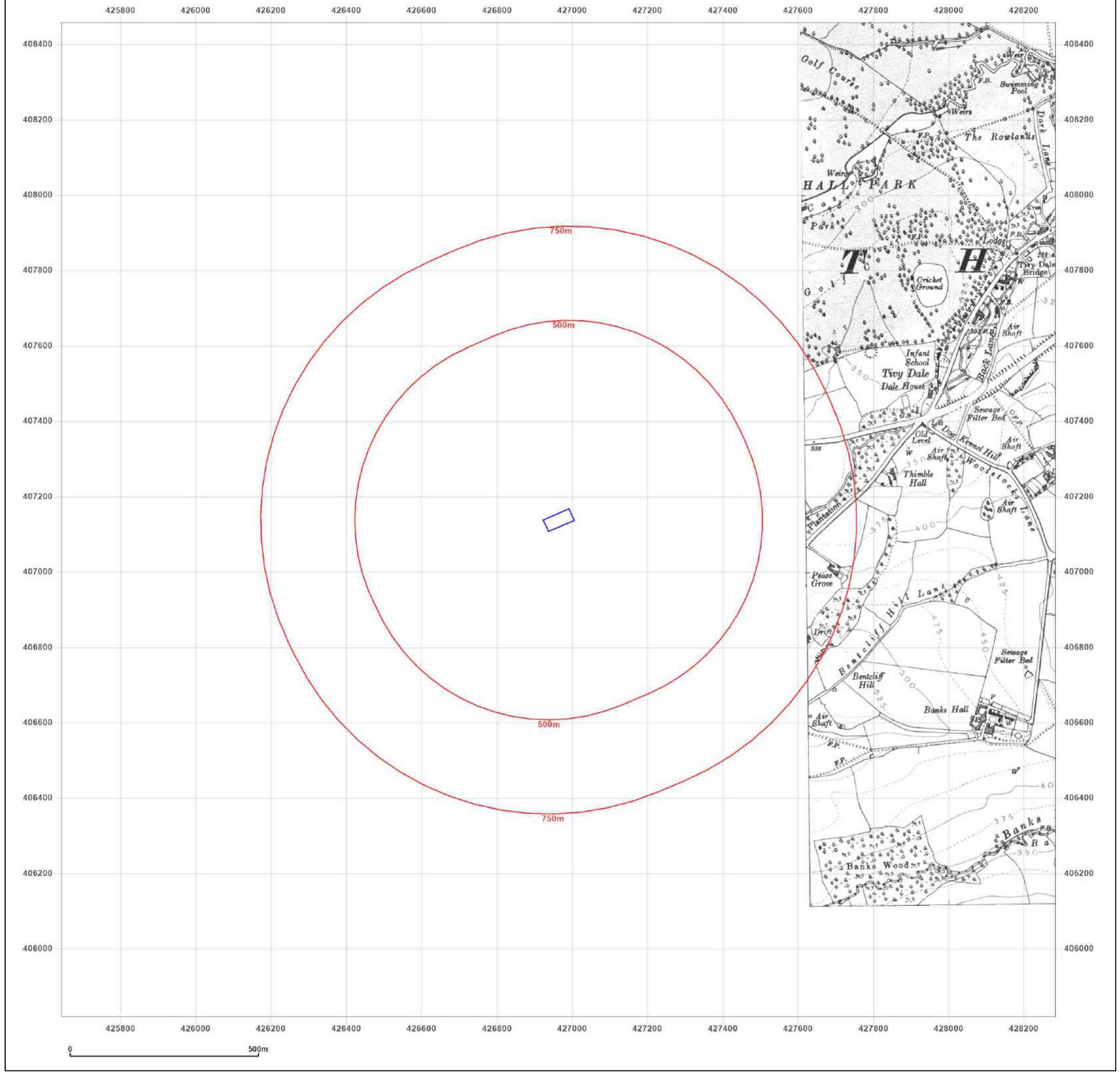
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Site Details:

unspecified

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Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

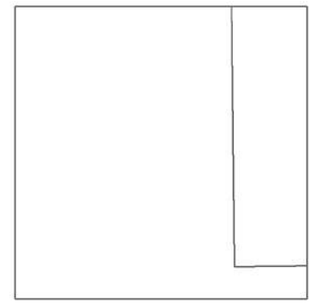
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Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1851
Revised 1929
Edition N/A
Copyright N/A
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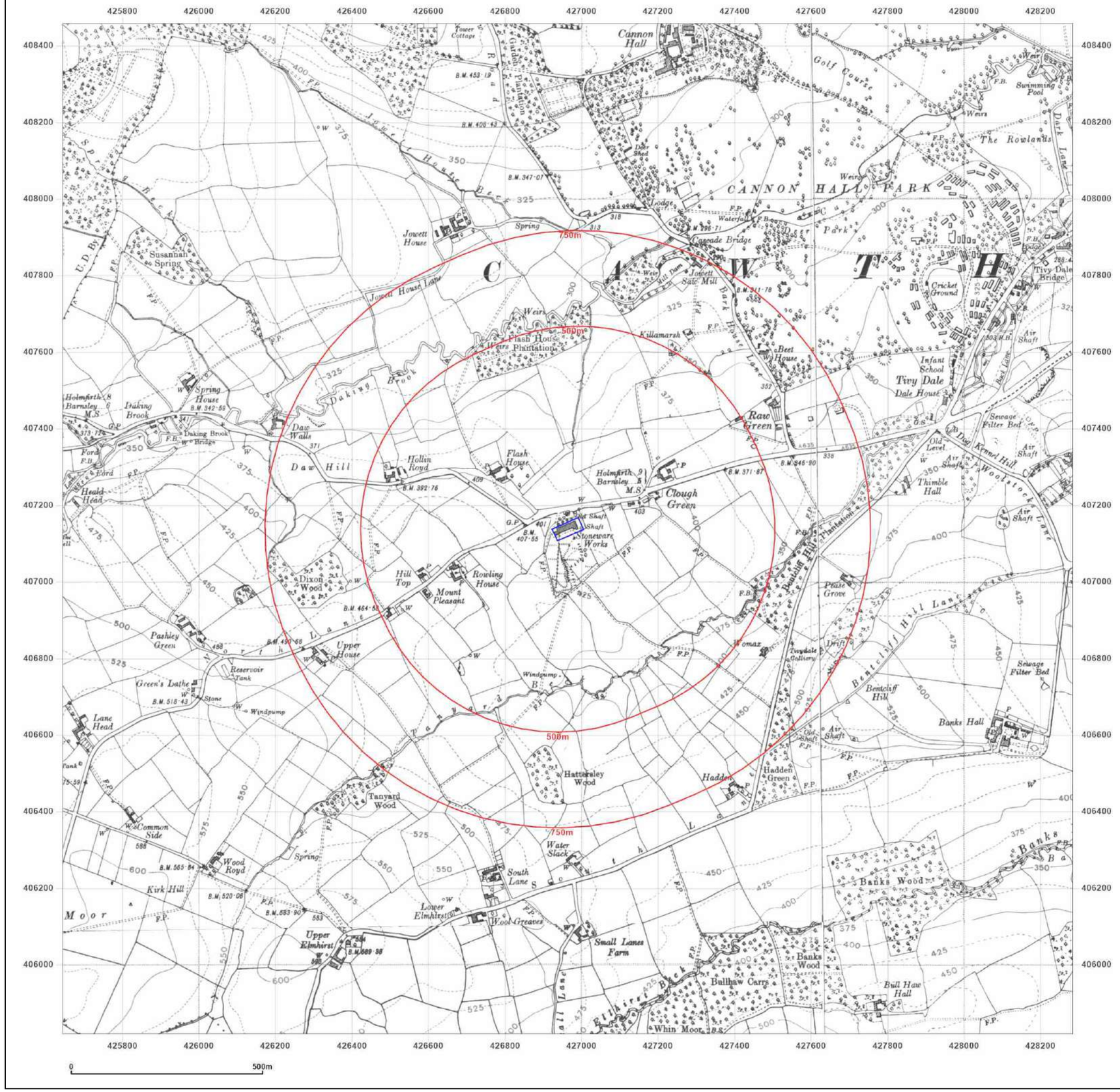
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EMAPSITE™

Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

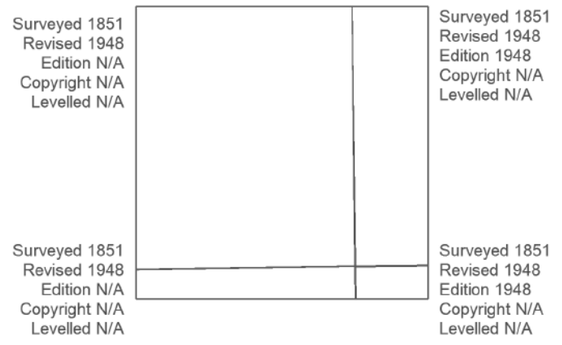
Map Name: County Series

Map date: **1948**

Scale: 1:10,560

Printed at: 1:10,560

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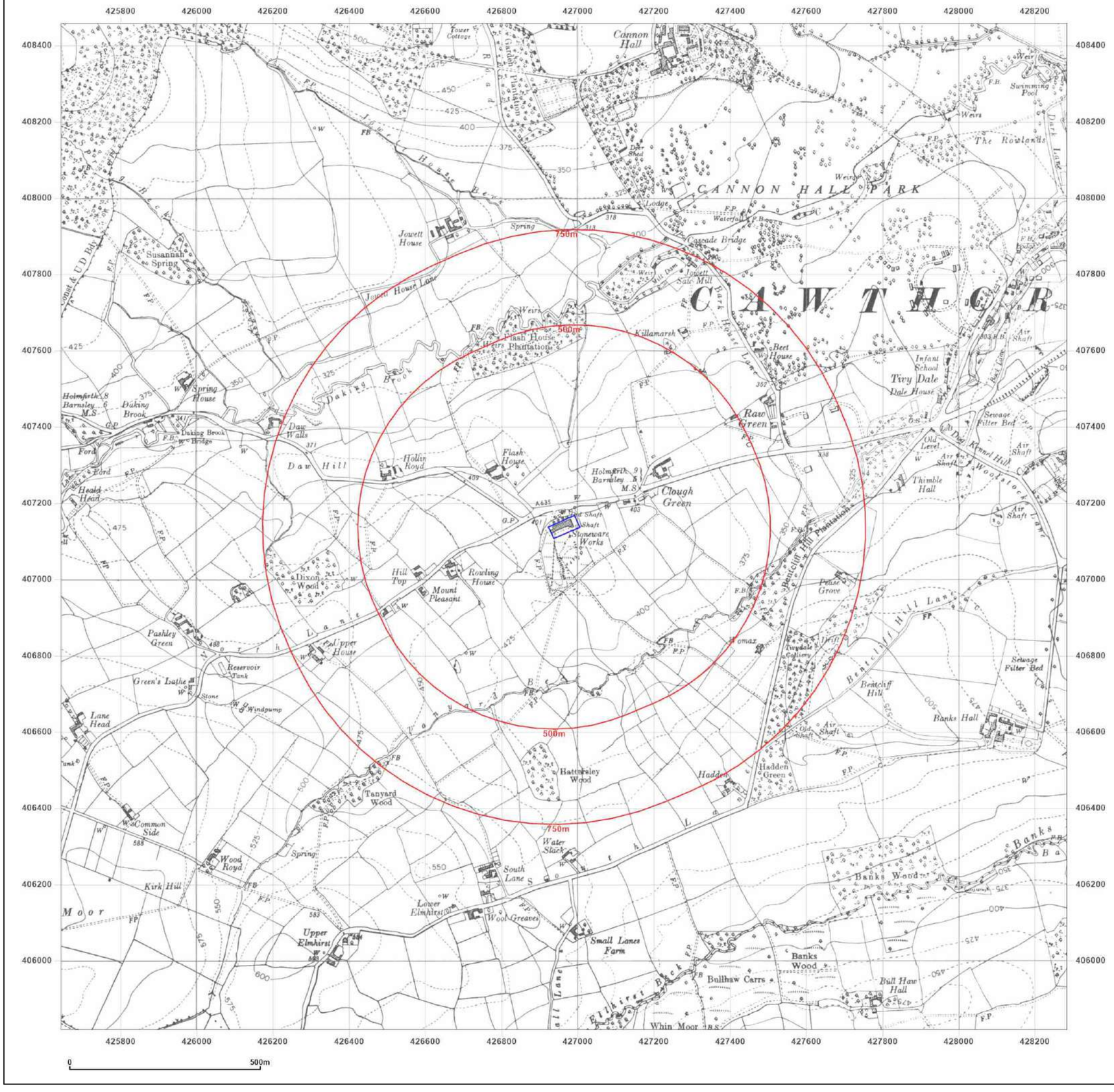
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Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: Provisional

Map date: **1951**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A

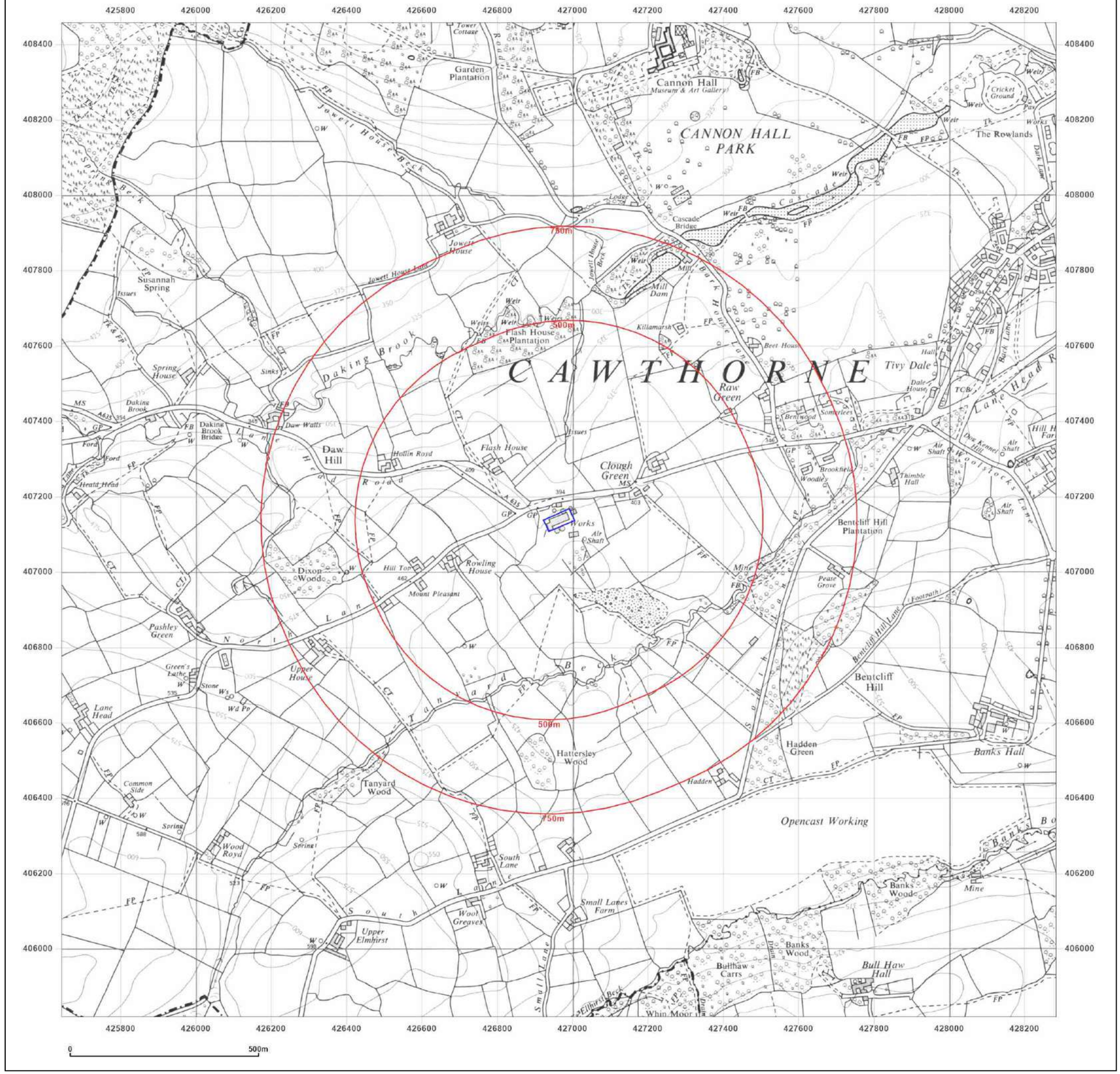
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Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: Provisional

Map date: **1965**

Scale: 1:10,560

Printed at: 1:10,560

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

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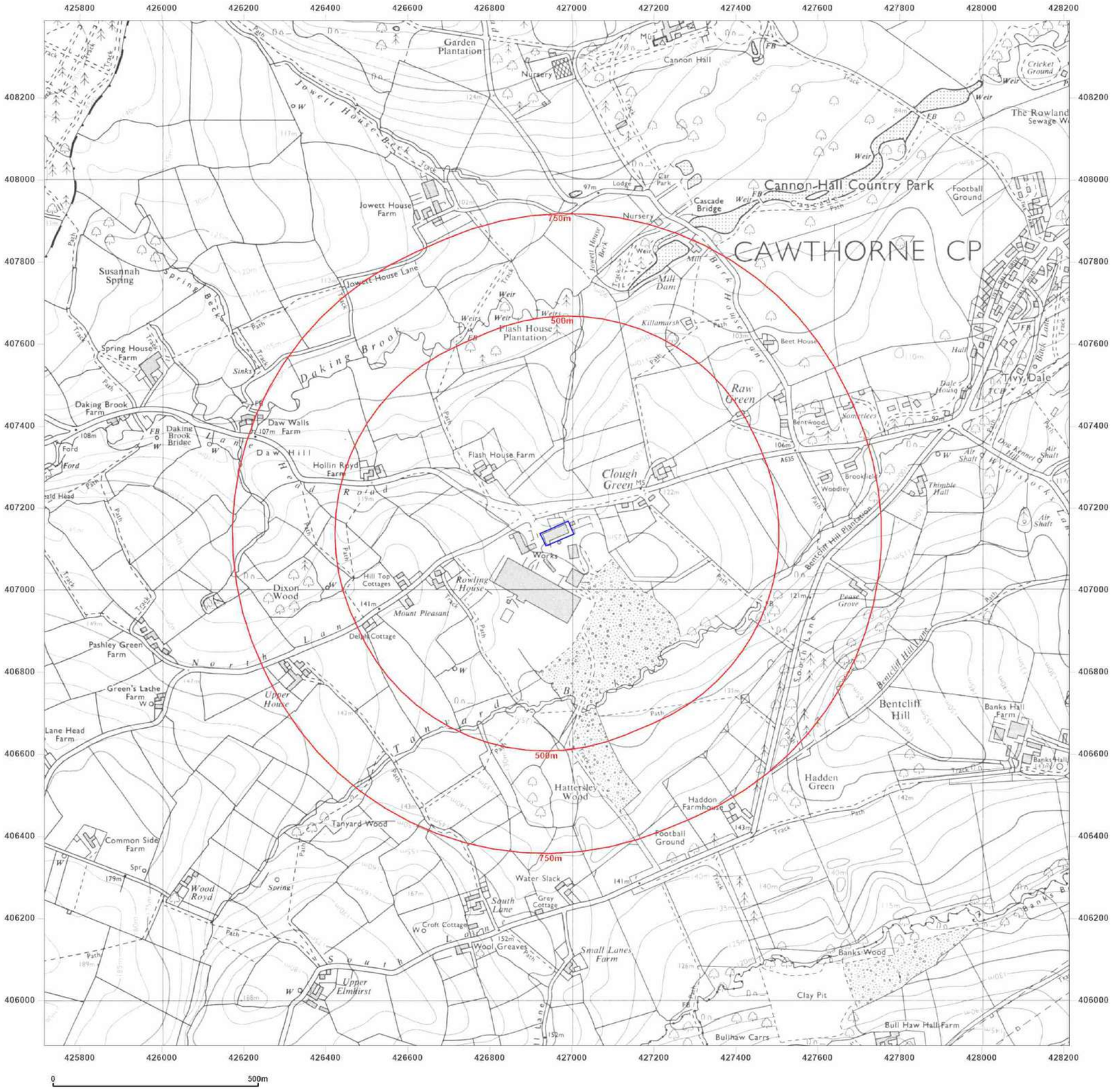
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Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: National Grid

Map date: **1983**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1977
Revised 1983
Edition N/A
Copyright N/A
Levelled N/A

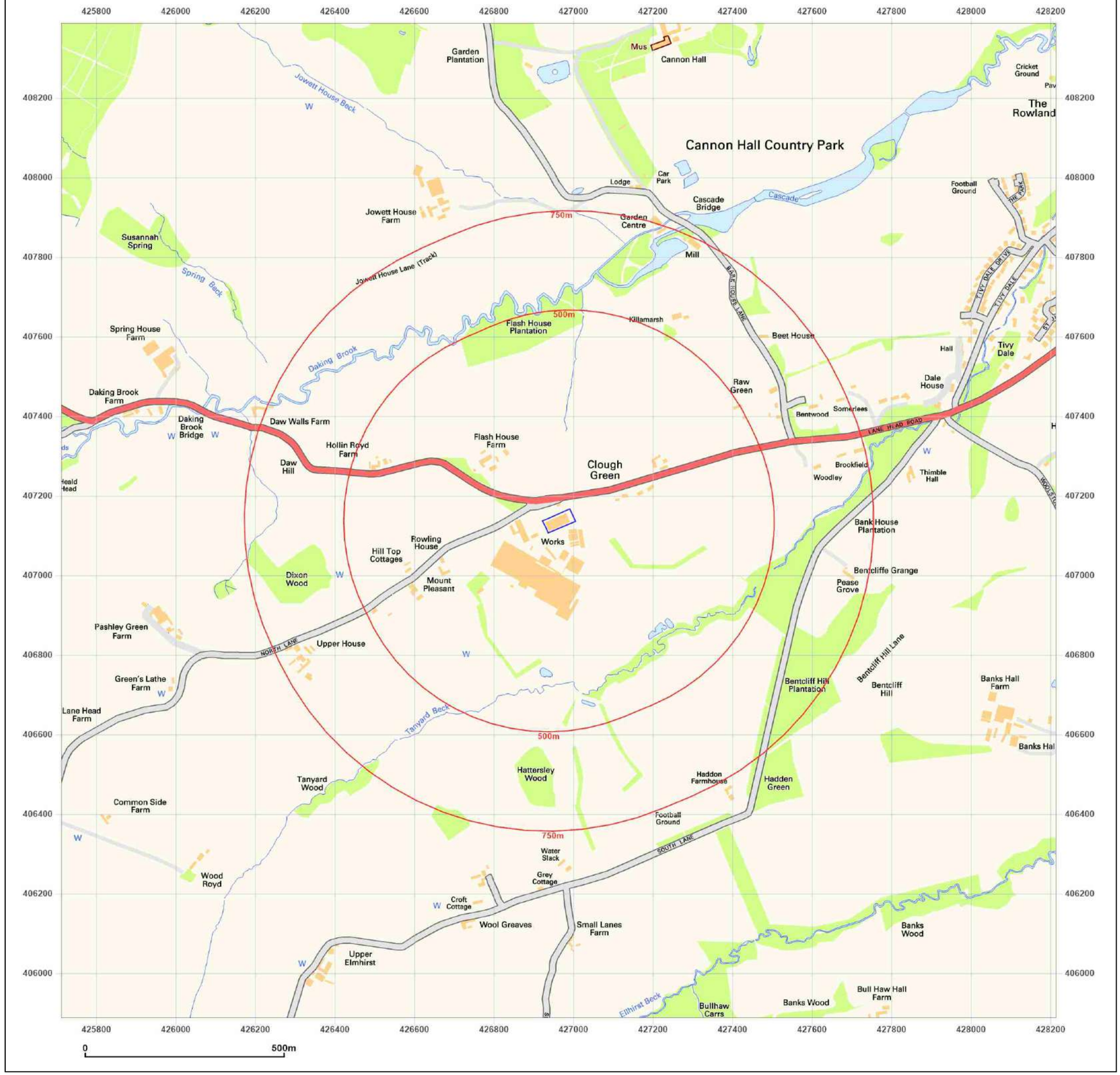
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Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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2001

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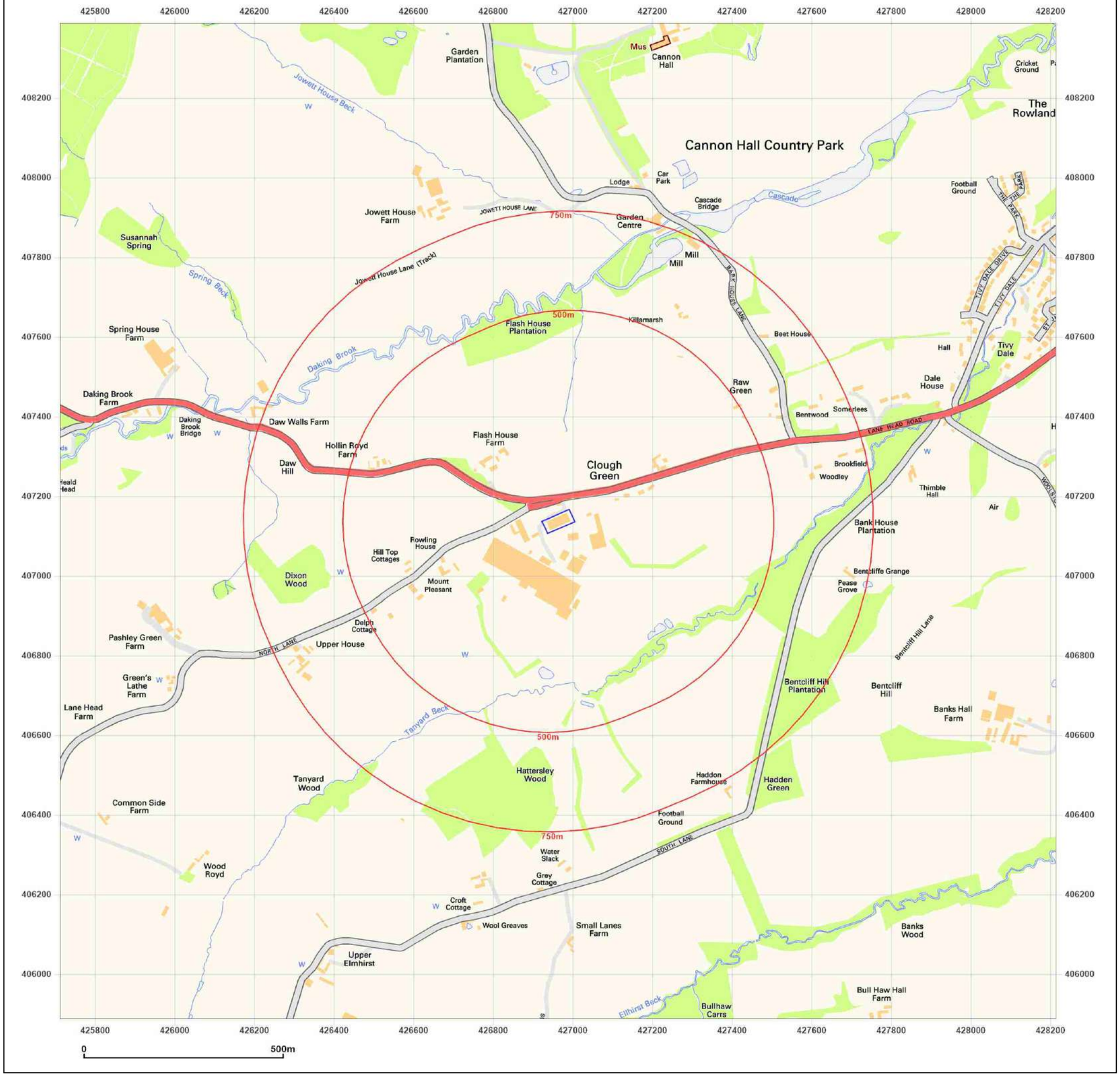
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Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
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2010

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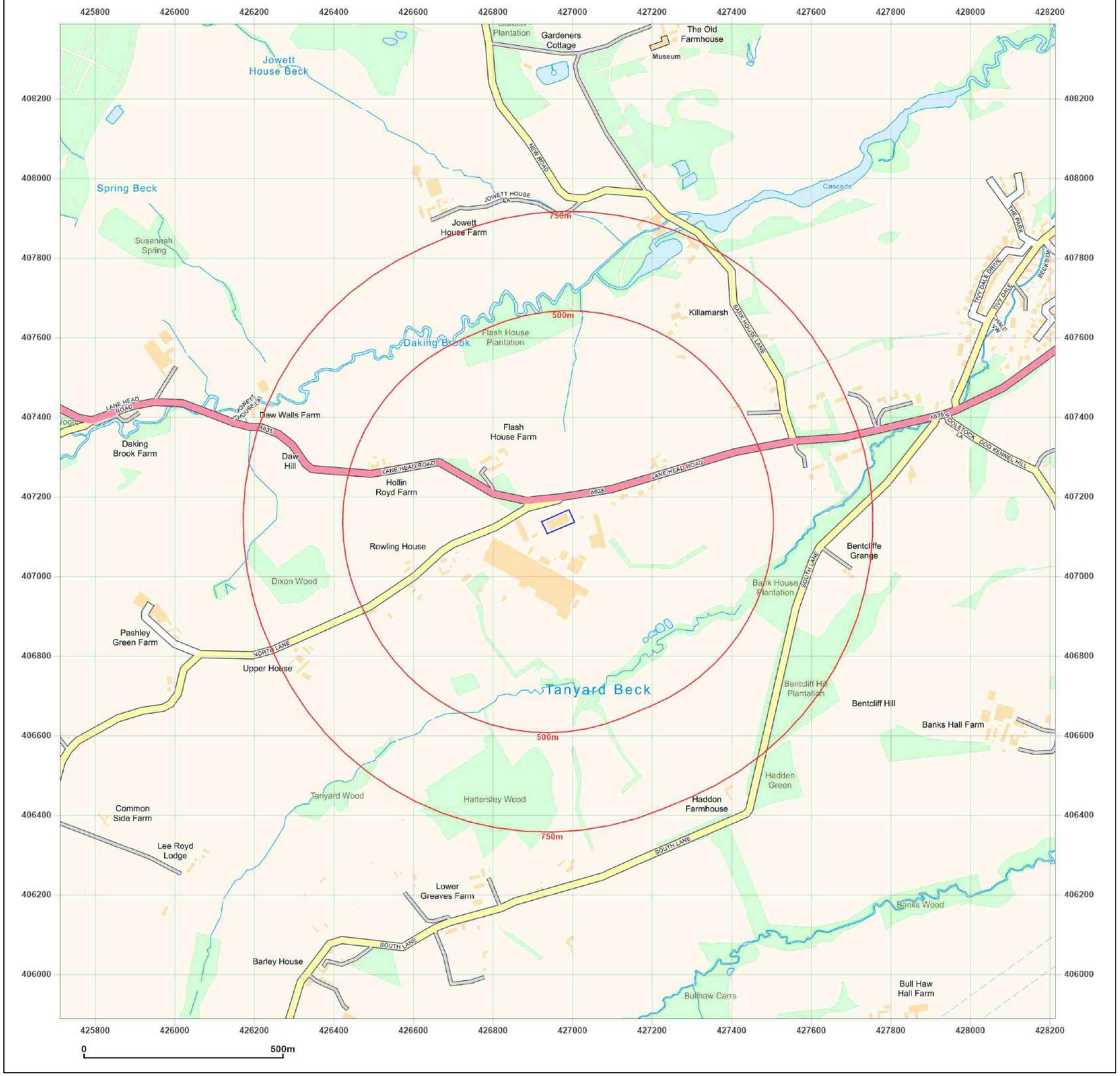
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EMAPSITE™

Site Details:

unspecified

Client Ref: EMS_881992_1091431
Report Ref: EMS-881992_1127760
Grid Ref: 426963, 407138

Map Name: National Grid

Map date: **2023**

Scale: 1:10,000

Printed at: 1:10,000

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2023

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Production date: 19 July 2023

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APPENDIX B Borehole Records Available from British Geological Survey (BGS)

British Geological Survey

Borehole record form

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for NAYLOR INDUSTRIES PLC

Location CLOUGH GREEN CAWTHORNE BARNSLEY S75 4AD.

NGR (ten digits) SE 26917 07065 Please attach site plan

Ground level (if known) — metres Above Ordnance Datum

Drilling company MUD DRILLING LTD.

Date drilling commenced 10/7/12 (DD/MM/YYYY) Completed 21/7/12. (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) G.L metres (m). Please tick if this is above ☐ or below ☐ ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter

250	mm from	0	to	6 m/depth
150	mm from	6	to	98.5 m/depth
	mm from		to	m/depth
	mm from		to	m/depth

Casing material and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material STEEL	diameter	150	mm from	0	to 6 m/depth
Casing material PLASTIC SLOTTED	diameter	113	mm from	0	to 98.5 m/depth
Casing material	diameter		mm from		to m/depth
Casing material	diameter		mm from		to m/depth

Grouting details

Water struck at 1. 89.5 m (depth below datum – mbd) 2. 97.0 m (mbd)
3. m (mbd) 4. m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum (if different from borehole datum) 0.50 m. Please tick if this is above ☑ or below ☐ ground level.

Pump suction depth 68 mbd

Water level (start of test) 16.17 mbd

Water level (end of test) 16.55 mbd

Type of test (for example, bailer, step, constant rate) CONSTANT

Pumping rate 5.55 m^3/hour ☐ or litres/second ☐. Please tick as appropriate.
for 01 days, 24 hours, — mins

Recovery to (from end of pumping) 16.17 mbd in — days, — hours, 210 mins

Date(s) of measurements Pump started 5/12/12 (DD/MM/YYYY)
Pump stopped 6/12/12 (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box ☑

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	FILL	0.40	0.40
	CLAY	1.40	1.80
	GREY MUDSTONE	4.40	6.20
	SANDSTONE	1.10	7.30
	GREY MUDSTONE	9.50	16.80
	BLACK SHALE	3.30	20.10
	GREY MUDSTONE	12.40	32.50
	BLACK SHALE	0.20	32.70
	COAL	0.30	33.00
	GREY MUDSTONE SANDSTONE BANDS	51.00	84.00
	BLACK SHALE	3.00	87.00
	GREY MUDSTONE	2.30	89.30
	SANDSTONE GREY	7.70	97.0
	SANDSTONE GREY BROKEN	0.30	97.30
	SANDSTONE GREY.	1.20	98.50
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form? 15 mins

For Official use only

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
Accession number	**Wellmaster number**	**SOBi number**	**NGR**
LIC NO	**Purpose**		**EA reference number**
Copy number	**Entered by**		

British Geological Survey

SE 20 NE /79

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN — LOCATION: CAWTHORNE — BOREHOLE No. 1

CUT/FILL(M) – — CHAINAGE(M) – — OFFSET(M) – — SHEET 1 OF 1

BORING METHOD/SIZE(MM) Shell and Auger 150mm / Rotary Coring 61mm.

BORING DATE	BORING CASING (M)	BORING WATER (M)	SAMPLES DEPTH (M)	SAMPLES TYPE	STRATA KEY	STRATA DEPTH (M)	STRATA LEVEL (M)	STRATA DESCRIPTION	TESTING 'N'	TESTING RQD %
13/1/75						0.00	122.46			
						0.10	122.36	TOPSOIL		
						0.40	122.06	Soft dark brown sandy stoney CLAY with roots.		
			0.70 – 1.00	B				Firm, medium grey-brown mottled, silty CLAY, with traces of mudstone and siltstone fragments.		
						1.80	120.66			
	2.00		2.00 – 2.30	B				Firm dark grey-brown CLAY with mudstone, black shale and coal fragments (Highly		
						2.40	120.06	weathered mudstone).		
								Firm dark grey silty, shaley CLAY, with mudstone		
			3.80 – 4.10	B				fragments (Highly weathered mudstone).		
						4.50	117.96			
	4.90 NX Casing							Hard, medium to dark grey, ironstained, silty		
			4.95					shaley weathered MUDSTONE.		
				SPT						129
			5.40			5.40	117.06			
			5.40							
	5.80									
13/1/75			5.90	CORE 1 (45%)		6.00	116.46	Hard, medium to dark grey, ironstained fractured MUDSTONE.		0%
14/1/75								COAL and DISTURBED GROUND.		
				CORE 2 (50%)		6.87	115.59			
						7.07	115.39	Soft dark grey shaley MUDSTONE.		0%
			7.17			7.32	115.14	Soft dark grey shaley MUDSTONE, with COAL fragments.		
				CORE 3 (100%)				Light grey silty shaley weathered MUDSTONE.		0%
			8.00	CORE 4 (100%)		8.00	114.46			
			8.20			8.15	114.31	COAL		
						8.20	114.26	Hard, medium grey silty, slightly fractured MUDSTONE.		0%
						8.40	114.06	COAL.		
				CORE 5 (100%)						32%
14/1/75			9.00			9.00	113.46	Hard, dark grey silty fractured MUDSTONE.		
15/1/75										
				CORE 6 (100%)				Hard, dark grey silty slightly fractured MUDSTONE.		66%
15/1/75			9.95			9.95	112.51	END OF BOREHOLE		

REMARKS

Water added to assist boring
Coring commenced at 5.40m using water flush
Core barrel sank under own weight between 6.00m and 7.00m
No water returns during cores 3,4,5 and 6 runs

British Geological Survey

SE 20 NE / 76

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN LOCATION: CAWTHORNE BOREHOLE No. 2

CUT/FILL(M) - CHAINAGE(M) - OFFSET(M) - SHEET 1 OF 1

BORING METHOD/SIZE(MM) Shell and Auger/150mm.

BORING			SAMPLES		STRATA				TESTING	
DATE	CASING (M)	WATER (M)	DEPTH (M)	TYPE	KEY	DEPTH (M)	LEVEL (M)	DESCRIPTION	'N' RQD	%
9/1/75						0.00	122.36			
						0.30	122.06	Soft, grey-brown clayey TOPSOIL.		
						0.50	121.86	Soft, dark brown sandy stoney CLAY.		
			1.00 – 1.30	B		1.00	121.36	Firm, medium and dark yellow-brown, mottled sandy, stoney CLAY.		
								Firm, medium grey-brown silty, shaley CLAY, with mudstone fragments (Highly weathered mudstone)		
			3.00 – 3.30	B		3.00	119.36			
								Highly weathered, grey-brown, silty shaley MUDSTONE.		
			4.70 – 5.00	B		4.50	117.86			
	5.50							Highly weathered medium grey, silty shaley MUDSTONE.		
			5.60	SPT		5.90	116.46		95 for 0.30m	
9/1/75			6.01						4 for 0.15m	
10/1/75						6.25	116.11	CAVITY.		
								CAVITY and LOOSE GROUND.		
	7.70m		7.70 – 7.90	B		7.70	114.66			
			7.90	SPT				Hard, medium grey, ironstained, silty, shaley MUDSTONE, with traces of coal fragments.	36	
			8.35			8.40	113.96			
			8.40	SPT				Very hard, medium grey silty, shaley MUDSTONE.	196 for 0.23m N=261	
			8.78							
			9.30 – 9.60	B						
	9.70		9.80							
10/1/75			10.10	SPT		10.10	112.26	END OF BOREHOLE	137 for 0.15m N=274	

REMARKS

Water added to borehole to assist boring.
Borehole dry on completion of boring.
Clay cutter dropped from 5.90m to 6.25m.
Casing sank from 5.50m to 7.70m.

British Geological Survey

SE 20 NE / 7c

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN LOCATION: CAWTHORNE BOREHOLE No. 3

CUT/FILL(M) - CHAINAGE(M) - OFFSET(M) - SHEET 1 OF 1

BORING METHOD/SIZE(MM) Shell and Auger/150mm.

BORING			SAMPLES		STRATA				TESTING	
DATE	CASING (M)	WATER (M)	DEPTH (M)	TYPE	KEY	DEPTH (M)	LEVEL (M)	DESCRIPTION	'N' RQD	%
7/1/75						0.00	122.28			
						0.20	122.08	Soft grey CLAY and TOPSOIL.		
						0.30	121.98	Light grey fine grained SANDSTONE BOULDER.		
								Firm, grey-brown sandy, stoney CLAY, with sandstone fragments.		
7/1/75	1.70									
						2.20	120.08			
								Firm, grey-brown silty shaley CLAY.		
						4.00	118.28			
								Firm, grey-brown, silty, shaley CLAY, with mudstone fragments (Highly weathered mudstone).		
						5.90	116.38			
								COAL		
						6.50	115.78			
								Dark grey silty MUDSTONE, with COAL laminations.		
						7.10	115.18			
								Medium grey silty, shaley MUDSTONE.		
8/1/75	8.00									
9/1/75										
9/1/75	9.00					9.00	113.28	END OF BOREHOLE.		

REMARKS Water added to borehole to assist boring.
Borehole dry on completion of boring.

British Geological Survey

SE 20 NE /7d

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN — LOCATION: CAWTHORNE — BOREHOLE No. 4

CUT/FILL(M) - — CHAINAGE(M) - — OFFSET(M) - — SHEET 1 OF 1

BORING METHOD/SIZE(MM) Shell and Auger 150mm./ Rotary Coring 61mm.

BORING DATE	BORING CASING (M)	BORING WATER (M)	SAMPLES DEPTH (M)	SAMPLES TYPE	STRATA KEY	STRATA DEPTH (M)	STRATA LEVEL (M)	STRATA DESCRIPTION	TESTING 'N'	TESTING RQD	TESTING %
15/1/75						0.00	122.25				
						0.20	122.05	TOPSOIL.			
			0.60 - 0.90	B		0.60	121.65	Soft, dark brown-grey, sandy stoney CLAY (MADE GROUND)			
								Firm, dark grey-brown mottled silty CLAY, with mudstone fragments, and large coal fragments. (MADE GROUND)			
						2.00	120.25				
	2.30		2.30 - 2.60	B				Soft to firm dark grey-brown silty shaley CLAY, with mudstone fragments. (MADE GROUND)			
						2.80	119.45				
						3.00	119.25	Soft dark brown clay and mudstone, with pottery fragments. (MADE GROUND)			
								Firm, dark grey shaley, highly weathered MUDSTONE.			
	4.25 NX Casing		4.30			4.30	117.95				
15/1/75 16/1/75	4.75		4.75	SPT				Hard, dark grey, ironstained, silty shaley, weathered MUDSTONE.	187		
				CORE 1 (55%)		4.97	117.28				
								COAL		0%	
				CORE 2 (95%)							0%
	6.00					6.12	116.13				
			6.52			6.32	115.93	Medium grey, silty, fractured, weathered MUDSTONE.			
				CORE 3 (100%)				Hard, medium grey silty, slightly fractured brittle MUDSTONE.		43%	
			7.30								
				CORE 4 (100%)						32%	
16/1/75			8.55			8.55	113.70	END OF BOREHOLE.			

REMARKS Water added to borehole to assist boring.
Rotary Coring commenced at 4.75m, using water flush.

British Geological Survey

SE 20 NE / 7e

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN — LOCATION: CAWTHORNE — BOREHOLE No. 5

CUT/FILL(M) — — CHAINAGE(M) — — OFFSET(M) — — SHEET 1 OF 2

BORING METHOD/SIZE(MM) Shell and Auger 150mm. / Rotary Coring 61mm.

BORING			SAMPLES		STRATA				TESTING	
DATE	CASING (M)	WATER (M)	DEPTH (M)	TYPE	KEY	DEPTH (M)	LEVEL (M)	DESCRIPTION	'N' RQD	%
17/1/75						0.00	122.15			
						0.10	122.05	TOPSOIL.		
			0.20 – 0.50	B		0.30	121.85	Soft, dark brown sandy stoney CLAY, with roots.		
								Stiff, medium grey-brown mottled, silty CLAY, with mudstone and traces of coal fragments.		
	1.60		1.60 – 1.90	B		1.50	120.65			
								Firm, dark brown mottled silty CLAY with mudstone fragments.		
	3.00					3.00	119.15			
			3.10 – 3.40	B				Firm, dark grey-brown CLAY, with mudstone fragments. (Highly weathered mudstone)		
	3.90									
17/1/75	NX Casing		4.00			4.00	118.15			
20/1/75			4.14 – 4.23	SPT				Firm medium grey, ironstained, silty shaley weathered MUDSTONE.	100 for 9.14m initial N>500	
	4.40			CORE 1 (95%)		4.40	117.75	Hard, medium grey, ironstained, silty, shaley, fractured MUDSTONE.		24%
			5.05 – 5.35	CORE 2 (26%)						0%
				CORE 3 (95%)						9%
			6.42							
	7.50			CORE 4 (100%)		7.58	114.57	COAL		17%
20/1/75										
21/1/75			8.70			8.80	113.35			
				CORE 5 (95%)				Hard, medium grey, silty, shaley, fractured MUDSTONE.		

REMARKS

Water added to borehole to assist boring.
Coring commenced at 4.23m using water flush.

British Geological Survey

SE 20 NE / 7e

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN — LOCATION: CAWTHORNE — BOREHOLE No. 5

CUT/FILL(M) -- — CHAINAGE(M) - — OFFSET(M) - — SHEET 2 OF 2

BORING METHOD/SIZE(MM) Shell and Auger 150mm, Rotary Coring 61mm.

BORING			SAMPLES			STRATA			TESTING	
DATE	CASING (M)	WATER (M)	DEPTH (M)	TYPE	KEY	DEPTH (M)	LEVEL (M)	DESCRIPTION	'N' RQD	%
21/1/75			10.27	CORE 5		10.27	111.83	Hard, medium grey silty shaley fractured MUDSTONE.		
								END OF BOREHOLE.		

REMARKS

BGS

British Geological Survey

SE 20 NE /7F

FORM 407

BOREHOLE RECORD

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

SITE: CLOUGH GREEN LOCATION: CAWTHORNE BOREHOLE No. 6

CUT/FILL(M) - CHAINAGE(M) - OFFSET(M) - SHEET 1 OF 2

BORING METHOD/SIZE(MM) Shell and Auger 150mm / Rotary Coring 61mm.

BORING DATE	BORING CASING (M)	BORING WATER (M)	SAMPLES DEPTH (M)	SAMPLES TYPE	STRATA KEY	STRATA DEPTH (M)	STRATA LEVEL (M)	STRATA DESCRIPTION	TESTING 'N' RQD	TESTING %
22/1/75						0.00	122.39			
			0.30 – 0.60	B		0.20	122.19	TOPSOIL.		
22/1/75						0.40	121.99	Soft, dark brown, sandy stoney CLAY, with roots.		
23/1/75								Soft, medium grey-brown mottled silty CLAY, with mudstone fragments.		
						1.60	120.79			
	2.00		2.00 – 3.00			2.10	120.29	Soft, dark grey-brown CLAY, with mudstone fragments.		
								Soft dark grey-brown silty shaley CLAY, with mudstone fragments. (Highly weathered mudstone)		
						3.60	118.79			
			3.70 – 4.00	B						
	4.00		4.03			4.00	118.39	Soft, dark grey silty shaley CLAY, with mudstone fragments. (Highly weathered mudstone)		
23/1/75	NX Casing 4.40		4.41	SPT				Hard, medium grey, ironstained, silty shaley weathered MUDSTONE.	200 for 0.23m N=267	
27/1/75				CORE 1 (61%)		4.60	117.39	Hard, grey-brown, ironstained, silty shaley fractured MUDSTONE.		0%
			5.80			5.26	117.13	CAVITY		
				CORE 2 (50%)		6.10	116.29			0%
	6.30		6.40			6.40	115.99	Soft, dark grey, very disturbed mudstone with coal fragments. (OLD MINE WORKINGS.)		
				CORE 3 (52%)		7.10	115.29	Hard, grey-brown, ironstained, silty shaley fractured MUDSTONE.		0%
								CAVITY.		
						8.00	114.39			
			8.30			8.20	114.19	Soft, dark grey, very disturbed mudstone with coal fragments. (OLD MINE WORKINGS.)		
				CORE 4 (90%)		9.00	113.39	Medium to dark grey, silty shaley fractured MUDSTONE.		0%
27/1/75			9.17							
28/1/75	9.50		9.50	CORE 5 (100%)				Hard, medium grey silty, fractured MUDSTONE, with traces of plant fossils.		0%
				CORE 6 (75%)						55%

REMARKS
Water added to borehole to assist boring.
Coring commenced at 4.41m, using water flush.
No water returns during core runs 2,3,4 and 5.

British Geological Survey

SE 20 NE / 7F

FORM 407

SOUTH YORKSHIRE COUNTY COUNCIL
DEPARTMENT OF ENGINEERING
ENGINEERING SERVICES LABORATORY

BOREHOLE RECORD

SITE: CLOUGH GREEN — LOCATION: CAWTHORNE — BOREHOLE No. 6

CUT/FILL(M) – — CHAINAGE(M) – — OFFSET(M) – — SHEET 2 OF 2

BORING METHOD/SIZE(MM) Shell and Auger 150mm / Rotary Coring 61mm.

BORING			SAMPLES		STRATA				TESTING	
DATE	CASING (M)	WATER (M)	DEPTH (M)	TYPE	KEY	DEPTH (M)	LEVEL (M)	DESCRIPTION	'N' RQD	%
28/1/75			10.35	CORE 6 (75%)		10.35	112.04	Hard, medium grey, silty fractured MUDSTONE, with traces of plant fossils. END OF BOREHOLE.	55%	

REMARKS

BGS

APPENDIX C Coal Authority Mining Report

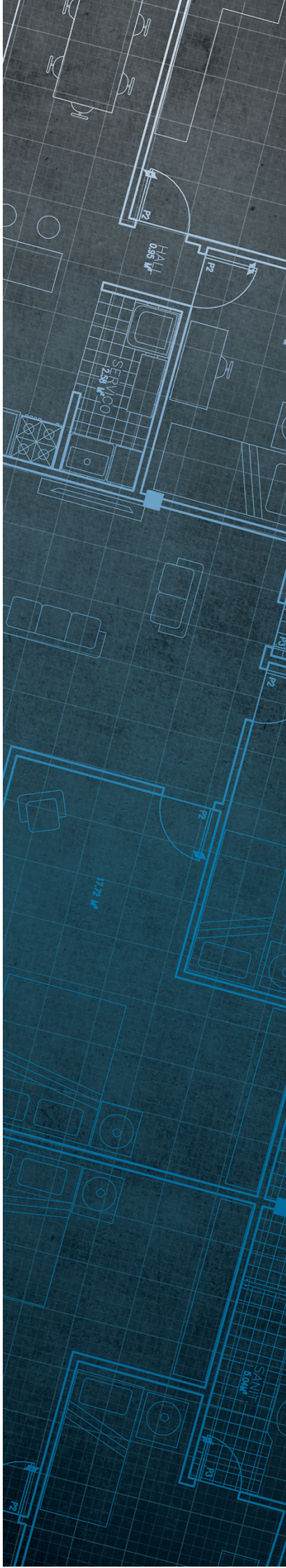
The Coal Authority

Consultants

Coal Mining Report

Naylor Industries Plc
Acton Works
Lane Head Road
Cawthorne
Barnsley
Barnsley
S75 4AD

Date of enquiry:	**19 July 2023**
Date enquiry received:	**19 July 2023**
Issue date:	**19 July 2023**
Our reference:	**51003367775001**
Your reference:	**4256**



Consultants
Coal Mining Report

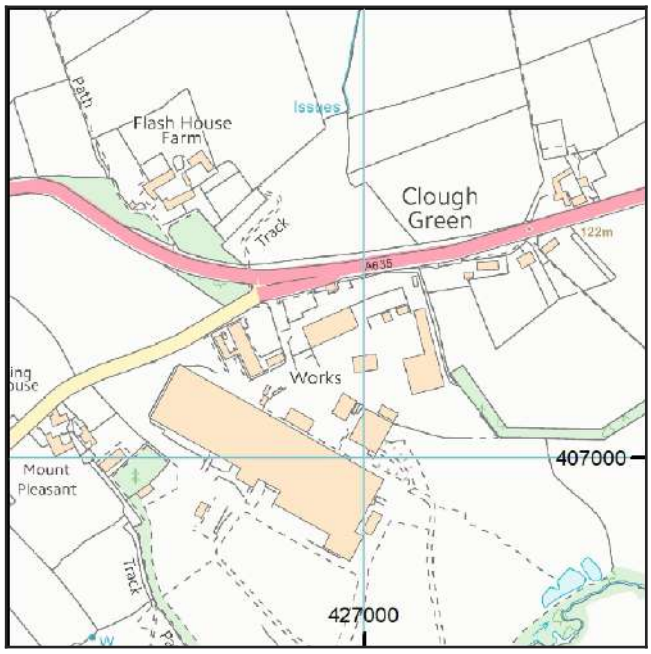
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

FRITH BLAKE CONSULTING

Enquiry address

Naylor Industries Plc
Acton Works
Lane Head Road
Cawthorne
Barnsley
Barnsley
S75 4AD



Approximate position of property

Map data

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200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

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

Section 1 – Mining activity and geology

Past underground mining
No past mining recorded.

Probable unrecorded shallow workings
Yes.

Spine roadways at shallow depth
No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	426407-001	426984 407182		Coal	
Shaft	426407-002	427000 407141		Coal	
Adit	426407-003	426969 407076		Coal	
Shaft	426407-004	426884 407179		Coal	
Shaft	426407-005	426901 407141		Coal	
Adit	426407-006	426972 407108		Coal	
Adit	426407-007	426956 407094		Coal	
Adit	426407-008	426989 407087		Coal	
Adit	426407-009	426991 407077		Coal	
Adit	426407-010	426992 407069		Coal	
Adit	426407-011	426970 407089		Coal	
Shaft	427407-003	427031 407088		Coal	
Adit	427407-006	427016 407086		Coal	

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Abandoned mine plan catalogue numbers

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

SY255	OM15182	OM14270
NE9		

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
LOW WHINMOOR	Coal	Yes	11.7	North-West	203

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

Please refer to the “Summary of findings” map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

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Section 2 – Investigative or remedial activity

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

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

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

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

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

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

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

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

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Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

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

Court orders
None recorded.

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

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

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

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

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Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Future development

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

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

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Section 5 – Data definitions

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

Past underground coal mining

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

Probable unrecorded shallow workings

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

Spine roadways at shallow depth

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

Mine entries

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

Abandoned mine plan catalogue numbers

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

Outcrops

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

Geological faults, fissures and breaklines

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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The Coal Authority

Summary of findings

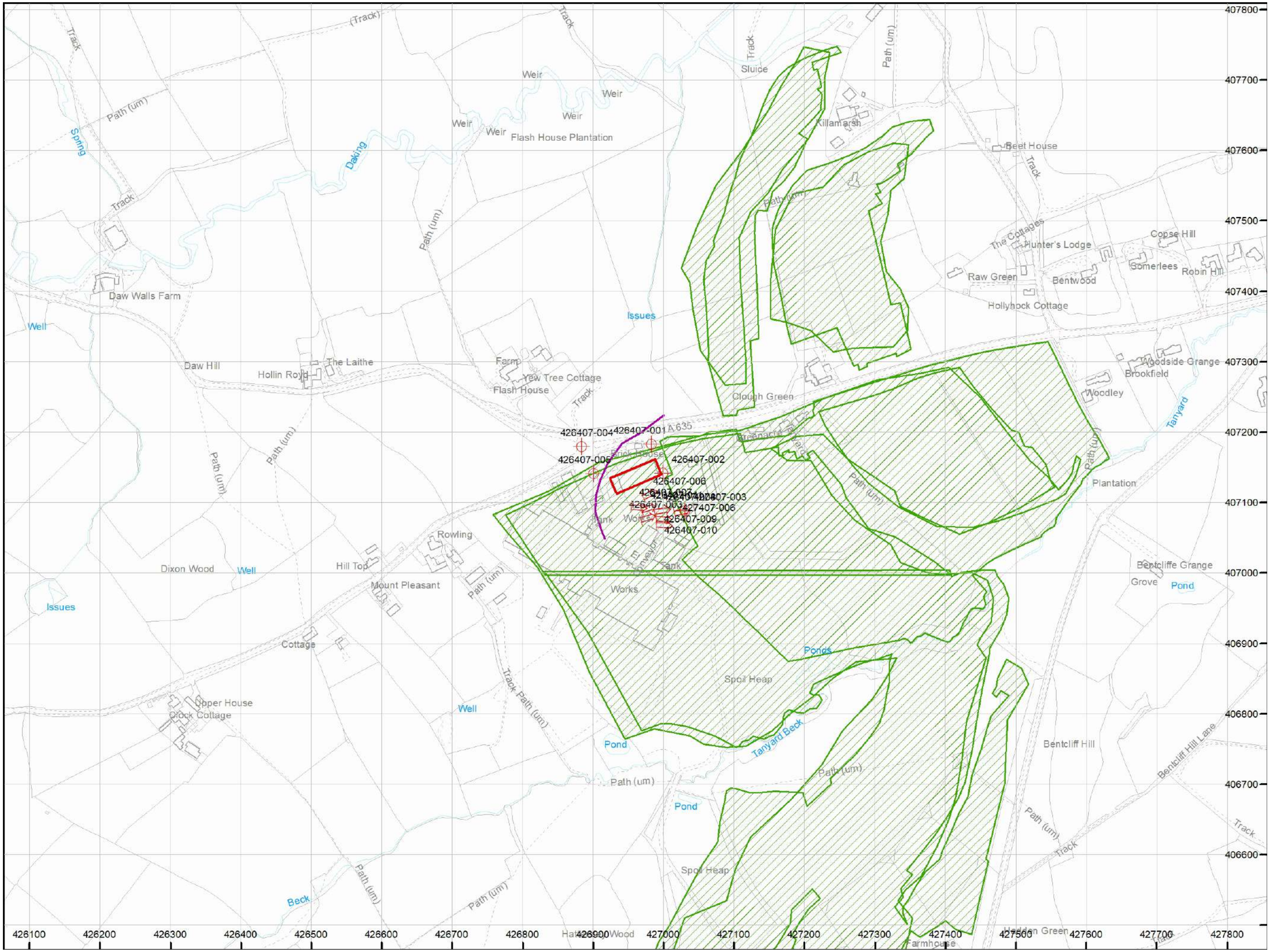
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Map data

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

Key

- Approximate position of the enquiry boundary shown
- Disused mine shaft
- Disused adit
- Outcrop (Proven)
- Unlicensed opencast site



How to contact us

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+44 (0)1623 637 000 (International)
www.groundstability.com

APPENDIX D Coal Authority Correspondence (October 2022)

Danilo Bettosi

From: Keith Ollivant <KeithOllivant@coal.gov.uk>
Sent: 17 October 2022 14:25
To: Keren McBratney
Cc: Malcolm Scott; Michael Owens; PS&SPSO
Subject: RE: I-367445-2022-10-17-Request for an Update - Rejection of incident

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe. If in doubt, forward this email to the helpdesk.

Hello Keren – apologies for the delay in responding. I hope you had a good break.

I can now confirm that there is no recorded shaft or adit at the location of the slumped concrete slab. There are shallow clay workings beneath the Yard approximately 7m beneath the surface and a small band of ancillary coal only 25cm thick was taken during that extraction. The much thicker fireclay was extracted by bord and pillar methods to maintain surface support. It is possible that the wash-out from the fire displaced some near surface foundation soils into the past voiding, but I can confirm that this is not considered a coal mining subsidence event under the 1991 Act as it is clearly a Fireclay Mine with no economically recoverable coal other than by the working of the economically viable fireclay.

I trust this is satisfactory. Please do not hesitate to contact me should you have any further concerns.

Regards

Keith Ollivant
Project Manager – Yorkshire and NW
Public Safety & Subsidence

The Coal Authority
200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

Email: keithollivant@coal.gov.uk
Tel: 01623 637429
Mobile: 07770 678394
W : gov.uk/coalauthority

From: PS&SPSO <PS&SPSO@coal.gov.uk>
Sent: 17 October 2022 13:51
To: Keith Ollivant <KeithOllivant@coal.gov.uk>
Cc: Malcolm Scott <MalcolmScott@coal.gov.uk>; Michael Owens <MichaelOwens@coal.gov.uk>
Subject: I-367445-2022-10-17-Request for an Update
Importance: High

Afternoon,
Please see the email below from Keren McBratney requesting an update
Kind regards
Lou

Louise Sharpe
Project Support Officer – Public Safety & Subsidence

T: +44 (0)1623 637 328
M: 07768 926 684
E: louisesharpe@coal.gov.uk
W: www.gov.uk/coalauthority

Emergency Hazard Line 24/7: 0800 288 4242
Coal Authority General Enquiries: 0345 762 6848

From: Keren McBratney <Keren.McBratney@naylor.co.uk>
Sent: 17 October 2022 13:06
To: PS&S Admin <PS&SAdmin@coal.gov.uk>
Cc: Malcolm Scott <MalcolmScott@coal.gov.uk>
Subject: I-367445-2022-10-17-Request for an Update

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Good Afternoon

Apologies for sending a further email and I know we spoke before I went on holiday however I have still had no further update regarding the Cawthorne site and would urgently request confirmation of the outcome.
Note Malcolm ; I apologise for copying you in and am aware that you were not involved in this site visit however am hoping you may be able to assist with us making some progress.
Kind Regards and Many thanks
Keren

From: Keren McBratney
Sent: 28 September 2022 09:25
To: PS&S Admin <PS&SAdmin@coal.gov.uk>
Subject: RE: I-367445-2022-08-19-Site Plan, & Photo

Good Morning

Apologies for chasing again however we have an increasing urgent requirement to utilise the yard space that is currently fenced off so would very much like to get some confirmation of the situation.
I have had a telephone conversation with Keith Olivant, who suggested that it may be that there was no coal mine shaft and that the area had been used for fire clay workings but that he would let us know however I still await confirmation of this so that we can start to do some work to clear out the area.
Many thanks for your assistance
Kind Regards
Keren

From: Keren McBratney
Sent: 08 September 2022 09:01
To: PS&S Admin <PS&SAdmin@coal.gov.uk>
Subject: RE: I-367445-2022-08-19-Site Plan, & Photo

Good Morning

We did receive a visit on 22nd August at Naylor Cawthorne site and agreement that we would have a follow up visit in around 4 weeks to take some samples but I have not received confirmation of this and do not have a contact email for Keith.
Please could you chase this up for me.
Many thanks
Keren

From: Sandra Turner <SandraTurner@coal.gov.uk> On Behalf Of PS&S Admin
Sent: 19 August 2022 12:29
To: Keren McBratney <Keren.McBratney@naylor.co.uk>
Subject: RE: I-367445-2022-08-19-Site Plan, & Photo

Afternoon Keren

Just to let you know that this has been logged on and passed to Keith Ollivant – Project Manager for this incident – he will contact you on Monday

Have a good weekend

Kind Regards

Sandra

The Coal Authority
Sandra Turner
PS&S Admin Officer
T : (01623) 637429
W : ps&sadmin@coal.gov.uk

Emergency Hazard Line 24/7: 0800 288 4242
Coal Authority General Enquiries: 0345 762 6848

From: Keren McBratney <Keren.McBratney@naylor.co.uk>
Sent: 19 August 2022 11:24
To: PS&S Admin <PS&SAdmin@coal.gov.uk>
Subject: I-367445-2022-08-19-Site Plan, & Photo

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Hello

Please see attached plan, map and photo OF the concerns S75 4AD

Kind Regards
Keren McBratney

Keren McBratney
Naylor Industries PLC – Group EHS Director
07870918820
kerenmcbratney@naylor.co.uk
Clough Green, Cawthorne, Barnsley. S75 4AD. UK
www.naylor.co.uk



Registered Office: Clough Green, Cawthorne, Barnsley, South Yorkshire, S75 4AD, England, UK
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Making a better future for people and the environment in mining areas. Like us on Facebook or follow us on Twitter and LinkedIn.

GENERAL NOTES

1. Earth Science Partnership (ESP) believes that providing information about limitations is essential to help clients identify and therefore manage their risks. These risks can be mitigated through further investigation or research, but they cannot be eliminated. This report may not be used for any purpose other than that for which it was commissioned.

2. This report includes available factual data for the site as obtained only from the sources described in the text. The data are related to the site on the basis of the site location and boundary information provided by the client. The findings and opinions conveyed in this assessment are based on the information obtained from a variety of sources as detailed in the report, which ESP believe are reliable. Nevertheless, ESP cannot and does not guarantee the authenticity or reliability of the information it has relied on. It is possible that the assessment failed to indicate the existence of further sources of information on the site. Assuming such sources do exist, their information could not have been considered in the formulation of the opinions and findings in this report. It should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.

3. In preparing this report it has been assumed that all past and present occupants of the site have provided all relevant and other information, especially relating to known or potential hazards. This report is not required to identify insufficiencies or mistakes in the information provided by the user/owner or from any other source, but has sought to compensate for these where obvious in the light of other information.

4. Reports are normally prepared and written in the context of a stated purpose, and should not, therefore be used in a different context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission.

5. The opinions presented in this report are based on the findings derived from a site inspection, investigations and a review of historical and other records. The report details any indicators that may suggest that hazardous substances exist at the site at levels likely to warrant mitigation. Not finding such indicators does not mean that hazardous substances do not exist at the site. The most recent site inspection was undertaken as detailed within the report. Circumstances on sites are subject to change and certain indicators of the presence of hazardous substances that may have been latent at the time of this inspection may subsequently have become observable.

6. The work carried out for the assessment can only investigate a small portion of the subsurface conditions. Certain indicators or evidence of hazardous substances may have been outside the limited portion of the subsurface investigated, latent at the time of the work or only partially intercepted by the works, and thus their full significance could not be appreciated. In this regard, groundwater levels are particularly susceptible to variation and it should be noted that groundwater levels are subject to diurnal, seasonal, and climatic changes and are solely dependent on the time the ground investigation was carried out and the weather before and during the investigation.

7. Accordingly, it is possible that the assessment failed to indicate the presence or significance of hazardous substances. Assuming such substances exist, their presence could not have been considered in the formulation of the report's findings and opinions. The conclusions resulting from this study and contained in this report are not necessarily indicative of future conditions or operating practices at or adjacent to the site. Where differing ground conditions or suspect materials are encountered during future site works, additional specialist advice should be sought to assess whether the new information will materially affect the recommendations currently provided herein and whether further consideration is required. Any limiting factors should be assessed by an appropriately qualified specialist.

8. The assessment was prepared for the sole internal use and reliance of the Client. The report shall not be relied upon by or transferred to other parties without the express written authorisation of the Earth Science Partnership. If an unauthorised party comes into possession of the report, they rely on it at their peril and the authors owe them no duty of care and skill.

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